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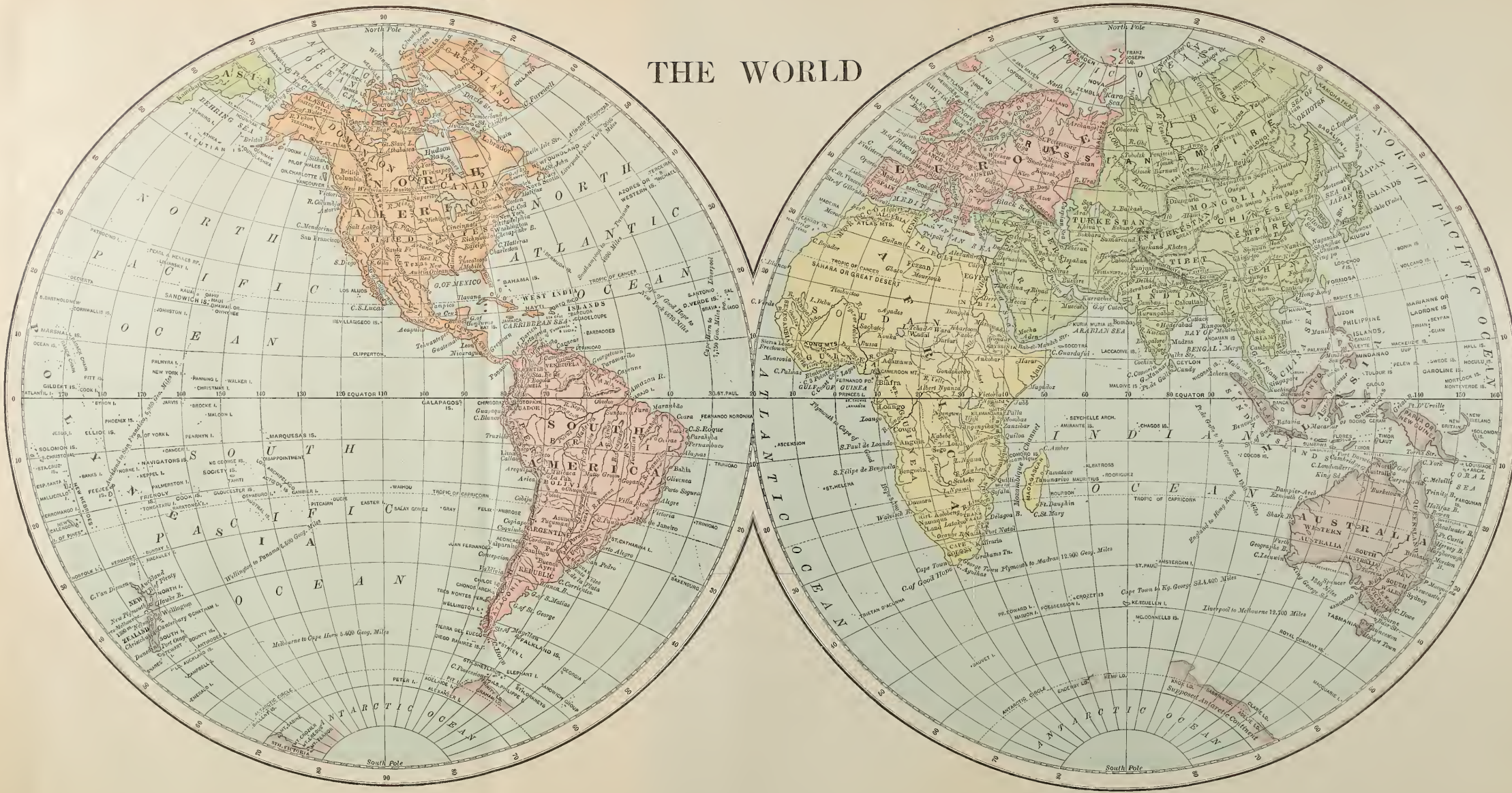


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UMBRE'LLA (Lat. *umbra*, a shade). As a shade from the sun, the umbrella is of great antiquity. In the sculptures of Egypt, Nineveh, and Persepolis, umbrellas are frequently figured, closely resembling the chaise umbrella of the present day. In the east, however, its use seems to have been confined to royalty; but in Greece and Rome it was more extensive. The custom was probably continued in Italy from ancient times; but at the beginning of the 17th c. the invention seems to have been little if at all known in England. In that century, however, it came into use as a luxurious sun-shade; and in the reign of Queen Anne it had become common in London as a screen from the rain, but only for the weaker sex. The first person of the male sex who had the moral courage to carry an umbrella in the streets of London was Jonas Hanway, the founder of the Magdalene Hospital, who was newly returned from Persia, and in delicate health. Still, it was long regarded as a sign of infirmity or effeminacy to use them, and those who did so suffered much unpleasant jeering in consequence. They were at first all brought from abroad, chiefly from India, Spain, and France; now the manufacture of umbrellas has reached an enormous extent in Great Britain—the exports alone amounting to the value of £200,000; whilst, instead of effeminacy, it is considered now a sign of poverty or improvidence not to be possessed of one.

U'MBRIA, one of the ancient divisions of Italy, west of Etruria, and north of the country of the Sabines. It is usually described as extending from the Tiber eastward to the Adriatic; but while this was probably the case in prehistoric times, it was not so during any part of the period of which we have authentic knowledge. Tradition, indeed, leads us to believe that at one time the Umbrian territory extended from sea to sea, embracing much, if not the whole, of the country subsequently occupied by the Etruscans; but when the Umbrians first come before us as a distinct people, we find them restricted to the ridges of the Apennines, the lowland region bordering on the Adriatic from the Æsis (mod. *Esino*) to the Rubicon, being held by a race of Gallic invaders, known as the Senones. The most notable towns of U. were Narnia, Interamna, Acriculum, Spoletium, Mevania, Fulginium, Assisium Tifernum, Nuceria, Camerinum, Sentinum, Urbinum, Sena Gallica, Fanum Fortunæ, and Ariminum.

The Umbrians were considered in ancient times to be the oldest people of Italy, and were, in consequence, vaguely spoken of as 'aborigines;' but neither the knowledge of the ancients, nor the methods of investigation which they pursued, allowed them to arrive at any trustworthy ethnological results. Modern researches into their language (of which we possess one important memorial in the tables of Iguvium; see EUGUBINE TABLES) have demonstrated that they spoke a tongue closely allied to the Oscan (see OSCI), and were therefore, in all probability, members of the Latino-Italian race. These researches further tend to confirm the tradition of their great antiquity, for an analysis of the structure of the Umbrian language proves it to be the oldest of the Italian dialects.

The Umbrians make their first authentic appearance in the wars between the Romans and the Etruscans. They would seem to have been destitute of any political organization or unity, for we find that some of their tribes took part with the Romans, and others —probably the majority—with the Etruscans. At any rate, they were subjugated along with the latter people; and we do not read of them again until the third Samnite war, when, in conjunction with the Etruscans and Gauls, they joined the Samnites in their last gallant struggle against the imperious supremacy of Rome (q. v.). The confederacy was utterly vanquished in the great battle of Sentinum (295 B.C.), and the Umbrians were again reduced to submission. The establishment of Roman colonies in the *Gallicus Ager*, or territory of the Senonian Gauls, seems to have completely overawed, and gradually even to have Romanized them. They stood faithfully by Rome in the dark years of the Hannibalic war, and were among the first to furnish Scipio with volunteers for the invasion of Africa. In 90 B.C., they obtained the Roman franchise, and thenceforth disappear from history as a distinct people.

UMPIRE is a third arbitrator appointed by two arbitrators in the event of their differing in opinion; and when the reference or arbitration has devolved upon the umpire, his award or umpirage becomes final and binding on the parties.

UMRO'HAH, a town of British India, in the district of Moradabad, N.W. Provinces, 80 miles east-north-east of Delhi. Pop. (1871) 32,314.

UNALA'SHKA, an island in the North Pacific, belongs to the Fox group of the Aleutian Islands, in lat. 55° 52′ N., and 166° 32′ W. It is 75 miles long, and in some parts 20 miles broad, has a rugged mountainous surface, and is thinly peopled. Ships are here supplied with all necessaries except wood.

UNCA'RIA. See GAMBIR.

U'NCIAL LETTERS—so called as being an inch (Lat. *uncia*) long—characters of a large and round form, used in some ancient MSS. The earliest form of an alphabet is its capitals, and the oldest Greek and Latin MSS. are written entirely in capitals. Uncial letters, which began to take the place of capitals in the middle of the 5th c., differ from them in being composed of rounded, and not straight lines, and exhibiting a tendency towards greater expedition in style. Uncial writing arose as writing on papyrus or vellum became common, the necessity for more rapid execution leading to the practice of curving the lines. Its being more easily learned than the cursive style, was probably the cause of its becoming the favorite mode of writing books of importance among the monkish scribes; while legal instruments, which required greater despatch, were executed by professional scribes in a corrupted form of the Roman cursive hand. Uncial writing prevailed from the 6th to the 8th, or even 10th century. The following specimens of uncial Greek and Latin writing are from a M.S. of the four Gospels and Acts of the Apostles in both languages, written early in the 6th c., and presented to the university of Cambridge by Theodore Beza in 1581. The passage is from John xxi. 19—'signifying by what death he should glorify God.'



Greek.



Latin.

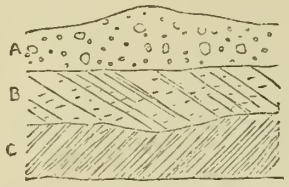
During the 6th and 7th centuries, a transitional style of writing prevailed in Italy, and to some extent elsewhere, in which the letters approximated more nearly to the Roman cursive hand: this passed by a gradual transition into the *minuscule* manner, or small hand, which, from the beginning of the 10th c., became usual in MSS.—See Silvestre's *Universal Palæography*, translated and edited by Sir F. Madden (Lond. 1850); *Traité de Diplomatique*, par deux Religieux Benedictins de la Congrégation de St. Maur (Par. 1755).

UNCLEA'NNESS, in the Old Testament betokens a state of bodily infirmity which, for the time being, excluded the sufferer from the 'holy community,' and which, by the various ceremonies connected with the gradual recovery from this exceptional state, went far to impress the people with the constantly reiterated connection between them and God, and their own destination of being 'a holy people.' No less did the strict cleanliness enforced by the constant fear of becoming an 'outcast' for however brief a period, and the strict supervision exercised by the priests, to whom the sanitary well-being was to a certain extent intrusted, act in a salutary manner. Birth, death, the different sexual functions and infirmities, were all, in different manner, causes of uncleanness, and treated according to their different degrees. To a certain extent, some incongruous admixtures of plants, animals, even materials, in one garment, &c., may also be reckoned among things that 'defiled' or gave rise to a certain uncleanness. Fruits of a tree during its first three years were not to be eaten, as 'uncircumcised' or unclean. About the special ways in which uncleanness was treated, we have spoken under PURIFICATION, where also the similarity that has been found between the Jewish laws on these points and those of the Persians and Indians, is touched upon. The uncleanness of the leper is specially treated under LEPROSY.

UNCONFO'RMABLE STRATA are strata which rest on the more or less inclined edges of older beds. The existence of unconformability in a series of strata is an indication of an interval sufficiently long to permit of the consolidation, disturbance, and upheaval, denudation, and subsequent depression of the inferior beds. No indication of the period that has intervened is to be found in the unconformability itself; but some idea of it may be obtained by an examination of the strata that are known to have been deposited subsequent to the inferior rocks, and previous to the overlying unconformable deposits. Thus, in the north of Annandale, the Silurian basement rocks, which have often an almost perpendicular dip, are covered by Permian sandstone, and this, again, by the boulder-clay, or alluvial deposits.

The first break in the strata represents the time during which the Devonian and Carboniferous rocks were deposited, when, in all probability, the Silurian strata formed a dry land surface, and supplied some of the materials for these rocks. The second break is all the indication in that district of the lengthened period dur-

ing which the whole of the Secondary and Tertiary strata were being deposited elsewhere. The temporal value of the break is not so easily determined in the majority of cases. It is only in one place in Britain, in a cutting in the St. Helen's Railway near Ormskirk, where any apparent unconformability exists between the Bunter and Keuper strata, and even there it is so slight



Diagrammatic Section of Strata near Moffat:
A, Boulder clay, or alluvial deposits; B, Permian sandstone; C, Silurian rocks.

that it was long overlooked; yet this break represents a gap which on the continent is filled by the important sets of strata, the Muschelkalk and St. Cassian beds, containing two great assemblages of fossils perfectly distinct from each other. Very frequently, however, no beds are known which fill up the gap between the two unformable series. Professor Ramsay has shown that in the Palæozoic epoch between the Laurentian gneiss and the Permian beds there are ten breaks. Each of these is accompanied by a sudden and remarkable change of fossils, sometimes in the genera, and always in the species. Professor Ramsay believes these gaps represent a *much greater* interval of time than that to which all the existing Palæozoic formations of Great Britain bear witness. Such blanks in the stony records of the world's history are as frequent in the Secondary and Tertiary epochs as in the Palæozoic.

The not taking into account the existence of unconformable stratification, has frequently caused a useless expenditure of money in searching for minerals. It seemed natural to expect that the Permian rocks of Upper Annandale covered beds of the true Coal-measures, but an examination of the numerous natural sections where the base of the Permian sandstone is seen, shows that it rests on the Silurian rocks; and the necessarily abortive attempts that have been made to reach coal through the Red Sandstone have been simply a useless throwing away of money.

UNCTION (Lat. *unctio*, an anointing, from *ungo*, I anoint), the practice of anointing the body, or certain portions of the body, with oil, especially with the oil of olives. It was resorted to by the ancients from motives of health (see OILS), of athletic development, or of luxury; but the practice is noticeable here chiefly in its relations to religion. Anointing with oil seems to have been supposed to carry with it the same effects in spiritual things which it produces in the natural world. It was a rite in frequent use among the Egyptians, as well as the Greeks and Romans; and the Scriptural narrative of the ante-Mosaic religion contains distinct evidence of its use (Gen. xxviii. 18, xxxi. 13). In the Mosaic ceremonial, its use is still more frequent. Priests and kings were anointed on being set apart for their several offices; as were also sacred vessels. The oil employed in these religious unctions was prepared of the most precious perfumes and balsams, and Ezekiel rebukes the Jews (xxiii. 41) for making a similar unguent for their personal uses. The special significance of the rite of unction may be inferred from the circumstance that the popular name of the expected Messiah was the Christos, i. e., the Anointed. In Christian use, anointing from a very early time possessed the same sacred significance. See EXTREME UNCTION. Besides the anointing of the sick, however, there are many other sacred unctions traceable in ancient Christian practice; namely, in baptism, in confirmation, in the ordination of priests and other clergy, in the consecration of churches and altars, the benediction of sacred vessels and utensils, &c. It has also been employed in the coronation of kings; and in some countries, curious traditions and legends are preserved connected with the unction of the king, or arising out of it. See RHEIMS.

UNDERGRA'DUATE, a student of a university or college who has not yet taken his first degree.

UNDI'NES (perhaps from *unda*, a wave), the name given in the fanciful system of the Paracelsists to the elementary spirits of the water. They are of the female sex. Among all the different orders of elementary spirits, they intermarry most readily with human beings, and the Undine who gives birth to a child under such a union, receives with her babe a human soul. But the man who takes an Undine to wife must be careful not to go on the water with her, or at least not to anger her while there, for in that case she will return to her original element. Should this happen, the Undine is not supposed to consider her marriage dissolved; she will rather seek to destroy her husband, should he venture on a second marriage. Baron de la Motte Fouqué has made this Paracelsist fancy the basis of an exquisite tale, entitled *Undine*.

UNDULATORY THEORY OF LIGHT. Optics ranks next to Dynamics in the category of nearly *exact* sciences—that is, of sciences whose fundamental principles are so well known, that the result of almost any new experimental combination can be predicted mathematically. Given the forces acting on a body, the Laws of Motion (q. v.) enable us, by purely mathematical processes, to determine the consequent motion. Though we have not as yet arrived at equal perfection in Optics, we are certainly far on the way, and probably have now attained nearly all the progress (independent of improvements in our mathematical methods) which will be made until the next great step in molecular physics shall give us the clue to the nature of the minute motions on which Light, Heat, Electric Currents, and Magnetism depend. The most extraordinary and almost incredible predictions of theory have been verified by experiment, and at present the differences between theory and experiment may be divided into two classes, corresponding to the above exceptions. The first are those depending on the imperfections of mathematical processes, where, because, for example, as we are yet unable to obtain the exact solution of a certain differential equation, we have to content ourselves with an approximate one. But every improvement in our means of approximation is found to introduce a closer agreement between theory and experiment. This difficulty may safely be left to mathematicians. It is otherwise with the second difficulty. This depends on our ignorance of the ultimate nature of matter, and our consequent inability to apply mathematical reasoning in a perfectly correct and sufficiently comprehensive manner. Here the experimenter's work is still required, and it is in this direction that we must in all probability now look for important extensions of our knowledge.

Optics is divided into two parts, *Physical* and *Geometrical*. Of these, the latter contents itself with assuming certain obvious experimental truths, such as the fact that light in a uniform medium moves in straight lines, the ordinary laws of reflection and refraction, &c., and, making these its basis, employs mathematics to develop their further consequences. It is thus that theory has shown how to carry to their utmost perfection such exquisite specimens of art as the best telescopes and microscopes of the present day. But these investigations, and their practical application, are wholly independent of the *nature* of light, and cannot be affected by discoveries in that direction.

It is otherwise when we come to Physical Optics. This commences with the question: '*What is light?*' and endeavors to deduce from the nature of light the experimental laws which, as we have seen, are assumed as the basis of Geometrical Optics.

By two perfectly distinct classes of astronomical observations—Aberration (q. v.), and the Eclipses of Jupiter's satellites—we know that light takes *time* to pass from one body to another—the velocity, however, being enormous—about 200,000 miles per second. Hence it follows that either *Matter* (q. v.) or *Energy* (see FORCE) must be transferred from a body to the eye before we can see it. Here we have at once the rival physical theories of light, which have alternately had the advantage of one another in explaining observed phenomena. It is only of late years that an *experimentum crucis* has finally decided between them—by showing one of them to be utterly incompatible with a result of observation.

Newton adopted the corpuscular theory, in which light is supposed to consist of material particles—i. e., he adopted the first of the two possible hypotheses; and he gave the first instance of the solution of a problem involving molecular forces, by deducing from this theory the laws of reflection and single refraction. We shall see immediately that this beautiful investigation led to the destruction of the theory from which it was deduced. But, independent of this, there are many grave and obvious objections to the corpuscular theory; for it involves essentially the supposition of material particles impinging on the eye with the astounding velocity of 200,000 miles per second! If such particles weighed but the millionth of a pound, each would have something like ten times the Momentum (q. v.), (i. e., the battering power), and *six million* times the Vis-viva (see WORK), or kinetic energy (i. e., the penetrating power), of a rifle-bullet. Suppose them a million times smaller—yet as millions of millions of them must be supposed to enter the eye at once, coming from every point of the surface of every visible object, it seems impossible to reconcile such a hypothesis with the excessive delicacy of the organs of vision.

It is not pretended by the advocates of the rival hypothesis, the Undulatory Theory of Light, that they understand exactly the nature of the transference of energy on which they suppose light to depend; but they take from the analogy of sound in air, and of waves in water, the idea of the existence in all space of a highly elastic fluid (or quasi-solid), provisionally named the *Ether* (q. v.), and they suppose light to consist in the propagation of waves in this fluid. Huygheus has the credit of having propounded, and ably developed and illustrated, this theory.

As we have seen above, no third hypothesis as to the nature of

light is admissible. Many strong arguments against the truth of the corpuscular theory had been furnished by experiment, especially in the early part of the present century; and as they were always met by further and more extraordinary properties which had to be attributed to the luminous corpuscles, the theory had become complicated in the most fearful manner; and this of itself was an almost complete disproof. Still, it held its ground, for Newton's old objection to the rival theory, viz., that on the undulatory hypothesis there should be no shadows at all (witness the analogy of sounds heard round a corner), was as yet unanswered. This difficulty was overcome by Young (q. v.), to whose sagacity we are indebted for the idea of *Interference* (q. v.), which completely explained the apparent discrepancy. But the question between the rival theories was finally settled by Fizeau and Foucault, who, by processes entirely different, but agreeing in their results, determined the velocity of light in air and in water.

Now, Newton had shown that refraction, such as that of light by water, if predicated of moving *particles*, requires that they should move faster in water than in air. Huyghens, again, had shown, that if such refraction be predicated of *waves*, they must move slower in water than in air. Fizeau and Foucault found, by direct measurement, that light moves slower in water than in air. Hence it is certain that *light consists in the transference of energy, not of matter;* and the Undulatory Theory is based upon this fact.

But, as to the manner in which energy is thus transferred, we are entirely ignorant. The common assumption is, that waves of distortion are propagated in the ether. The nature of this motion will be described under WAVE. But many other modes have been suggested, one of the most notable of which is that of Rankine. Here the particles of ether are not supposed to be *displaced*, but each is merely made to turn about an axis as the wave of light passes it; the particles having Polarity (q. v.), by virtue of which they arrange themselves in similar positions when no light is passing, and by which, also, any rotation of one particle produces a consequent rotation of those in its neighborhood. For the explanation of most of the common phenomena of optics, it is quite indifferent which of these assumptions we make, and, indeed, theory has not yet been carried far enough to enable us to devise experimental methods of testing which is the more likely to be the case in nature. It cannot be too strongly insisted on that all we know at present is, that light certainly depends on the transference of energy from one part of the luminiferous medium to another; what kind of energy is transferred, vibratory or oscillatory motion, or rotation, &c., is a problem which may possibly for ever remain unsolved. But vibratory wave-motion being that with which we are most familiar, as in earthquakes, sound, waves in water, &c., we naturally choose this as the most easily intelligible basis of explanation and illustration. And we shall now briefly show how the laws of linear propagation, reflection, single refraction, interference, diffraction, dispersion, polarization, and double refraction may be accounted for.

We assume, then, that light consists in a succession of waves, and for our earlier inquiries it does not matter whether they be (like those of sound) waves of condensation and rarefaction, in which the vibrations take place *in* the direction of the ray, or (like those in water) waves of distortion or displacement without condensation, in which case the luminous vibrations must be assumed to take place in some direction *perpendicular* to the ray. The phenomena of polarization and double refraction show us that the former of these hypotheses is untenable.

Propagation of Light in a Uniform Isotropic Medium. (An isotropic medium is such that if a cubical portion be taken, it possesses precisely the same properties whatever be the directions of its sides. Glass and water are isotropic, rock salt and ice are not.)—Suppose AB (fig. 1) to represent at any time the *front* of a

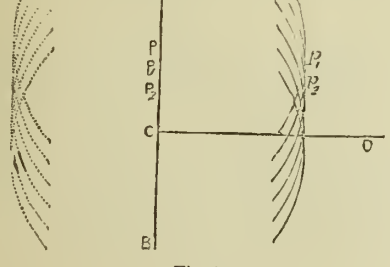


Fig. 1.

plane wave which is passing in the direction CD; i. e., suppose all particles of the ether in the plane AB (perpendicular to the plane of the paper) to be similarly and equally displaced. According to Huyghens, we must suppose every particle, P, to be itself the source of a wave, which, from the uniformity of the medium, will spread with the same velocity in all directions. With center P, and radius the space which light passes over in any assigned interval t, describe a sphere represented in section by a circle in the figure. Do the same for adjacent points, P_1, P_2, &c. Let p_1 be the intersection of the circles whose centers are P and P_1. p_2 that of the circles whose centers are P_1 and P_2, and so on. Then, as p_1 is *equidistant* from P and P_1 and (approximately) from all points of a small circular space between P and P_1 on the wave-front AB, all the separate wave-disturbances coming from these points to p_1 will be in the same *phase* (see WAVE), and will therefore combine so as to strengthen each other; while in other directions they will be in different phases, and combine to destroy each other. The locus of all such points as p_1, p_2, &c., will therefore, at the end of the time t, contain all particles of the ether equally and similarly disturbed, and will thus be the new wave-front. But it is obviously a plane parallel to AB. Also the disturbance at P has passed to p_1; and, when the distance PP_1 is taken as very small, Pp_1 is perpendicular to the wave-front AB. Hence, in such a medium, a plane wave remains plane, and moves with uniform velocity in a direction perpendicular to its front. [There is a difficulty as to what becomes of the disturbance, which, according to Huyghens's assumption, ought to travel *back* into the dotted portions of the spheres; and it is not easy to account for the absence of this on mechanical principles. But we are content here to take for granted that no waves are propagated backwards from the main wave, as a fact clearly proved by experiment.] Since a small portion of the surface of any curved wave may be considered as plane, we now see how any such wave will be propagated in an isotropic medium. Erecting perpendiculars at every point of the surface of the curved wave, and laying off along these lines the space which light passes over in a given interval, the extremities form a new surface, which is the wave-front after the lapse of that interval.

Reflection at a Plane Surface.—Suppose AB (fig. 2) to be a plane

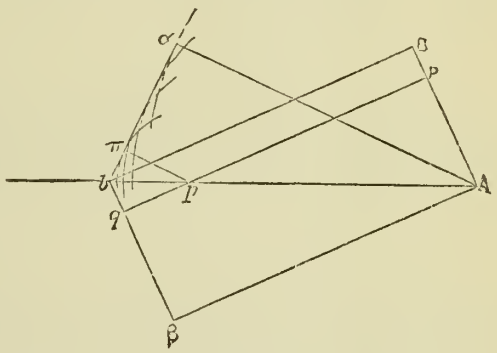


Fig. 2.

wave-front, moving in the direction Bb perpendicular to AB. Let Ab be the reflecting surface, and let the intersection of the plane of the wave-front with the reflecting surface be a line through A perpendicular to the paper. When B has arrived at b, A would have arrived at β, and P at q (where $b\beta$ is parallel to BA, and Pq and Aβ to Bb), had it not been for the reflecting surface. Hence, when B is at b, A has diverged into a sphere of radius Aβ, P from p into a sphere of radius pq; and so for each point of the wave-front. Now, the spheres so described about A and p as centers obviously touch the plane $b\beta$; consequently, they touch the other plane $b\alpha$, which makes the angle A$b\alpha$ equal to A$b\beta$. Now, $b\pi\alpha$ is the front of the reflected wave, and Aα is the direction in which it is proceeding. Hence, obviously, the ordinary laws of Reflection. See CATOPTRICS.

Refraction at a Plain Surface into an Isotropic Medium.—Here we

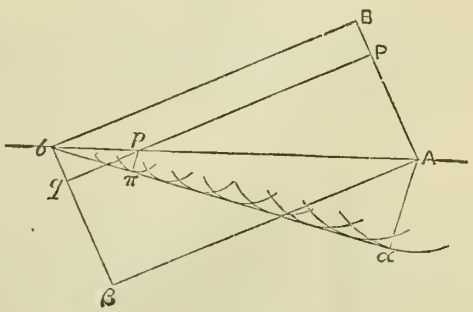


Fig. 3.

take account of the change of velocity which light suffers in pass-

ing from one medium to another. In fig. 3, A, P, B, b, p, q, and β represent the same as before—but suppose Aα now to represent the space through which the wave travels in the second medium, while it would travel from B to b in the first. With center A, and radius Aα, describe a sphere. Let $b\alpha$ touch this sphere in α. Then $b\alpha$ is the front of the refracted wave. For, if $p\pi$ be drawn perpendicular to $b\alpha$, we have

$$p\pi : A\alpha : : bp : bA : : pq : A\beta$$

Hence, while A travels to α, and B to b, P travels to p, and thence to π. And the sines of the angles BAb and A$b\alpha$, which are the angles of incidence and refraction, are to each other as Bb to Aα, i. e., as the velocity in the first medium is to that in the second. See DIOPTRICS.

It is obvious from the cut, that, the *less* is the velocity in the second medium, the more nearly does the refracted ray enter it at right angles to its surface. As a contrast, we may introduce here a sketch of Newton's admirable investigation of the same problem on the corpuscular hypothesis. Let AB (fig. 4)

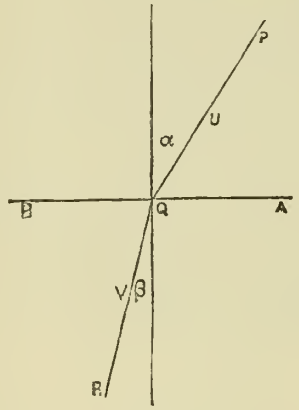


Fig. 4.

be the common surface of the two media, PQR the path of a corpuscle. Let U and V be the velocities in the two media, α and β the angles of incidence and refraction. Then the forces, which act on the corpuscle, being entirely perpendicular to the refracting surface, the velocity *parallel* to that surface is not altered. This gives

$$U \sin. \alpha = V \sin. \beta$$

Also the kinetic energy is increased by the loss of potential energy in passing from the one medium to the other. Hence the square of V exceeds that of U by a quantity which depends only on the nature of the two media and of the corpuscle. This shows that V is the same whatever be the direction of the ray, and then the first relation proves that the sines of the angles of incidence and reflection are *inversely* as the velocities in the two media; i. e., the refracted ray is more nearly perpendicular to the refracting surface the *greater* is the velocity in the second medium. It is very singular that two theories, so widely dissimilar, should each give the true *law* of refraction; and, in connection with what has just been said, it may be mentioned, that on the corpuscular theory a corpuscle passes from one point to another with the least *action*, while on the Undulatory Theory it passes in the least *time*. Hamilton's (q. v.) grand principle of *Varying Action* includes both of these.

Interference.—Fresnel's mode of exhibiting this phenomenon (whose discovery, as before said, is due to Young) is very simple and striking. An isosceles prism of glass, with an angle very nearly 180°, is placed, as in fig. 5, symmetrically in front of a

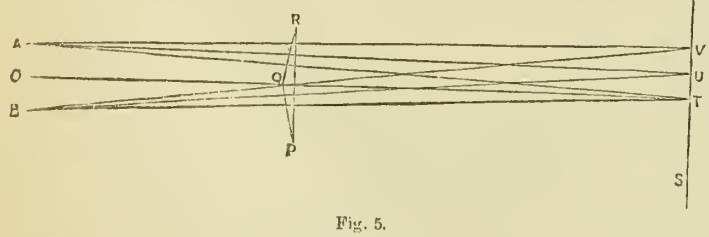


Fig. 5.

brilliant point (the image of the sun formed by a lens of very short focus, for instance). The effect of the prism is that light which pases from O through the portion QR appears to have come from some point such as A (the image of O as seen through the upper half of the prism). Similarly, the light which has passed through PQ appears to come from some point B. The light which has passed through the prism is to be received on a white screen ST.

At the point T, which is in the prolongation of the line OQ, the distances TA and TB are equal; but for no other point, as U, in the line ST, are UA and UB equal. Suppose U and V to be such that UA and UB differ in length by half a wave-length of some particular color, VA and VB by a whole wave-length of the same; then waves arriving at T, as if from A and B, have passed over equal spaces, and consequently their crests coincide, so that at T they reinforce each other. But at U, a hollow from A is met by a crest from B, so that darkness is the result. At V, again, crest and crest coincide. And so on. Hence, if we are experimenting with one definite color of light, the effect on the screen is to produce at T, V, &c., bright bands of that color, all parallel to the edges of the prism PQR. At points like U, there are dark bands. And the length of a wave can easily be calculated from this experiment; for the lengths of OQ and QT can be measured, and knowing the angles of the prism and its refractive index (see REFRACTION) for the particular color employed, we can calculate the positions of A and B. We have then only to measure the distance TV between the centers of the two adjoining bright bars, and then geometry enables us to calculate the difference of the lengths of VA and VB, which, as we have seen, is the length of a wave. The results of this experiment show how very minute are these wave-lengths for visible rays. Thus, for

	Inch.
Extreme Red, the wave-length in air is	0·0000266
" Violet, " " "	0·0000167

These are, roughly, the $\frac{1}{40,000}$th and the $\frac{1}{60,000}$th of an inch Seeing, then, that light describes 200,000 miles per second, the number of waves which enter the eye per second are—

Extreme Red.....	460 millions of millions.
" Violet.....	730 " "

These numbers, compared with those of sonorous waves (see SOUND) show the extraordinary difference in delicacy between the optic and auditory nerves. But whereas the range of the ear is somewhere about 12 octaves, that of the eye is less than one.

Diffraction.—This has been already illustrated in a previous volume.

Dispersion.—We have just seen that, by Fresnel's interference experiment, waves of different lengths are separated (for in the last figure the position of the bright line, V, depends on the length of the waves which produce it). But the different colors are also separated by common refraction, as in Newton's celebrated experiment. See SPECTRUM. This shows, of course, that in refracting media, waves of different colors move with different velocities; and, as the violet are more refracted than the red, it appears that the shorter waves move more slowly in glass or water than the longer ones. In free space, waves of all lengths travel with equal speed, else (see ABERRATION) all stars ought to appear drawn out into spectra, in consequence of the earth's annual motion. Also, a star suddenly breaking out, or suddenly vanishing (a phenomenon several times observed), should flash out first red, and gradually become white, or should gradually decay from white to violet, which is not observed to be the case. These facts are the most difficult to explain of any to which the Undulatory Theory has yet been applied. Fresnel, indeed, appears to have been in possession of a solution of the difficulty, but the Appendix to one of his papers, to which he more than once refers as containing this explanation, was not found among his MSS. Cauchy and others have, however, by delicate investigations, shown that, *if the forces exerted by the molecules of a refracting body on the ether are exerted through distances comparable with the length of a wave*, the velocity of light will then depend on the wave-length. The velocity is, in fact, shown to be represented by a formula such as this:

$$A - \frac{B}{\lambda^2},$$

where A and B are constant quantities for a given medium, and λ is the length of a wave. The larger λ is, the less is the second term of the formula, and therefore the velocity is the greater. A very singular result follows from this formula—viz., that the velocity becomes more and more nearly equal to A as the wave-length is greater. Hence, waves of low radiant heat, which (see HEAT) are merely waves of light which are incapable of producing vision, must be crowded together towards a limit, not very far beyond the red end of the spectrum.

Polarization.—We now come to a set of phenomena which give us some further information as to the nature of luminiferous waves. When two beams of light, such as those in Fresnel's experiment, are polarized in planes perpendicular to each other (see POLARIZATION) before they meet, *they do not interfere*. This is in accordance with the assumption required for the explanation of

the existence of polarization itself—viz., that the vibrations of the ether take place *transversely* to the direction of the ray.

Double Refraction.—Our assumptions, forced upon us by experimental results, are now so far complete that we may proceed, after Fresnel, to apply them to the explanation of double refraction. See POLARIZATION; REFRACTION, DOUBLE. This explanation is extremely beautiful, and when published, was justly hailed as the greatest step in physical science which had been made since Newton deduced the facts of physical astronomy from the law of gravitation.

As we have seen above, in treating of simple reflection and refraction, that the form and velocity in and with which a disturbance spreads from any point of a wave, is all that is required for the determination of the course of a ray, we must endeavor to find the form in which a disturbance spreads in a double-refracting crystal; and this should lead us to a construction for each of the two rays.

Huyghens had already pointed out that one of the two rays produced by Iceland spar follows the ordinary law of refraction. Hence, the disturbances which give rise to this ray are propagated in spherical waves in the crystal. He showed also that the other ray could be accounted for, if the disturbances to which it is due were propagated in the form of an oblate spheroid touching the sphere with the extremities of its axis, that axis being parallel to the crystallographic axis of the mineral.

The following diagram (fig. 6) will make this clear: P is the

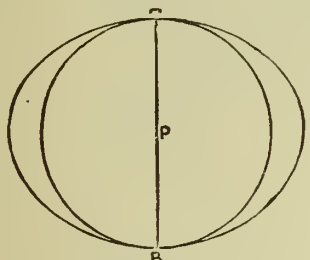


Fig. 6.

point where the ether is disturbed. Two waves spread from P in the form shown in the cut, the line APB being the axis of rotation of the spheroid, and parallel to the axis of the crystal. Thus, let rays αA, &c. (fig. 7), of which AB is the wave-front, fall

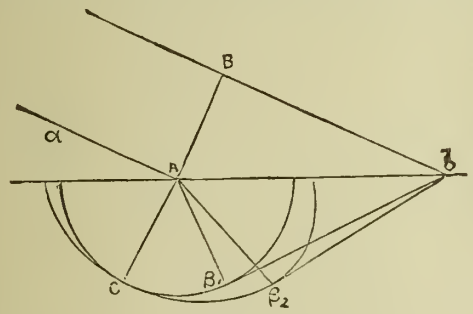


Fig. 7.

upon the surface Ab of such a crystal; and let AC be the direction of its axis. Draw, about A as center, the sphere and spheroid into which the disturbance at A spreads in the crystal while light in air passes from B to b. Then if planes be drawn through the line b (perpendicular to the paper) so as to touch the sphere in β_1, and the spheroid in β_2, these planes will touch respectively all the intermediate spheres and spheroids produced by disturbances at points between A and b. [This is evident from simple geometry.] Thus $b\beta_1$ and $b\beta_2$ are the new wave-fronts; and the ray αA, falling on the crystal, is divided into the two Aβ_1 and Aβ_2. Of these, Aβ_1 is the ordinary ray, and, being produced by spherical waves, has all the properties of a ray ordinarily refracted. It obviously moves perpendicularly to its front, as Aβ_1 is perpendicular to $\beta_1 b$.

But it is otherwise with Aβ_2, which is, in general, *not perpendicular to its front, $\beta_2 b$.* Again, if AC, the axis of the crystal, be not in the plane of incidence, the ray Aβ_2 is not in that plane; so that here we have *refraction out of the plane of incidence.*

The exact accordance of this construction with observation was proved by the careful experiments of Wollaston. We have only to add, that the two rays Aβ_1 and Aβ_2 are, in all cases, completely polarized in planes at right angles to each other.

The experiments of Brewster showed that in by far the greater number of minerals and artificial crystals, *both* rays are extraordinary—i. e., neither of them can be accounted for by disturbances propagated spherically in the crystal. But no tentative process could lead to the form of the wave-surface in this most general case. Here Fresnel's genius supplied the necessary construction.

He assumes that the ether in a crystallized body is possessed of different rigidity, or different inertia, in different directions; a supposition in itself extremely probable, from the mechanical and other properties of crystals. In the general case, there are shown to be three principal directions in a crystal, in any one of which, if the ether be displaced, the resulting elastic force is in the direction of the displacement. Each of these is, in all cases, perpendicular to the others. Any given displacement of the ether corresponds to partial calculable displacements parallel to each of these lines, and thus the elastic force consequent on any displacement whatever is known if we know those for the three rectangular directions. All the calculations are thus dependent on *three* numbers only for each substance.

To find the form in which a disturbance will spread, Fresnel proceeds as follows. Let the plane of the paper represent the front of a wave in the crystal, and suppose a particle of ether to be displaced in it from A to B (fig. 8). This displacement may

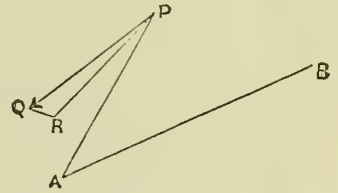


Fig. 8.

be resolved (by the law of the parallelogram of velocities, forces, &c.) into two components in any two directions in the plane of the paper. Assume AP to be one of these, and let PQ be the force produced by disturbing the particle of ether from A to P. In general, PQ will *not* lie in the plane of the paper. Let fall a perpendicular, QR, upon the plane of the paper. In general, the point R will not lie in AP. The portion RQ, of the elastic force of the ether, Fresnel neglects, because it would produce vibrations perpendicular to the wave-front, i. e., *similar to those of sound*, and he assumes that such normal vibrations do not produce visible light. We shall recur to this point. Fresnel now assumes that the vibrations which will be propagated continuously in the crystal are such as have PR coincident in direction with AP; and then the rate of their propagation will depend upon the ratio of PR to PA. He shows by mathematical reasoning that there are *two* such directions in every wave-front, and that they are always *perpendicular* to each other. This, of course, at once accounts for double refraction, the complete polarization of each of the two rays, and their being polarized in planes perpendicular to each other.

The original plane wave is now broken into two, both parallel to the first, but in general moving at different rates. He next considers a disturbance at any point in a crystal as equivalent to waves having fronts in *every* plane passing through that point, and investigates mathematically the form of the surface which is touched by the planes of all the pairs of polarized rays which have (in any given time) proceeded from each of those wave-fronts. The form of this surface is very remarkable. It is symmetrical with reference to three planes at right angles to each other. These, of course together, cut it into eight parts, one of which is figured below (fig. 9). From this it appears, though Fresnel did not perceive

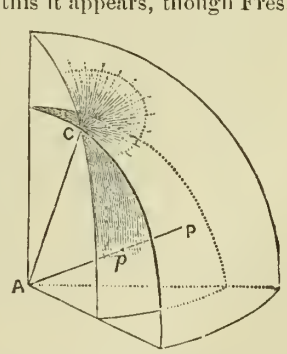


Fig. 9.

it, that the surface has four *conical cusps*, as they are called, the inner portion seeming to be drawn through a hole, as it were, and then spreading out again to form the outer portion. The external appearance of these points very much resembles the portion of an apple round the point of attachment of the stalk. Fresnel showed that, in particular cases, when two of the three principal elasticities are equal, this surface degenerates into the sphere and spheroid of Huyghens already described for Iceland spar; and that, when all three are equal, it becomes a single

sphere, as in glass, water, and other singly refracting bodies. All this, of course, is in complete accord with experiment. But there is vastly more. If we use the wave-surface of Fresnel to construct the refracted rays, just as we employed the sphere for simple refraction, or the sphere and spheroid for Iceland spar, we find generally *two* definite refracted rays (both usually out of the plane of incidence) for one incident ray. But Hamilton (q. v.), who was the first to perceive the existence of the cusps already described, saw that they indicated the existence of a very remarkable phenomenon, to which he gave the name of Conical Refraction (q. v.).

The ray which, in the crystal, passes from A to C (the cusp, see last figure), has not, like other rays such as ApP, two definite wave-fronts. For if at *p* and P, where the line ApP meets the inner and onter portions of the wave-surface, we draw tangent planes, these are the definite fronts of the corresponding waves; so that such a ray will split into two only, on leaving the crystal. But AC intersects the surface at C, where it is *conical*, and has an *infinite* number of tangent planes, so that when it leaves the crystal it will split into an infinite number, forming a hollow cone. Hamilton's prediction then was: If a single ray of light be made to pass through a plate of a biaxal crystal in the direction AC (limiting it, for instance, by sheets of tinfoil with small holes in them properly fixed on each side), it will enter and emerge as a hollow cone. Also the plane of polarization will differ for different rays in this cone. Lloyd completely verified this wonderful prediction by experiments made with a plate of *Arragonite* (q. v). But more, Hamilton observed that (see last figure) the wave-surface can be touched by a tangent plane in a circle surrounding the cusp. If, then, we make the construction of fig. 7 with Fresnel's wave instead of the sphere and spheroid, there will be a definite direction of the incident ray αA, for which the tangent planes $b\beta_1$ and $b\beta_2$ in that figure will coincide, and will touch the wave-surface in the circle about the cusp. Any line drawn from A to a point in that circle will be a direction for a refracted ray. Hence the ray αA will be broken up into a hollow cone of rays, the vertex of the cone being A, and its base this circle. If the crystal be cut into a plate, each ray will of course emerge parallel to A, and the *ensemble* of them will form a hollow cylinder. The prediction, then, is that a single definite ray, falling in a given direction on such a plate of crystal, will emerge as a hollow cylinder. This, and the predicted laws of the polarization of the light of the cylinder, were also verified by Lloyd.

'The formulæ which led to such triumphantly successful predictions *may* have been deduced from incomplete or even erroneous premises; but they *represent a truth*, and must in time conduct us step by step back to ultimate proof of the truth of Fresnel's assumptions, and of the Undulatory Theory of Light, as now understood, or show us what modifications may be required in the original conceptions.'

It would unduly lengthen this article, and besides would lead us into discussions far too recondite for a work like this, to enter upon the question of whether the vibrations in polarized light are *perpendicular to* or *in* the plane of polarization, a subject which has recently been well investigated by Stokes (q. v.); or to consider the production of elliptically polarized light by reflection at the surface of metals, diamond, &c.; and various other most important points of the theory. We can only mention that Green, Cauchy, Stokes, and others, who have entered deeply into the mechanical question of luminiferous vibrations, have found themselves obliged to take into account the *Normal* wave, which, as we have seen, Fresnel neglected.

Fluorescence (see PHOSPHORESCENCE), Spectrum Analysis (see SPECTRUM), and various other important recent additions to the theory, must be merely mentioned; as also the very remarkable observation of Maxwell, which appears to connect Light and Electricity, and was derived from a theory which assumes the ether to be the vehicle of Electricity and Magnetism as well as of Light and Heat, and by which it appears that the velocity of Light is expressible in terms of the static and kinetic units of Electricity.

For further information, we refer the reader to Lloyd's *Wave-theory*, an excellent elementary treatise; while to the more advanced mathematician we may commend Airy's *Tract on the Undulatory Theory*, and Herschel's article 'Light' in the *Encyclopædia Metropolitana*.

UNDY, in Heraldry, the same as Wavy. See HERALDRY.

UNFERME'NTED BREAD. Under this heading we may briefly notice one or two improvements which have been introduced into the manufacture of AERATED BREAD, give some details supplementary to the article under the latter heading in Vol. I. of the *Encyclopædia*, and indicate the general bearings of this kind of baking, and of the bread thus produced, upon public health and upon the subject of medical dietetics. In 1862, the 'Aërated Bread Company (Limited)' was established for purchasing from the patentee, Dr. Dauglish, the sole right of manufacturing this kind of bread in and around London; and from that time, the use of this new article of food has become much more extensive. Indeed, at the present day, Dauglish's Aërated Bread is manufactured (by purchase of the right to use the process) not only in most of the large towns in England, but also in Melbourne, Adelaide, and Sydney. In the working of the original patent, it was found that the pressure at the commencement of the process of driving the mixed ingredients from the iron box through a cock or tap at the bottom was so violent as to give almost an explosive expansion to the ejected portion of dough, causing the structure of the bread more to resemble whipped cream of froth than fermented bread. This was a point of greater importance than might have been anticipated, because it is found by experience that the flavor and other palatable qualities depend in a great measure on the internal arrangement of the loaf. Moreover, a great part of the pressure obtained was entirely wasted.

A new patent was, after a time, taken out by Dr. Dauglish, to improve the 'piled elastic texture' of aërated bread; and secondly, to provide mechanical means for dividing the dough into the requisite exact and uniform measured quantities for loaves, and for delivering each loaf into the tin in which it is to be baked. Dr. Dauglish's last patent—his new mechanical or traveling oven—was only completed shortly before his death, which took place in the spring of 1866. In this oven, the loaves, after being placed on the movable bottom at the mouth, are carried with a regular intermittent motion, in an endless chain, which forms the movable bottom, through a chamber varying in length from 20 to 50 feet, to end or tail of the oven. This chamber is heated by two or more furnaces, the flues of which are kept separate, each furnace heating its own portion. Small windows are inserted at intervals, by means of which the baking can be watched during its progress. The mouth of the oven is protected by two doors, which are lifted and shut alternately by an arrangement of apparatus worked by the same power which causes the endless chain constituting the movable bottom to traverse the length of the oven: the work of charging the oven goes on incessantly while the loaves are on their journey towards the tail of the oven; and the opening and shutting of the two oven doors is so arranged as to prevent the escape of the heat or steam from the interior of the oven. On the arrival of the loaves at the tail of the oven, the baking process is completed, and they are tipped off the revolving bottom, falling, by their own weight, on to a table placed ready to receive them. The mechanism at the tail of the oven is likewise so arranged as to prevent the escape of the heat or steam in the oven. By means of this traveling oven, the old and laborious plan of putting into and taking out of the oven each loaf separately with the peel (so injurious to the health of the journeyman baker) is henceforth abolished in the making of aërated bread. The great point mentioned above, namely, lessening the amount of pressure brought to bear on the gas, has had its value fully borne out by recent experience. Of late years 90 lbs. pressure per square inch has been lessened to 30 lbs., to the saving of steam-power, and improving the quality of the bread. The Americans have tried an enormous pressure, but, we believe, without satisfactory results.

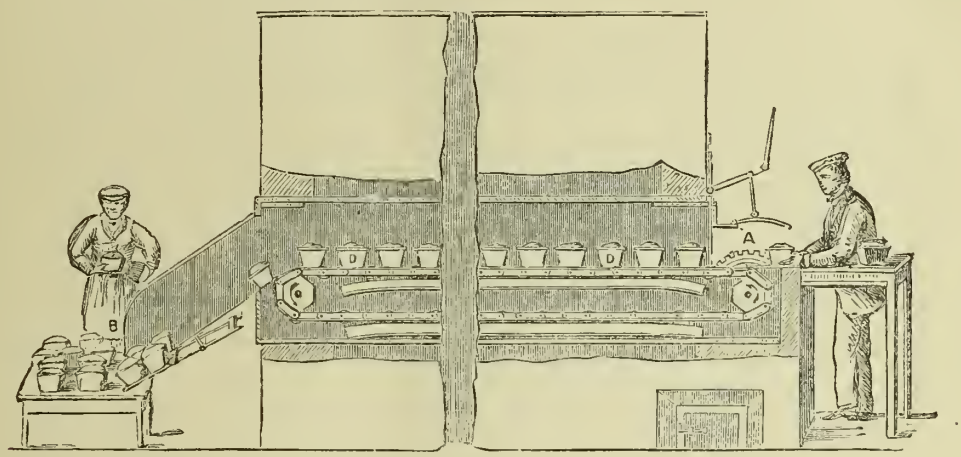
At first the carbonic acid gas employed in the manufacture of aërated bread was solely obtained from carbonate of lime and sulphuric acid. The Aërated Bread Company, however, made experiments regarding the possibility of applying the carbonic acid of the gread London breweries (now a wasted product) to the aëration of their bread, and the results hitherto obtained have been most satisfactory; while there is not the slightest doubt of the essential purity of the gas, in so far as deleterious matters are concerned, the delicate flavor of both hops and malt conveyed in the form of aromatic vapor by the gas to the dough communicates to the bread a singularly agreeable and palatable taste. Two gallons of new malt and hops partially fermented at a temperature of 160° F. are added to 268 lbs. of flour.

No one who takes an interest in the sanitary conditions of various trades, and who has read Mr. Tremenheere's 'Report on the Sanitary condition of Journeymen Bakers,' published by order of government; or a powerful article upon that commissioner's Report in the *Times;* or the pamphlet by Dr. Guy on the same subject, can doubt that the general introduction of aërated bread would cause the saving of a large number of human lives, now annually sacrificed in the London bakeries alone. Dr. Guy states that no class of men, save the Red-ditch needle-grinders, are liable to so severe and often fatal diseases of the chest. Forty-two years is rather over the average duration of life among them, and they are often completely enfeebled in very early life by frequent attacks of rheumatism. Under the new system, the business of a journeyman baker, from being almost certainly fatal, would become a healthy rather than a dangerous one.

The dietetic advantages of aërated bread are apparently so obvious that it is surprising that they are not even more generally recognized than seems at present to be the case. Its perfect cleanness and purity, its light and uniform texture, and its sweet and agreeable flavor, are strong claims upon acceptance. To the workingman, it is especially suited, because it retains much of the ingre-

dients of the wheat which enter into the formation of blood and muscle, and are allowed to escape in fermented bread. It is strongly recommended by medical men not only as an article of ordinary diet, but particularly in cases of indigestion; and according to Dr. Corfe of the Middlesex hospital, most especially 'in those cases of dyspepsia which so often affect the brain-workers of the great metropolis, men who work for the press, &c.' Cases of indigestion, flatulence, &c., not unfrequently occur in which no kind of bread (even well-made country bread) can be borne with comfort. In such instances, if there is no ready access to aërated bread, it may be obtained weekly in a tin box from London, as, amongst other advantages, it possesses that of being almost as palatable on the tenth day as on the day of its baking. The aërated bread has been found singularly valuable as food for infants, when they are being brought up wholly or partially by hand. When mixed with milk and water, the bread forms a soft jelly-like compound which is easily sucked through the tube of a common feeding-bottle.

In the commercial organization of the Company, as developed in London, there is, in the first place, a large bakery attached to the central offices in Whitecross Street. The metropolis is divided into districts, somewhat resembling the postal districts. Four of these have bakeries as well as depôts; the others have depôts without bakeries, the bread being obtained from adjacent districts. Altogether, there are about fifty depôts or shops at which the bread may be purchased. The company prefer that these depôts should be placed in the keeping of agents who are the servants of the company, paid either by salary or commission or both.



Dr. Dauglish's Traveling Oven:
A, the mouth, and B, the tail of the oven; C, C, oven flues; D, D, the loaves in their tins moving onwards from the mouth of the oven to its tail; E, the door of one of the furnaces. (To save space, only the two ends of the oven are represented.)

UNGHVA'R, an important market-town in the north-east of Hungary, is charmingly situated on the river Ungh, 90 miles north-north-east of Debreczin. It is the residence of a bishop, and contains a very old castle, a beautiful church, a seminary and gymnasium. Trade is carried on in salt, cattle, and wine, particularly the last, vines being extensively cultivated in the vicinity. The population of U. in 1880 amounted to 11,373.—U. is also the name of a county or district containing about 1200 square miles, and a population of 130,000.

U'NGUENTS, or OINTMENTS, are employed in medicine as external applications. They consist of some active agent in solution or in the form of a soft extract, or in fine powder, carefully rubbed up with some kind of fatty matter, or a mixture of several such matters, as prepared lard, prepared suet, white wax, yellow wax, olive oil, and almond oil. There are no less than 28 ointments in the British *Pharmacopœia*. Some, as the ointments of aconitia, atropia, and belladonna, are employed to allay neuralgia and local pains; simple ointments (consisting of white wax, prepared lard, and almond oil) are employed in dressing raw and blistered surfaces; the ointments of cantharides and of savin are used to keep up the discharge from issues or blistered surfaces; the ointments of creosote, galls, carbonate of lead, oxide of zinc, &c., serve as astringents; those of ammoniated mercury, calomel, nitrate and red iodide of mercury, iodine, iodide of potassium, elemi, resin, and turpentine, act as astringents of varying power, and that of red oxide of mercury as a mild caustic. Many of the ointments are of special service in skin diseases, and sulphur ointment is the specific application for itch.

UNGUICULA'TA (Lat. clawed), in Zoology, a section of the class Mammalia, consisting of those animals which have toes furnished with nails or claws. In the system of Linnæus, it includes the orders *Bruta*, *Glires*, *Primates*, and *Feræ;* in that of Cuvier, the orders *Bimana*, *Quadrumana*, *Carnaria*, *Marsupialia*, *Rodentia*, and *Edentata*.

UNGULA'TA (Lat. hoofed), in Zoology, a section of the class Mammalia, consisting of those animals which have hoofs, and divided into *Perissodactyla* and *Artiodactyla*. See ARTIODACTYLA, ZOOLOGY, FOOT; and for Cuvier's classification, PACHYDERMATA

UNGULED, in Heraldry, a term applied to the tincture of the hoofs of an animal; e. g., Azure, a stag trippant or, attired and unguled gules, the arms of the family of Strachan in Scotland.

U'NICORN (Lat. *unum cornu*, one horn), an animal probably fabulous, mentioned by ancient Grecian and Roman authors as a native of India, and described as being of the size of a horse, or larger, the body resembling that of a horse, and with one horn of a cubit and a half or two cubits long on the forehead, the horn straight, its base white, the middle black, the tip red. The body of the animal was also said to be white, its head red, its eyes blue. It was said to be so swift that no horse could overtake it. The oldest author who describes it is Ctesias, who resided for many years as physician at the court of Artaxerxes Mnemon, and who wrote about 400 B.C. His information, however, was all at second-hand. He calls it the Wild Ass (*Onos agrios*). Aristotle briefly mentions it under the name of Indian Ass, saying: 'We have never seen a solid-hoofed animal with two horns, and there are only a few of them that have one horn, as the Indian Ass and the Oryx.' Pliny nearly follows Aristotle, but says that the Indian Ass is one-hoofed, and the Oryx two-hoofed. He speaks also of the *Monokeros*, a very fierce animal, with the body of a horse, the head of a stag, the feet of an elephant, the tail of a wild boar, and a single horn. All these accounts are evidently untrustworthy, and much tinged with fable. Not more credible are those of more modern authors. Lobo, in his History of Abyssinia, describes the U. as resembling a beautiful horse; but there is no good evidence of the existence of any such animal there or in any part of the world. Its existence, however, is not to be decided against on any other grounds; for there does not appear to be anything monstrous or absurd in the notion. Although the descriptions of the U. given by the ancients are very unlike the Indian rhinoceros, yet probably that animal was the origin of them all. In like manner, it seems probable that the head of a U., which Barrow saw depicted on the side of a cavern in South Africa, and the head of a U. described and figured by Campbell in his *Second Journey in South Africa*, are to be referred to some species of rhinoceros. The word U. is unhappily used in versions of the Old Testament for the Hebrew *reêm*. The Septuagint led the way in this, by using the Greek *monokeros;* and it has been supposed by many that the animal meant is a rhinoceros. The reêm was, however, certainly not a one-horned, but a two-horned animal. In Dent. xxxiii. 17, where the English version has 'horns of unicorns,' the correct translation is 'horns of a reêm.' Other circumstances, as an allusion to the gamboling of the young, are also unfavorable to the idea that a rhinoceros is intended.


Unicorn.

The U. is perhaps best known as a heraldic charge or supporter. Two unicorns were borne as supporters of the Scottish royal arms for about a century before the union of the crowns; and the sinister supporter of the insignia of the United Kingdom is a unicorn argent, armed, crined, and unguled or, gorged with a coronet composed of crosses patée and

fleurs-de-lis, with a chain affixed, passing between the forelegs, and reflexed over the back, of the last.

U'NIFORM (one form), in its Military and Naval sense, means the particular dress and equipment assigned by proper authority to each grade of officers and men. The clothing consists of one prevailing color, variously ornamented and 'faced' according to the rank and corps. Although some regiments wear other colors, scarlet may be said to be the prevailing uniform of the British army; blue of the French; and white of the Austrian; dark blue is likewise the color of the British navy. It is surprising how late the introduction of compulsory uniforms took place. We find soldiers serving with corps and yet dressed after the dictates of their own fancy well into the 17th c.; while in the navy, uniforms were not fixed with certainty until the beginning of the reign of King George III.

UNIFO'RMITY, Act of. See Nonconformists.

UNIGE'NITUS, Bull, one of the most important documents in the history of Jansenism. It was occasioned by the publication of the *Réflexions Morales* of Quesnel (q. v.), in which all the essential principles of Jansenism were revived, and although cautiously, yet systematically explained, so as to form the basis of that practical, moral, and religious teaching which it is the object of the *Réflexions Morales* to convey. The book was at first simply prohibited by a brief of Pope Innocent XI., in the year 1708; but, as it found many patrons, and especially the Archbishop of Paris, Cardinal de Noailles, it was deemed necessary to subject it to a more detailed examination, the result of which was that 101 propositions were extracted from it, and formally condemned, in 1713, by a bull commencing with the word 'Unigenitus.' The mode of condemning these propositions was peculiar, being that which is technically called *Damnatio in globo*. The whole body of propositions were condemned as 'heretical,' 'false,' 'rash,' 'scandalous,' 'offensive to pious ears,' &c.; without, at the same time, any particular propositions being pointed out as deserving any one of these specific forms of censure. This circumstance, with others, gave rise to much controversy, and to a prolonged opposition to the bull. De Noailles and other bishops refused to accept it unless with certain qualifications; on the contrary, Louis XIV. insisted on unconditional acceptance; but on the death of Louis, the Regent, the Duke of Orleans, having given his countenance to the opponents of the bull, the resistance was persisted in; and eventually a declaration was put forth in 1717, by certain bishops, four in number, appealing from a pope to a general council. This appeal was condemned by the pope, nor was it countenanced even by the Regent; but a more modified appeal 'from the pope ill-informed to the pope better-informed,' was afterwards published by De Noailles, which obtained many adherents, and by which the opposition was kept alive to the end of the pontificate of Clement XI. in 1721, and even under his successors, Innocent XIII. and Benedict XIII. It was not till the year 1730 that, after the formal registration of the Bull Unigenitus by the parliament of Paris, the party thus created in France, and known under the name of 'Appellants,' received its final condemnation from the civil authority, after which it gradually died out, although some relics of it are still treaceable, even after all the storms of the Revolution, in the so-called 'Petite Eglise.' See Gallican Church.

UNION. The crowns of England and Scotland were united under one sovereign on the accession of James VI. of Scotland to the English throne as James I. in 1603; but for above a century longer, each country continued to be ruled by its respective parliament, the interest of the one often coming into collision with that of the other. After various fruitless proposals for a closer connection of the countries, the Scotch were, in 1702, prevailed on to send 20 commissioners to London, who with 23 English commissioners, should deliberate on the terms of a union. Their proceedings, after being broken off, were resumed in 1706. The Scottish commissioners were at first disposed for a mere federal union, and objected to the proposed assimilation of customs, excise, and regulations of trade; but a majority were at last brought over to the views of the English commissioners; and the minority, with one exception, yielded. The union, though popular in England, was the subject of great dissatisfaction in Scotland, being regarded by the bulk of the community as a surrender of national independence to a powerful rival. Addresses against it were presented from all quarters, and in some places the people rose in arms, forming regiments of horse and foot to oppose it. The treaty was, however, after strenuous opposition, ratified by the Scottish as well as the English parliament, and ultimately completed on May 1, 1707. Its principal conditions were the incorporation of England and Scotland into the United Kingdom of Great Britain, the succession of whose monarchs was to be the same as that of England. There was to be one parliament, in which the peers of Scotland would be represented by 16 of their number elected each parliament, and 45 Scotch members were to sit in the House of Commons. All rights and privileges were to be communicated between the subjects of both kingdoms, unless when otherwise agreed. The Episcopal Church was confirmed in England, and the Presbyterian in Scotland. Scotland was to retain her Courts of Session and Justiciary, and to have a separate seal for private rights and grants.

While the parliament was to raise £2,000,000 by land-tax, Scotland would contribute £48.000 of that sum. The laws of trade, customs, and excise in Scotland were to be assimilated to those of England, and the coinage, weights and measures of the two countries were to follow a uniform standard. In other matters, the laws of Scotland were to remain in force, but might be altered by the parliament of Great Britain. The separate Privy Council of Scotland, which the Act of Union left untouched, was abolished the following year.

Ireland remained a distinct kingdom till 1801, when it was united with Great Britain into the United Kingdom of Great Britain and Ireland. By the terms of the union, the separate parliament of Ireland was done away with, and Ireland was represented in the parliament of the United Kingdom by 4 lords spiritual and 28 lords temporal in the House of Lords, and 120 members of the House of Commons. Power was reserved to the sovereign to create one peer of Ireland for every three extinct peerages, and when the peerage of Ireland became reduced to 100, to create one peerage for each one that became extinct, so as to keep the peerage of Ireland up to 100, over and above those Irish peers who are also peers of England or Great Britain. The churches of England and Ireland were united into one Protestant Episcopal Church. The subjects of Ireland were placed on the same footing as those of Great Britain in respect of trade and navigation, and in all treaties with foreign powers; and the law-courts of Ireland were to continue, subject to the regulations of parliament; writs of error and appeals being decided by the House of Lords of the United Kingdom.

UNION COLLEGE, a seat of learning at Schenectady, New York, U. S., incorporated in 1795, chiefly by the efforts of General Philip Schuyler, a distinguished officer of the American Revolution. It was named Union from its being established by the co-operation of several religious denominations. Its first president was John Blair Smith of Philadelphia, who was succeeded in 1799 by Jonathan Edwards, the younger; but its great prosperity and usefulness have been secured under the presidency of Rev. Eliphalet Nott, from 1804 until his death in 1865. By his zeal and enterprise, it was endowed, and equipped with buildings, library, and natural history cabinets. It has 18 professors and 175 students. In 1873 a school of engineering, a medical college (with 120 students), and a law school (with near 100 students), were associated with the U. C., now known as Union University.

UNION GOODS, a general name for such textile fabrics as are composed of more than one material; but it is applied chiefly to those made from vegetable fibres, as mixtures of flax and hemp, or jute, cotton and flax, &c. This class of manufactures has immensely increased of late years.

UNIO'NIDÆ. See Fresh-water Mussel.

UNION-JACK (from the *jacque*, or surcoat, charged with a red cross, anciently worn by English soldiers—see Jack), the national banner of the United Kingdom of Great Britain and Ireland, formed out of a combination of the crosses of St. George (argent, a cross gules), of St. Andrew (azure, a saltire argent), and of St. Patrick (argent, a saltire gules), these three crosses being the national banners of England, Scotland, and Ireland respectively. The first union-jack, which was introduced by a royal proclamation in 1606, three years after the union of the Scottish with the English crown, combined only the crosses of St. George and St. Andrew, and may be blazoned, azure, a saltire argent surmounted by a cross gules edged of the second. This combination was by royal proclamation of date 28th July 1707, constituted the national flag of Great Britain (fig. 1).

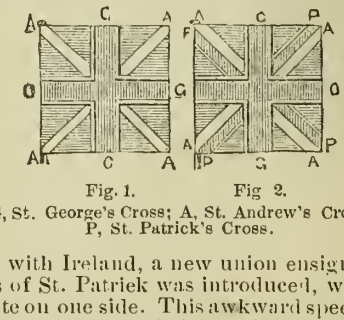


Fig. 1. Fig 2.
G, St. George's Cross; A, St. Andrew's Cross;
P, St. Patrick's Cross.

On the union with Ireland, a new union ensign was devised, in which the cross of St. Patrick was introduced, with its four limbs edged with white on one side. This awkward specimen of heraldry forms the second and now existing union ensign (fig. 2). Generally speaking, it is displayed as a national ensign on flags only; but the reverse of the bronze coins of the realm contains a not

very accurate representation of it on the shield of the seated figure of Britannia. The inaccuracy consists in the crosses of St. Andrew and St. Patrick being made to assume the appearance of a single saltire with a narrow border of equal width on each side.

UNITA'RIANS, a name applied generally to all who maintain that God exists in one person only, and specially to a small Christian sect of recent times, whose distinguishing tenet is the Unity as opposed to the Trinity of the Godhead. In the more general sense, the name of course includes the Jews and the Mohammedans as well as those Christians who deny the doctrine of the Trinity, and in this sense also there have been U. from the earliest period of ecclesiastical history. Until the middle of the 2d c., there seems to have been no controversy upon the subject; but from that time to the end of the 3d c., there was a succession of eminent teachers who maintained, against the ecclesiastical doctrine of the Logos, the undivided unity—or, as they expressed it —the *Monarchy* of God. From their use of this word, they are known in ecclesiastical history as the Monarchians. There are generally understood to have been two classes of them—those who taught that Christ was God in such a sense that it was the Father who became man, and was born and suffered, and who were, on this account, called by their opponents Patripassians; and secondly, those who held that Christ was in nature a mere man, but exalted above all other prophets by the superior measure of Divine wisdom with which he was endowed, and who therefore corresponded more nearly with the modern Unitarians.

It is right to notice, however, that the doctrines of the Monarchians are known to us only through the statements of opponents, and it is probable they would have disowned the more extreme views ascribed to them. To the former of the two classes we have mentioned belonged Praxeas, against whom there is a treatise by Tertullian, and Noetus; and at a later period—about the middle of the 3d c.—the famous Sabellius taught very similar doctrines. The other class was represented by Theodotus, Artemon, and especially Paul of Samosata, Bishop of Antioch, who was eventually deposed on account of his heresy. Beryllus, Bishop of Bostra in Arabia, who is said to have been convinced of his error by Origen, would seem, from the single sentence which records his teaching, to have belonged to this class rather than the other. The Monarchians appealed in support of their doctrines to the Old and New Testaments, and to the early opinions of the church. They are said, by Tertullian, to have consisted of the simple and the unlearned—'always,' he adds, 'a majority of the faithful'—a statement which shows that they must have been tolerably numerous in his time; while a writer quoted by Eusebius brings against them the apparently opposite charge of being students of geometry and lovers of Aristotle.

The grand theological struggle which followed in the 4th c. between the Arians and the Athanasians may be regarded as but another phase of the Unitarian controversy, inasmuch as Arius held that the Son was a created being, and denied his consubstantiality with the Father. On this head, the reader may consult the articles ARIUS and ATHANASIUS. We now pass on to the post-reformation period.

It is not strange that in the great stir of thought which accompanied the Reformation, some should have been found bold enough to question the grand catholic doctrine of the Trinity. Such there were even before the Socini. See SOCINUS. Among the earliest may be mentioned Hetzer and Bassen, both of whom were executed in 1529, the former, however, not exclusively for his religious opinions; Denck, Campanus, and the famous Spaniard, Michael Servetus (q. v.). So widely, indeed, was the Unitarian doctrine diffused that it was thought necessary, in the first article of the Augsburg Confession, to condemn the modern Samosatans, who deny the personality of the Word and Spirit, declaring the former to be a proper spoken word, and the latter a divine influence; and as early as 1527, one Andr. Althamer published a work against 'the modern Jews and Arians under a Christian name, who deny the deity of Christ.'

Under the influence of the elder Socinus, Unitarianism gained many adherents in Venetia. Poland and Transylvania, however, became its principal strongholds, and in those countries, favored by circumstances, it struck the deepest roots. In Poland, the nobility, protected from persecution by their class privileges, proved singularly favorable to a movement which seemed more destructive to the traditions of the Catholic Church than any that had yet been entered upon; the Unitarian refugees from other countries found here a ready welcome; and in the reign of Sigismund II. (1548—1572), this party of reformers was strong enough to form itself into a separate church. At a rather later period, Poland was the principal field of labor of the younger Socinus, and Unitarianism continued to flourish there till the middle of the 17th c., when, under John Casimir, who before his elevation to the throne had been a cardinal and a Jesuit, it was extirpated by force. In Transylvania, the U. have succeeded in maintaining their existence, notwithstanding much opposition and persecution, from the Reformation to the present day. The first who openly preached Unitarianism in that country were George Blandrata and Francis Davidis (1565), and under the influence of these distinguished men, large numbers, including the king himself, embraced the new opinions. But this period of prosperity was not of long duration. In 1572, though still permitted to worship according to their conscience, the U. were forbidden to make any attempts at propagandism, or even to print their religious books. They were not, however, subjected to any violent persecution until after the incorporation of Transylvania with the Austrian Empire, which took place in 1690; but after that time they were robbed by the Roman Catholics of all their churches and church property, forbidden to build new churches without the permission of the emperor, and by degrees excluded from all government offices, even the very lowest. On the accession of Joseph II., happier times returned.

Their churches were forbidden to be seized, and an indemnity was even paid them for the loss of the cathedral church of Klausenburg. They were now enabled to build new churches, and their cathedral and college at Klausenburg are said to be still two of the finest buildings in that city. The U. of Transylvania number about 60,000, and are said to be increasing. They have an organized system of church government, with a bishop at its head. They have three colleges—that of Klausenburg, with 12 professors and 273 students; that of Torda; and that of St. Keresztur.

In England, Unitarian opinions were somewhat later in making their appearance than on the continent. As early, indeed, as 1548, a priest named John Ashton was accused of Arianism, and escaped with his life only by recantation; and during the reigns of Edward VI., Mary, Elizabeth, and James I., a few suffered martyrdom on similar charges. But during the reign of James I., continental Socinianism began to exercise considerable influence in England, and continued to do so to the end of the century, so so much so that, in 1665, Dr. Owen wrote that 'the evil is at the door, that there is not a city, a town, scarce a village in England, wherein some of this poison is not poured forth;' and how deeply the Church of England was infected with it may be inferred from the no doubt exaggerated statement of Palmer, who, in 1705, spoke of 'troops of Unitarian and Socinian writers, and not one dissenter is found among them.' Many eminent men of the time, including Milton, Locke, and Newton, and in the next century, the famous apologist, Lardner, must be numbered among the U.; but it was in the last decade of the 17th c. that the controversy on this subject was most active, and at this time were published the old Unitarian tracts—a series of anonymous writings marked by eminent learning and talent.

Hitherto, however, the U., with the exception of the society formed in London by John Biddle (q. v.), which did not survive its founder, had no organized existence. But after the passing of the Toleration Act in 1689, whereby nonconformity was made legal, the way was prepared for that gradual change by which the orthodoxy of the English Presbyterians passed into Unitarianism. It was at this time that most of the old Presbyterian chapels were founded, and the trusts being open—i. e., not committed to any doctrinal system—ministers and people were left free to adopt and promulgate whatever new opinions should approve themselves to their conscience. Thus, the U. are the legitimate successors and representatives of the 2000 Presbyterian divines who in 1662 left the Church of England in consequence of their inability to comply conscientiously with the terms of the Act of Uniformity. The ground of this separation, it should be understood, was no difficulty about the doctrinal articles of the establishment. The English Presbyterians (so-called from their preference for that form of church government, for they were never able to adopt it) were originally as orthodox as their Episcopal brethren; but having refused to commit themselves to any authoritative creed, they underwent a gradual change to Arian, and at length to Unitarian, views. Many preached such views without exciting attention or controversy, and indeed, until 1813, the law which made it blasphemy to speak against the Trinity, though not strictly enforced, was still in existence. During the latter half of the 18th c., Dr. Priestley (q. v.) appeared as the champion of the humanitarian view of Christ's nature, and, by the influence of his writings, secured the more open advocacy of that doctrine. In 1773, Dr. Lindsey resigned his charge in the Church of England, and became pastor of the Unitarian congregation of Essex Street, London—an event which may be regarded as an epoch in the history of English Unitarianism. In 1813, the U. were placed by law fully on a par with other dissenters, and since that time there has been no attempt at persecution, with the exception of the claim made to some of their properties by certain orthodox dissenters. This claim was met by the Dissenters' Chapels Act in 1844.

The U. of England and Wales are purely congregational in their church government, their only organ for combined action being the British and Foreign Unitarian Association, which holds its meetings annually in London. Their principal place of ecuca-

tion is Manchester, New College, London, which is, however, an unsectarian institution. They have also a missionary college in Manchester, and the Presbyterian College, Caermarthen, educates Independent and Unitarian ministers. They have at present about 350 chapels and 80 mission stations.

In Scotland, the religious atmosphere has never been very favorable to Unitarianism. It was in that country that the last execution for blasphemy against the Trinity took place in the person of the unfortunate Aikenhead. Nevertheless, towards the close of the 18th. c., there was a certain amount of Arianism among the Moderates in the Church of Scotland. Unitarianism, as a distinct system, was preached at Montrose, as early as 1783; and at the beginning of the present century, some attempts were made to diffuse it by means of missionary efforts. There are now seven congregations in the country. That at Edinburgh was originally a branch from the Cameronians, the strictest of Calvinists, but having adopted the principle of free inquiry, they gradually embraced Arian, and eventually Immanitarian, views. This last change took place during the ministry of the late Dr. Southwood Smith, about the year 1812.

In Ireland, the history of Unitarianism is intimately connected with that of Presbyterianism. It flourishes principally in the north of the island, where there is a strong infusion of Scotch blood, and where Roman Catholicism has the least influence. In 1871, there were 9373 U. in Ireland. The U. of Ireland are Presbyterians in fact as well as in name.

Unitarianism in the United States has passed through much the same phases as in Great Britain. After 1740, Arian views of the person of Christ were pretty widely diffused among the New England clergy; and in 1787, took place the first secession from the Episcopal Church, on the ground that those parts of the liturgy which imply a belief in the Trinity could not be any longer employed. From the first, the New England churches were remarkably free from the restraints of tests and creeds, and were thus prepared for the adoption of a liberal theology. By imperceptible degrees, many of them glided into Unitarianism; but it was not until about 1815 that the name began to be much used. At that time the influence of Dr. Channing (q. v.) was thrown into the scale; and since then, Massachusetts, and particularly Boston, has been the stronghold of Unitarianism in America. The U. have 362 societies in the States, and upwards of 25 in Boston alone. Harvard University, Cambridge, is not a denominational institution; but it is at present in the hands of the U., and most of their ministers are educated either there or at the Meadville Theological School, Pa. Besides the U., properly so called, the Universalists, the 'Christians' of America, and the Hicksite Quakers are understood to hold anti-Trinitarian sentiments, though they give no special prominence to the doctrine of the Divine Unity. When we have mentioned, further, that there are a few Unitarian churches in the principal colonies of Great Britain, we shall have made a sufficiently complete enumeration for the purposes of this sketch. We have, however, to add, that Unitarian sentiments, under the names of Liberal Christianity and Rationalism, are more or less widely diffused in France, Switzerland, Germany, and Holland.

We now proceed to give a brief sketch of the theological opinions by which U. are distinguished from other Christian sects. It is, of course, impossible that we should notice all the phases of belief they have passed through since the Reformation. We confine ourselves to stating the more important doctrines of the early Socinians, as they are set forth in the Racovian Catechism, and sketching rapidly the opinions of the modern U. of England and America.

The Socinians assumed, as the fundamental principle of their theology, the sufficiency of Scripture, or rather of the New Testament, which, they held, had, for all matters of faith, superseded the Old. According to their system, Christ was a true man, but conceived of the Holy Spirit; and on account of the Divine power which he has received from the Father, and his exaltation as head over all things, he is to have worship offered to him. The Holy Spirit is not a person, but a Divine influence. The Socinians rejected also the doctrine of original sin. Man, they taught, was created with a mortal nature, but by the special gift of God, was endowed with a conditional immortality. He was created innocent, but not positively righteous. The gift of immortality he forfeited by disobedience. The fall of Adam, however, being a single act, could not deprave his own nature, much less that of his posterity; and in the latter, death was not a consequence of the fall, but was simply the condition of birth and life. Thus, the actual consequence of Adam's fall was not any radical corruption of human nature, whereby it was impossible for man to do any good thing, but rather a moral deterioration, producing, with repeated acts of disobedience, an increasing tendency to sin. Man, after the fall, retained his free will, and the power of abstaining from sin if he so pleased. On the question of the merits of Christ, the Socinian doctrine was essentially different from that of all the other Protestant sects. Christ's merits did not consist principally in his death, but in his life, his teachings, and his example. Nor was his death regarded as an atoning sacrifice, or as having any vicarious efficacy whatever, but simply as a confirmation of God's will, and the seal of the new covenant. Christ died for our sins —first, that all sinners might in this way have the assurance of forgiveness and of eternal life; secondly, that they might be drawn to Christ, and led to seek through him alone remission of their sins; and thirdly, that God might thus testify His boundless love to the human race, and might reconcile it to Himself. But the crucifixion was important chiefly as preparing the way for the great crowning miracle of the resurrection. Here, in fact, not Christ's death, but his resurrection, is the central point of the Christian scheme. By this he confirmed his doctrine of immortality, and prepared for his ascension into heaven, where he now fills the office of our great High Priest.

Jesus 'frees us from the punishment due to our sins, in that he continually protects us by the virtue and power which he has received from the Father, and by his intervention, defends us, as it were, from the wrath of God; and he frees us from servitude to our sins, by drawing us away from every kind of vice, and showing us in his own person the reward of him who abstains from sin.' Predestination in this system means the decree of God, made before the foundation of the world, that they who believed and were obedient should be saved, and that they who believed not and were disobedient should be damned. Justification takes place when God pardons our sins and gives us eternal life. The Socinians regarded the sacraments as simply external signs testifying to Christian faith. Hence they held infant baptism to be irrational as well as unscriptural, but thought that a custom so old and established should be tolerated.

It need scarcely be said, that the systematic theology of the early Socinians is in this country quite a thing of the past; indeed, the English U., though undoubtedly more or less influenced by their continental brethren of the Reformation period, have with the latter no very direct historical connection. They seem rather to have arrived at independent conclusions, through their 'rational' interpretation of Scripture, and their consistent rejection of human authority in matters of faith. The U. of the present day, like almost all Christian sects, must be divided into two classes—a conservative and a progressive class—or, as they are often called, an old and a new school. The former adopt the old rule of the sufficiency of Scripture, though with many such qualifications as the scientific criticism of the Bible has rendered indispensable. The most conservative U., for example, would not contend for the literal truth of the first chapter of Genesis, nor for the doctrine of verbal inspiration in any shape. The Bible *is not*, but it *contains*, the Word of God, is the form which best expresses their position on this subject. They generally hold the simple humanity of Christ, and even reject the supernatural birth, thinking the part of the gospels which record that event to be less authentic than the parts referring to the ministry, the death, and resurrection of Jesus.

To the death of Christ they ascribe much the same kind of efficacy as we have seen was ascribed to it by the Socinians, regarding his teaching and example as the most essential part of his work, and his death as an attestation to the truth of his mission, and a preliminary to his resurrection. What, however, chiefly distinguishes the U. of this school from those of the new or progressive school, is the place which they give to the miracles as supernatural sanctions of the truth of Christianity. In this respect they must be considered as still under the influence of Locke's philosophy and the theology of Dr. Priestley. Denying that man has any immediate knowledge or intuition of spiritual things, they regard Christianity as a system of moral and religious truth external to man's nature, and requiring in proof of its Divine origin, certain evidence beyond its inherent credibility and adaptation to human wants. This evidence they find in the miracles, which they accept as well-attested facts, on the same ground on which all historical facts are accepted. 'If there be any truth in history,' says Dr. Priestley, whose influence can still be traced in the U. of this school, 'Christ wrought unquestionable miracles, as a proof of his mission from God; he preached the great doctrine of the resurrection from the dead; he raised several persons from a state of death; and, what was more, he himself died and rose again in confirmation of his doctrine. The belief of these facts I call the belief of Christianity.' According to this view, therefore, Christ is an ambassador from heaven to earth; the miracles he wrought are his credentials; and the moral and religious truths which he taught are his message. It is not indeed denied that many or all of those truths might be learned from the light of nature, but they have received from Christianity a sanction which gives them a greater degree of certainty than they could otherwise possess.

The U. of the progressive school, on the other hand, have abandoned the philosophy of Locke for more spiritual modes of thought. So far from regarding man as entirely dependent upon his reasoning powers for his knowledge of religion, they rather look upon him as standing in a living relationship with the one

infinite source of all truth, and as having within his own nature the germs of the highest religious faith. Christianity, accordingly, they regard not as a *message* or a system of truth communicated and authenticated from without, but as the highest expression of the Divine in humanity—an expression not necessarily preternatural, but connected with the previous history of mankind by the natural laws of moral and spiritual development. To this view of Christianity, the miracles are not felt to be essential as proofs; and the truths of the gospel are thought to be quite unaffected by any judgment regarding them. The U., however, of this school, while, from their point of view, they regard the question of the miraculous as one of critical rather than religious interest, yet generally accept the miracles as historical facts, considering that there is sufficient evidence to prove that they took place. A few, but an increasing number, agree with Theodore Parker and many of the German critics in rejecting them on the twofold ground, that they are intrinsically incredible, and that the evidence for them is conflicting and uncertain. Generally speaking, the U. of this school, like the so-called Broad Church men, are disposed to regard with favor the freest criticism of the Bible.

Holding that inspiration is a quality which is not peculiar to the Bible, but common to all the most elevated religious literature, and that it in no case implies immunity from error, they maintain that the Scriptures must be subjected to the same rules of criticism and interpretation as any other book, and that each book of Scripture is to be studied not as a collection of infallible oracles, but as a record of the mind of the age in which it was produced. In this light, however, and also as a record of the grandest religious movements of the world's history, they hold the Bible in the highest estimation. Such is a statement, necessarily imperfect, of the peculiarities of the two Unitarian schools in their extremest divergence from one another; it need scarcely be added that in fact they merge into each other by imperceptible gradations.

It will, of course, be understood that the U. of all shades of opinion are agreed in rejecting the entire orthodox scheme—including the doctrines of the Trinity, the vicarious atonement, the Deity of Christ, original sin, and everlasting punishment—as both unscriptural and irrational. They celebrate the Lord's Supper in their churches, not as a sacrament, but as a service commemorative of Christ's death, and expressive of spiritual communion with him. They also adhere generally to the rite of infant baptism, though there are a few Unitarian Baptist churches. In recent years, the U. have given renewed prominence to the principles of Comprehension and of Free Inquiry apart from the restraints of theological creeds, conceiving that in this they are conforming to the spirit of their Presbyterian forefathers; and many even object to the name Unitarian, as one which might be held to imply a doctrinal bond of union, and to be, to that extent, inconsistent with the fundamental principles of the body, which both now and in former times have always included unrestricted freedom of religious thought.

It is impossible here to explain at greater length the Unitarian position; but it may be mentioned, as an important fact, that when, at the meeting of the British and Foreign Unitarian Association in 1866, it was proposed to add to the rules a clause defining 'Unitarian Christianity,' the motion was almost unanimously rejected. The motion was intended as a protest against anti-supernaturalism. Its rejection, on the other hand, was an assertion of the principle of comprehension and freedom, and was voted for by those who sympathized doctrinally with the proposer, as well as by those who differed from him.—For fuller information on the history and doctrines of the U., the reader may consult Dr. Beard's *Unitarianism in its Actual Condition;* the Rev. J. J. Tayler's *Religious Life of England;* Otto Fock's *Socinianismus;* and Lange's *Geschichte und Lehrbegriff der Unitarier vor der Nicänischen Synode.*

UNITED GREEKS. See GREEK CHURCH.

UNI'TED PRESBYTE'RIAN CHURCH, the name of a religious body in Scotland, which was constituted in 1847 by the amalgamation of the SESSION and RELIEF CHURCHES, whose origin and history we propose briefly to narrate.

The SECESSION CHURCH.—The causes which led to the formation of the Secession Church, in order to be thoroughly understood, would require to be unfolded at much greater length than our space permits. But some notice of them, however brief, is absolutely necessary. It is well known that the Reformation from popery in Scotland was a very radical and decisive affair in regard to both the doctrine and government of the church. The people became strongly Calvinistic and Presbyterian; and after the accession of James to the English throne (1603), their attachment to their ecclesiastical system became stronger still. The efforts of that monarch to supplant it by Episcopacy proved unavailing, so far as the great body of the commons and gentry were concerned; but moved by various considerations, into which religious conviction entered only as a very subordinate element, many of the Scottish nobles adopted the church principles of their sovereign, and after the Restoration (1660), supported the governments of Charles and James in their persecution of the Covenanters. See COVENANTS; SCOTLAND; SCOTLAND, CHURCH OF.

At the meeting of the Scottish Estates in 1690, Episcopacy, which, in Scotland, had obtained a temporary supremacy under the rule of Sharp (q. v.) and Lauderdale, and had, besides, become synonymous with adherence to the House of Stuart, was abolished, and Presbyterianism re-established. One unavoidable consequence of this was the abolition of the *right of patronage*, for in a multitude, probably the great majority, of cases, the exercise of this right would have placed the nomination to ecclesiastical benefices in the hands of Episcopalian landholders, and thereby imperiled the existence of a sound Presbyterian ministry. But although there were still many zealous Presbyterians in Scotland, especially among the peasantry, the spirit of the nation as a whole had gradually undergone a great, and, in the opinion of some, a disastrous change, so far as religion was concerned. A kind of torpor seized the upper and middle classes after the 'glorious Revolution,' and earnestness growing unfashionable, was sneered at as fanaticism. A proof of the latitudinarianism of the times is the fact, that some hundreds of Episcopalian curates were allowed to retain the parishes in which they had been arbitrarily stationed, on subscribing the *Confession of Faith;* and great numbers of laymen became elders in a church whose strict adherents they had themselves but recently hunted even to death. This obtrusion into the church of curates whom Bishop Burnet describes as 'the worst preachers I ever heard, ignorant to a reproach, and many of them openly vicious,' produced, as may easily be conceived, a pernicious influence on the purity of ecclesiastical discipline; and in 1712, when the obnoxious *Law of Patronage* was restored, the triumph of the 'court' or 'moderate' party in the church may be regarded as complete. See MARROW CONTROVERSY.

Violent settlements, effected by the agency of dragoons, now became frequent, and greatly irritated the people, whose petitions and appeals were almost invariably disregarded; and finally, in 1730, the Assembly enacted that in future no reasons of dissent 'against the determinations of church judicatures' should be entered on record. This attempt to gag the mouths of congregations was more than some could bear, and in October 1732, the Rev. Ebenezer Erskine of Stirling, in a sermon delivered in his capacity of moderator before the synod of Stirling and Perth, denounced in solemn and impassioned words the recent legislation and spirit of the church. A committee was immediately appointed to consider the matter, and reported rather vaguely but unfavorably at the ensuing meeting of synod; in consequence of which, Mr. Erskine, after three days' 'warm reasonings,' was found deserving of censure by a majority of six. He immediately protested (as did also twelve other ministers and two elders), and appealed to the next General Assembly, which sustained the decision of the synod, and ordered the rebuke and admonition to be administered, 'in order to terminate the process.' Erskine, of course, had to submit to censure, but left a written protest on the table of the Assembly, in which he declared his intention to continue testifying against the 'defections' of the time. This protest was also signed by William Wilson, minister of Perth; Alexander Moncrieff, minister of Abernethy; and James Fisher, minister of Kinclaven. The Assembly was indignant, and next day ordained that the four brethren appear before the Commission in August, next, to express sorrow for their conduct, and retract their protest; ' on pain of being suspended from their ministry. This they refused to do, and in consequence were declared 'no longer ministers of the church' (November 1733), whereupon they handed in a final written protest, in which, after referring to the 'defections from our reformed and covenanted principles' of the 'prevailing party,' they protested that they were obliged TO MAKE A SECESSION FROM THEM, and appealed unto the first free, faithful, and reforming General Assembly of the Church of Scotland.

This was the origin of the famous 'Secession Church,' which has made so deep an impress on the religious life of Scotland. At first composed of only four ministers, it rapidly began to gather strength. Little Christian societies were everywhere formed, which were gradually supplied with pastors either from the Establishment, or from pious youths trained to the work of the ministry by Erskine and his friends. Erskine and his friends drew up a statement of their reasons for separation, which was published under the title of *A Testimony to the Doctrine, Worship, Government, and Discipline of the Church of Scotland, or Reasons (by the Four Brethren) for their Protestation entered before the Commission of the General Assembly.* This document, which afterwards came to be known as the 'First or Extra-judicial Testimony,' presented in a polemical or argumentative form those facts in the later history of the Church of Scotland at which we have already glanced; and is of great value with reference to a proper understanding of the grounds of secession. From it we learn that it was *not* one thing only, not even the unpopular 'law of patron-

age' (as has sometimes been carelessly imagined and asserted), that induced Erskine and his friends to leave the church of their fathers; but an accumulation of grievances that in their eyes had become insupportable. In short, the Secession Church had a *religious*, and not a *political* origin. What the 'four brethren' sought was the vindication of what they held to be evangelical truth, much more than of the mere right of 'popular election.' So much popular indignation was excited by the deposition of the 'four brethren,' that it was thought desirable by the majority of the 'Moderate Party' to make certain concessions to the 'Evangelicals,' or 'Marrow party,' lest the spirit of insurrection should grow, and perhaps overturn the Establishment.

Accordingly, the General Assembly of 1734 passed some measures distinctly favorable to the latter party, and curiously contrasting with their former procedure; and finally, on the last day of the sittings, empowered the 'synod of Perth and Stirling' to remove the censures from the four brethren, and to restore them to their respective charges. This was done; and to show how far their new-born cordiality could go, the synod proceeded, in Mr. Erskine's absence, to elect him 'moderator;' but Mr. Erskine declined to be 'reponed,' and gave his reasons in a letter to the Stirling presbytery, and in a pamphlet subsequently published. In December 1736 appeared the pamphlet entitled *An Act, Declaration, and Testimony for the Doctrine, Worship, Discipline, and Government of the Church of Scotland*, commonly known as the 'Judicial Testimony,' which is a sort of survey of the whole ecclesiastical history of Scotland from the Reformation downwards, in which all the 'instances of defection and relapse are marked and judicially condemned.' In 1737, the Rev. Thomas Mair of Orwell, the Rev. Ralph Erskine of Dunfermline, the Rev. Thomas Nairn of Abbotshall, and the Rev. James Thomson of Burntisland, joined the original 'four.' The church authorities, filled with anger and alarm, now resolved to proceed to extremities against the seceders. In 1738, the 'commission,' obeying the injunctions of the Assembly of that year, libeled the 'Eight Brethren,' and summoned them to appear before the Assembly of 1739, which they did—having, however, first drawn up and passed an act entitled a *Declinature*, in which they disclaimed the authority of the Established courts. One final effort was made by the Assembly to bring them back to the bosom of the church, but it failed—the 'brethren' adhering strictly to all their former protestations and testimonies; and after a 'year of grace,' the General Assembly of 1740 solemnly pronounced their deposition, and the connection between Erskine and the church of his fathers was for ever at an end.

It is not necessary to describe minutely the gradual extension of the 'Secession movement' among the people of Scotland, but we may mention, that in spite of the frequent refusal of sites for churches, and other modes of persecution, the cause abundantly prospered; and after a few years, the 'Secession Church' came to be recognized as a really important body, both from the number of its congregations, and the grave, serious, and solid character of its members.

In 1747, a rupture or 'breach' took place in the new body on the question of the burgess-oath, some affirming that this oath could not be taken by any consistent Seceder, and others insisting that it could, and that the question regarding it ought to be matter of mutual forbearance. The party condemning the religious clause in the burgess-oath formed the *General Associate Synod*, or popularly, the *Anti-burgher Synod;* the party tolerating it, the *Associate* or *Burgher Synod*. Subsequently, a second split occurred in each of these, and two other trivial denominations were formed, the one assuming the designation of the *Constitutional Associate Presbytery*, or *Old Light Anti-burghers* (1806); and the other, the designation of the *Original Burgher Presbytery*, or *Old Light Burghers* (1799). After holding aloof from each other for more than 70 years, the Burghers and Anti-burghers began to approximate once more, and finally, on the 8th September 1820, in Bristol Street meeting-house, Edinburgh, the synods of the two long separated branches of the Secession were solemnly re-united.

At the date of the 'breach' (1747), the number of Secession congregations was 32; when the reunion took place it had increased to 262. Henceforward, the history of the Secession Church exhibits a course of uninterrupted prosperity. A certain change, however, now begins to show itself in the character and spirit of the denomination. Hitherto Seceders had worn a sort of *old-world look*, if we may use these words respectfully; their thoughts and interests in matters ecclesiastical centered round bygone times and events; their very language, like their sentiments, was archaic, and fell coldly upon all but the devoutest ears. Now, however, the wants of the modern world made themselves felt even in the narrow circles of Scotch dissent. In a word, they came under the liberalizing influences of the new-born enthusiasm for foreign missions, and started 'stations' in Canada, Jamaica, Trinidad, Calabar, &c. So vigorously was this important branch of Christian work carried on, that in 1847, at the period of the union of the Secession and Relief Churches, the former was found to be supporting a staff of more than 60 missionaries in different parts of the world. Further, the *Secession* Church began to assume an attitude more distinctly antagonistic to the Establishment. Though it has never formally avowed the *voluntary* principle (see VOLUNTARYISM), yet the fact that it has maintained itself *ab initio* by voluntary effort, has had the effect of determining the great majority of the pastors and people to adopt this principle.

A variety of circumstances, partly political and partly ecclesiastical, led to a great controversy between leading divines of the Establishment and of the Secesssion, known as the *Voluntary Controversy* (1829—1834), which served to strengthen the voluntaryism of the Seceders, and brought them more closely into connection with the Relief Church (see below), whose theoretical voluntaryism was perhaps still more pronounced. Next followed the famous *Atonement Controversy*, in which the Secession Church signalized itself by an adherence to the liberal evangelical theology of the Marrow, and on this vital point also it had the sympathy and support of the Relief body. The desire for union between the two denominations now became stronger than ever. Committees were appointed, and conferences held; and at length on the 13th May 1847, in Tanfield Hall, Edinburgh, the union of the Secession and Relief was formally accomplished, and the two churches abandoning the names by which they had hitherto been known, formed themselves into one body under the designation of the UNITED PRESBYTERIAN CHURCH.

We now revert to the RELIEF CHURCH, whose history and fortunes we shall briefly narrate. After the expulsion of Erskine and his friends from the Church of Scotland, the assemblies (packed with 'Court of Session elders') became more determinedly 'moderate' than ever. The split that occurred among the Seceders in 1747 convinced them that they had now little to fear from the aggressive zeal of their opponents, who had taken to quarreling among themselves; and, desiring to stand well with government for various reasons, they boldly resolved to deprive the people of all right to elect, or in any way to interfere with the election of, ministers. Never were forced settlements more shameless than about this period; but it has been well remarked, 'there is a point at which oppression becomes intolerable; and to a religious people, no oppression is half so galling as that which is spiritual.' *Relief* was felt to be a necessity, and relief came in the person of the Rev. Thomas Gillespie, minister of the parish of Carnock, near Dunfermline. The circumstances which brought him into collision with the General Assembly were these: In 1749, the Rev. Andrew Richardson was presented to the parish of Inverkeithing by the patron, Captain Philip Anstruther; but the presentation proved so extremely unpopular that the presbytery of Dunfermline refused to proceed with it.

In 1750, the case came before that high-handed body, the 'Commission of the Assembly,' who ordered the presbytery to proceed at once to induct Mr. Richardson. This mandate they firmly refused to obey; and when, after much discussion, the affair again came before the Commission in March 1752, it was resolved to transfer the onus of the unpopular settlement from the shoulders of the presbytery of Dunfermline to those of the synod of Fife. This compromise did not satisfy the out-and-out Moderates in the Church of Scotland. It was therefore resolved to make an example of the presbytery of Dunfermline at the ensuing Assembly. On 18th May, the 'Inverkeithing case' came on, and after a brief but animated debate, the conduct of the 'Commission' was condemned by the Assembly without coming to a vote; the presbytery of Dunfermline was ordered to induct Mr. Richardson on Thursday the 21st, and on the day following to appear at the bar of the Assembly. The presbytery did *not* meet on Thursday—at least a *quorum* did not—and Mr. Richardson was consequently not inducted. On Friday, six ministers of the presbtery—Robert Stark, David Hunter, Thomas Gillespie, Alexander Daling, Thomas Fernie, and John Spence—handed in a 'representation,' explaining why they could not obey the commands of the supreme court. They were warned by the moderator of the danger in which they stood, and were finally informed that if they remained obdurate, *one* of them should be deposed. Next day, they were called in *singly*. Stark, Fernie, and Hunter all wavered and shifted their ground a little; Daling and Spence said nothing; but Gillespie was ready with a second 'representation.' This was enough. Gillespie was fixed on as the most suitable sacrifice, and almost without trial, without a libel or any formal process whatever, he was arraigned, cast, condemned, and deposed. The majority of the General Assembly, corrupt as its composition undoubtedly was, seems to have shrunk from active participation in the deed. Out of 158 members present, only 56 ventured to vote, and these, it must be remarked, were mainly lawyers!

The *Relief Church*, it will thus be seen, was founded simply on an assertion of the right of congregations to elect their own ministers. In 1758, Mr. Thomas Boston, junior, minister of Jedburgh, and son of the great Boston, threw in his lot with Gillespie; in 1761, the congregation of Colinsburgh, in Fife, did the same. The Relief had now got a footing and steadily increased.

'Societies' (as in the case of the Seceders) sprung up everywhere, which were gradually formed into congregations, and obtained ministers from the Establishment, the Secession, the Reformed Presbytery, and the English Presbyterians; nevertheless, they had long to sustain a severe fire of attack from the Seceders and Reformed Presbyterians, on account of their firm adherence to the latitudinarian principle of 'free communion,' i. e., of holding Christian fellowship at the Lord's table with other denominations. It is unnecessary to prosecute the history of the Relief further than to state that at the union in 1847 it numbered 113 congregations, while the Secession numbered 384 congregations; so that the UNITED PRESBYTERIAN CHURCH commenced with 497 churches, and a membership estimated at more than 140,000.

UNITED PRESBYTERIAN CHURCH.—The career of this church as a corporate body has been one of uninterrupted prosperity, and scarcely more is necessary than to indicate its present attitude and condition. In point of doctrine, it adheres (like all the other Presbyterian churches of Scotland) to the Westminster Confession of Faith, and the Larger and Shorter Catechisms, 'it being always understood that we do not approve of anything in these documents which teaches, or may be supposed to teach, compulsory, or persecuting and intolerant principles in religion'—a qualification supposed to refer more particularly to the 23d chapter of the Confession of Faith. Its form of church government is Presbyterian; but, unlike the Established and Free Churches, it has no intermediate courts between presbyteries and the supreme court, the latter of which it does not call a General Assembly, but only a Synod; though, in point of fact, it partakes more of the nature of a 'General' Assembly than the bodies known by that name, since it is really an assembly of the whole clergy of the denomination, with one elder from each kirk-session. It has a Theological Hall and Library in Edinburgh, and a staff of professors. The United Presbyterian Church is also at present, not only in *practice*, but also in *theory*, a voluntary church. The voluntary principle, it is true, is not formally laid down in any portion of her standards or 'Basis of Union;' but a long experience of practical voluntaryism has finally led, one may almost say, the whole body of United Presbyterians to the conviction that the interests of Christianity are best served by the total separation of the church from the state. Although inferior in point of wealth to the Established and Free Churches, the United Presbyterian Church has honorably distinguished itself by its general liberality and occasional munificence.

In the year 1875 about 100 congregations of the U. P. Church situated in England were transferred by the mother church in Scotland to the 'Presbyterian Church in England' (q. v.). Since the separation of its English branch the U. P. Church still counts about 580 congregations and over 174,000 members. Protracted negotiations for union between the U. P. and Free Churches have been without result.

UNITED PROVINCES. See NETHERLANDS.

UNITED STATES OF AMERICA, a federated republic, composed of 38 independent states, eight organized and two other territories, and a federal district, occupies the central portion of the continent of North America, from lat. 24° 30′ to 49° 24′ N., long. 66° 50′ to 124° 45′ W., exclusive of Alaska. Its greatest length, from the Atlantic to the Pacific, is 2760 miles; greatest breadth, from Minnesota to Texas, 1600; northern or British frontier, 3540 miles; Mexican, 1550 miles; ocean coast, including the larger indentations, 12,609 miles, of which 6861 are on the Atlantic, 3461 on the Gulf of Mexico, and 2281 on the Pacific. The area of the U. S., as revised at the census of 1880, is 3,602,990 sq. m. The vastness of this territory will be best recognized by remembering that the total area of Europe is but little greater, being estimated at 3,826,000 sq. m. Texas, one of the states, is itself considerably greater in extent than the Austro-Hungarian Empire; and there are four other states or territories, each larger than the United Kingdom.

In 1783, the U. S. had an area of only 827,844 sq. m.; by the purchase of Louisiana from France in 1803, it acquired 1,171,931; by the cession of Florida by Spain in 1819, 59,270; by the annexation of Texas in 1845, 376,000; by the Oregon Treaty with Great Britain in 1846, 280,425; by the Mexican treaties, 677,260; and by the purchase of Alaska from Russia in 1867, 577,390 sq. m.

The 38 states composing the Federal Republic, each having its constitution, legislature, executive, and judiciary, and represented in the Federal Congress by two senators, and from 1 to above 30 representatives, according to its population, may be arranged in six groups, as in the accompanying table.

The eight organized territories are governed by the Federal Congress, with governors and judiciary appointed by the President of the U.S., but have a local legislature, and send a delegate without a vote to Congress. There is also the Indian Territory, a reserve for Indian tribes removed from the east of the Mississippi River; and unorganized region west of this, called Public Lands; the district of Columbia (60 sq. m.), ceded by Maryland, including Washington, the Federal capital, governed by Congress; and Alaska, under military rule. All these states and territories are described separately.

The original thirteen states are those which are marked in the table as having been admitted between 1787 and 1790. At the outbreak of the Civil War, there were fifteen slave-holding states; in the table they are the south-eastern and southern states, together with Nos. 10, 11, 12, and 27 (11 being then part of 13). In 1881 the preliminary steps were taken for having the southern half of Dakota delineated as a new territory, with the name of Pembina.

Physical Character.—Though occupying the central portion of a continent, more than two-thirds of the frontiers of the U. S. are shores of lakes and oceans, with numerous bays and sounds, rivers, and lakes. The principal lakes, besides those divided with British America, are Lake Champlain, Lake Michigan, Great Salt Lake, Pyramid Lake, Mono Lake, Lake Tulare, and many beautiful clusters of smaller lakes in Maine, New York, Minnesota, &c.

The rivers of the U. S. may be classed in four divisions: 1. The Mississippi and its branches (q. v.); 2. The rivers emptying into the Atlantic or its bays and sounds—the St. Croix, Penobscot, Kennebec, Merrimac, Connecticut, Hudson, Delaware, Susquehanna, Potomac, James, Roanoke, Nense, Cape Fear, Pedee, Santee, Savannah, Altamaha, St. Johns, &c.; 3. Those, besides the Mississippi, emptying into the Gulf of Mexico—the Chattahoochee, Alabama, Tombigbee, Pearl, Sabine, Trinity, Brazos, Colorado, Nueces, and Rio Grande; 4. Those emptying into the Pacific—the Oregon or Columbia, Sacramento, San Joaquin, Colorado, &c. Besides these, there are many small rivers emptying into the great lakes, and finding their outlet through the St. Lawrence; and the rivers which empty into the salt lakes of the great interior basin of Utah.

The chief mountains of America are those of the Alleghanies and the Rocky Mountains; for the extraordinary scenery of the west, see YELLOWSTONE; also COLORADO and YOSEMITE.—The geology of the U. S. will be found under the titles AMERICA, APPALACHIANS, ROCKY MOUNTAINS, and the several states.—The soil is of every variety, from the sterile deserts of the great western plains and Utah, to the inexhaustible fertility of the bottom-lands of the Mississippi Valley, where heavy crops of maize have grown for fifty successive years without manuring. The St. Lawrence basin is an elevated calcareous plain, fertile and well wooded. The Atlantic slope from Maine to New Jersey, east of the Hudson, is hilly, and best adapted for grazing; more southerly, the coast-belt is low, sandy, in places swampy, with pine-barrens, the inland region fertile, and among the best in the country. The Mississippi valley is generally level, and prairie-land of unsurpassed fertility, with a rich mould, in places 25 feet deep. North-west, the country rises to a high and sterile region, extending from 200 to 400 miles from the base of the Rocky Mountains. The Texas slope has rich bottom-lands on the coast, a fine rolling fertile country, rising to a high plateau, dry and sterile, except in the river-bottoms. The Pacific slope is generally sterile, except the great valleys between the mountain-ranges, and bordering the rivers, which are of great fertility.

Utah, with the exception of a few fertile spots, is a desolate untimbered region of salt lakes and land saturated with alkaline substances. The country east of the Mississippi, except the prairies of Illinois and Indiana, was, at its settlement, heavily wooded, and there are still vast forests of valuable timber—beech, birch, maple, oak, pine, hemlock, spruce, walnut, hickory, ash, elm, &c.; and in the south, live oak, water oak, magnolia, palmetto, tulip-tree, cypress, cotton-wood, cane, &c. West of the 97th meridian stretches a vast region of almost treeless prairies; forests again occur in the Rocky Mountains, and California, Oregon, and Washington Territory have the largest timber in the world. The flora and fauna will be found under the head NORTH AMERICA (*Botany, Zoology*), and the several states.

Population.—The growth of the population will be best seen from the table, which shows the rapid increase of the inhabitants of the Republic at various censuses from 1800 to that of 1880. How far this is due to foreign immigration is shown by some appended figures. It is to be noted that the census figures for the various states do not include in their totals, the tribal or wild Indians within their limits. These are estimated apart, but the civilized or settled Indians are reckoned along with their neighbors of European stock. A separate column shows the number of the colored persons.

At the census of 1880 there were 64 cities in the U. S. with between 20,000 and 50,000 inhabitants; 15 between 50,000 and 100,000; 10 between 100 000 and 200,000; 3 between 200,000 and 300,000; 3 between 300,000 and 400,000; 2 between 400,000 and 500,000; 1 (Philadelphia) over 800,000; and 1 (New York) with upwards of 1,200,000. It was found that of the 18 most populous cities of the U. S., 6 had increased since 1870 by from 20 to 30 per cent. 4 from 30 to 50, 4 from 50 to 71, and 1 (Milwaukee) 92 per cent.

No country has been peopled by such a variety of races. New

England was settled by English Puritans, and a few Scottish and Welsh; New York, by Dutch; Pennsylvania, by Quakers and Germans; Maryland, by English Roman Catholics; Delaware and New Jersey, by Dutch and Swedes; Virginia, by English cavaliers; the Carolinas, in part by French Huguenots; Louisiana, by French; Florida, Texas, and California, by Spanish; Utah, by Mormons, chiefly from England, Wales, and Denmark. Immigration from Ireland, Germany, England, Scotland, France, Switzerland, Sweden has been large and progressive. Of the total of 50.155.783 reckoned in the census, 25.518,820 were males, and 24.636,963 females; 43,475,840 were native born, and 6,679,943 were whites, foreign born, 105,465 were Chinese, 148 Japanese, and 66,407 were civilized Indians. The table shows separately the tribal Indians, and the occupants of the Indian territory. Of the whites foreign born, 2,772,169 were natives of the United Kingdom; 1,966.742 were Germans; 717,084 British Americans; 194,327 Norwegians; 181,729 Swedes; 106,971 French.

It is said that the Irish and the Germans, with their descendants constitute one-third of the entire population; about 10,000,000 being set down as of Irish descent, and 6,000.000 of German stock. From 1820 to 1880, the immigrants from Great Britain and Ireland numbered over 4,700,000. The current of immigration which goes to swell the grand total is very large, but fluctuates from year to year. Between 1870 and 1880 it varied from 138,000 in 1877, to 457.000 in 1880; in 1881 it reached the enormous aggregate of 669,431.

Climate.—For a particular account of the climate of the U. S., we refer to the articles RAIN and TERRESTRIAL TEMPERATURE. It is remarkable for wide transitions of cold and heat, rain and drought, except in the peninsula of Florida, where the temperature varies but 12° F., and Western Oregon and Washington Territory, where the climate is like that of England. With few exceptions, the summers are hot, both north and south, the thermometer rising at times to 110° F., and along the northern range of states sinking to—20°, and even sometimes as low as—40°. The whole Atlantic coast has a winter temperature 10°

States.	Admitted.	Area in Sq. Miles.	Pop. in 1800.	Pop. in 1820.	Pop. in 1860.	Pop. in 1870.	Pop. in 1880.	Colored Pop. in 1880.
I. NEW ENGLAND STATES.								
1. Massachusetts	1788	8,315	423,845	523,159	1,231.066	1.457,351	1,783.085	18,697
2. Maine	1820	33.040	151,719	298,269	628,279	626,915	648.936	1.451
3. Connecticut	1788	4,990	251,002	275.148	460.147	537.454	622.700	11.547
4. Vermont	1791	9,565	154.465	235.966	315.098	330.551	332.286	1,057
5. New Hampshire	1788	9,305	183,762	244.022	326.073	318.300	346.991	685
6. Rhode Island	1790	1,250	69,122	83,015	174,620	217,353	276,531	6,488
II. MIDDLE STATES.								
7. New York	1788	49,170	589.051	1.372 111	3.880,735	4.382.759	5.082.871	65,104
8. Pennsylvania	1787	45.215	602,365	1.047,507	2.906.215	3.521.951	4.282.891	85.535
9. New Jersey	1787	7.815	211.149	277.426	672.035	906.096	1,131.116	38,852
10. Maryland	1788	12,210	341,548	407 350	687.049	780.894	934,943	210,230
11. West Virginia	1862	24.780	....	66.557	....	442.014	618.457	25,886
12. Delaware	1787	2.050	64,273	72,749	112.216	125.015	146.608	26,442
District of Columbia	1790	70	14,093	33.039	75,080	131.700	177,624	59,596
III. SOUTH EASTERN STATES.								
13. Virginia	1788	42,450	880,200	1.065,116	1.596.318	1.225.163	1.512.565	631,616
14. Georgia	1788	59,475	162.686	340,985	1,057.286	1.184.109	1.542.180	725.133
15. North Carolina	1789	52.250	478.103	638.829	992.622	1.071.361	1.399.750	531.277
16. South Carolina	1788	30,570	345.591	502,741	703.708	705.606	995.577	604 332
17. Florida	1845	58,680	....	....	140,424	187,748	269.493	126,690
IV. SOUTHERN STATES.								
18. Kentucky	1792	40,400	220,995	564,135	1,155,684	1.321.011	1.648.690	271,451
19. Tennessee	1796	42,050	105,602	422.771	1,109.801	1.258 520	1.542.359	403.151
20. Alabama	1819	52,250	....	127.901	964.201	996.992	1.262.505	600.103
21. Mississippi	1817	46,810	8,850	75,448	791.305	827,922	1.131.597	650.291
22. Texas	1845	265.780	...	....	604.215	818.579	1.591,749	393.384
23. Louisiana	1812	48,720	....	152,923	708.002	726.915	939.946	483,655
24. Arkansas	1836	53,850	....	14,255	435,450	484.471	802.525	210,666
V. INLAND STATES.								
25. Ohio	1802	41.060	45,365	581,295	2,339.511	2.665.260	3.198.062	79.900
26. Illinois	1818	56.650	....	55.162	1.711.951	2.539.891	3.077.871	46.368
27. Missouri	1821	69.415	....	....	1,182.012	1.721.295	2.168.380	145.350
28. Indiana	1816	36.350	5,641	147.178	1.350.428	1.680.637	1.978.301	39.228
29. Iowa	1846	56.025	..	....	674.913	1.194.020	1.624.615	9.516
30. Michigan	1837	58.915	....	8,765	749.113	1.184.059	1.636.937	15.100
31. Wisconsin	1848	56.040	....	....	775.881	1.054.670	1.315 497	2.702
32. Minnesota	1857	83.365	....	....	172.023	439.706	780.773	1,564
33. Kansas	1861	82.080	....	....	107.206	364.399	996.096	43.107
34. Nebraska	1867	76.855	....	....	28.841	122.993	452.402	2.385
35. Colorado	1875	103,925	....	....	34,277	39,864	194.327	2.435
VI. PACIFIC STATES.								
36. California	1850	158.360	....	....	379.994	560.247	864.694	6.018
37. Oregon	1859	96.030	....	....	52,465	90.923	174.768	487
38. Nevada	1864	110.700	....	....	6,857	42,491	62,266	488
TERRITORIES.								
1. New Mexico	1850	122,580	....	....	93,516	91.874	119,565	1,015
2. Arizona	1863	113.020	....	....	....	9.658	40.440	155
3. Utah	1850	84.970	....	....	40.273	86.786	143.963	232
4. Washington	1853	69.180	....	....	11,594	23.955	75.116	325
5. Idaho	1863	84.800	...	....	....	14.999	32.610	53
6. Montana	1864	146.080	....	....	....	20 595	39.159	346
7. Dakota	1861	149.100	....	....	4.837	14.181	135.177	401
8. Wyoming	1868	97.890	....	....	....	9.118	20.789	298
TOTAL		2,954.450				38.696.984	50.155.783	
Indian Territory	....	64 690	....	.....	....	68,152	76.895	....
Indians	...	...	....	....	....	....	179.232	.....
Alaska	1867	577.390	....	....	....	(?) 30.000	30.156	....
Public Lands, &c		6.460	....	....	...	....	....	..
TOTAL OF UNITED STATES		3,602,990	5,309,427	9,633,822	31 443,321	38,795.136	50,442.066	6.580.793

lower than that of Western Europe in the same latitude. Thus, at New York, in the latitude of Madrid, the Hudson River is frozen, and the harbor at times filled with floating ice.

The causes modifying the climates of the different portions of the states chiefly arise out of the physical features; of which the Rocky Mountains, the Gulf of Mexico, the Atlantic, and the lake system in the north are the most prominent. On the west, from the shores of the Pacific to the Cascade Mountains, one of the most important ranges of mountains in America, the climate resembles that of Great Britain more closely than that of any other country in the world, being mild and humid, with frequent showers at all seasons. But the great valley lying between the Cascade and the Rocky Mountains is almost entirely a rainless district, because the westerly winds are drained of their moisture in crossing the Cascade Mountains before arriving there. In winter, it is covered with snow, but in summer is dry and arid. Owing, however, to the copious streams poured down from the melting snow, it presents abundant facilities for irrigation, so that its capabilities and resources are great, if they were properly developed. The country east of the Rocky Mountains depends for its rain on the Gulf of Mexico; and the rainfall there is distributed most in the low plains, and least on the plateaux and mountains. Hence over this extensive district southerly winds are warm and moist, and westerly and northerly dry and cold.

The result is rapid alternations of temperature, such as are never experienced in Western Europe, the temperature having frequently a range in the course of a day of 50° or 60°. In the New England states, the northerly and easterly winds are cold moist, and chilly, accompanied with frequent fogs; otherwise the climate resembles that of Great Britain. The climate of the states surrounding the great lakes in the north is mild and moist in summer as compared with the other northern states; but in winter, when the lakes are frozen over, a degree of cold is experienced greater, absolutely and relatively, than anywhere else in the states. This excessive cold is caused by the country being exposed in the north to the full sweep of the polar current from the north; but more particularly to its low-lying situation, thus forming, as it were, a vast basin into which is poured from all sides the cold, and therefore heavy, currents of air chilled by terrestrial radiation during the winter season.—The health of the U. S. varies with climate, elevation, &c. Swamps and river-bottoms in some regions, especially the more fertile, are malarious. The rice-swamps of Georgia and South Carolina are fatal to whites, but not to negroes. In vast tracts of new country, even the rolling and hilly, the disturbance of the soil causes intermittent fevers. Diseases of the lungs prevail in the northern and middle states, bilious fevers in the southern; in the western, intermittent and remittent bilious.

In 1850, the average mortality was 1 in 72, varying rather widely in different regions, modified not only by climate, but by the presence of large towns, and by immigration and emigration. In 1870, the lowest rates of mortality were 0·69 per cent. in Oregon, 0·80 in Minnesota, and 0·81 in Iowa; the highest were 1·77 per cent. in Massachusetts (with numerous manufacturing towns), and 2 in Louisiana (with yellow fever). Of the larger cities in 1880, Charleston had a death-rate of 32 per 1000, New York, 26; Baltimore, Brooklyn, and New Orleans, 24; Boston, 23; Washington, 22; Cincinnati, Cleveland, Chicago, and Philadelphia, 20; San Francisco and St. Louis, 19. Probably no portion of the world is more salubrious than Vermont, the eastern slope of the Alleghanies, California, and Oregon.

Mineralogy.—The U. S. are rich in mineral productions. Coal is found in every state except Maine, New Hampshire, Vermont, New Jersey, Delaware, South Carolina, Louisiana, Mississippi, Minnesota, Wisconsin, and Nevada. The area of the coal-measures is estimated at 300,000 sq. miles. The whole extent of the coal area in the U. S. has been divided into four principal coalfields or tracts—viz., the Great Central Alleghanian or Appalachain coalfield, extending from Alabama, through Eastern Tennessee and Kentucky, Western Virginia, Maryland, Ohio, Pennsylvania, and reappearing in New Brunswick and Nova Scotia. This field has been computed to cover within the U. S. an area of 50,000 to 60,000 sq. m., of which about 40,000 sq. m. are considered workable area.

The second coal-field occupies the greater part of Illinois and Indiana, and in extent is nearly equal to the first. A third field covers a large portion of Missouri; and the fourth, of Michigan. The Chesterfield bituminous coal-field, a small district near Richmond, contains the oldest collieries in America. The petroleum springs form a source of great wealth. Beds of rich marl are found in several of the eastern states, and in many, nitrates and carbonates of soda, and potassia, gypsum, and marble of great variety, and some of rare beauty. Iron is found everywhere, from the pure metal in mountain masses, to bog-ore; and in many places in close proximity to coal. Lead exists in rich deposits in Missouri, Arkansas, Illinois, and Iowa. Copper is found in several states, and in great quantities of ores of 71 to 90 per cent. on the borders of Lake Superior. Zinc exists in New Jersey and Pennsylvania, and tin in Maine and California. There are rich silver mines in Colorado, Nevada, Utah, New Mexico, Arizona, and California. Gold is found in small quantities in some of the Atlantic coast states; in great quantities in California, Oregon, Colorado, Nevada, Washington, Arizona, New Mexico, and Montana. There are also found platinum and mercury in California, osmium and iridium in Oregon, cobalt in North Carolina and Missouri, and nickel in Connecticut and Pennsylvania. The value of the produce of American mines increased by 90 per cent. in the period 1870—1880, and amounted in the latter year to 72 millions sterling. Over 9¼ millions of tons of iron ore were raised in 1880 (more than twice as much as in 1870); 20,300 tons of copper ore; 66 millions of tons of coal; and 860 millions of gallons of petroleum (20 times as much as in 1870). A value of $34,700,000 of gold was obtained in 1881, and $43,000,000 of silver.

Agriculture.—Agriculture holds the first place in the national industry. In 1871, the acreage of hay was 10,009,052; maize, 34,091,137; wheat, 19,943,893; oats, 8,365,800. The average size of farms, nearly all held by their cultivators in fee-simple, was 153 acres. In 1880, the acreage of maize was 52,965,000 acres, and of wheat, 36,000,000. The cereal crops of 1879 and 1880 were the largest ever known. The production of wheat in 1879 was 448,000,000 bushels, in 1880 it was 480,000,000; and of maize, 1,577,000 were produced in 1880. The advance in production between 1870 and 1880 was unprecedented, amounting to about 100 per cent., taking all kinds of grain produce; whereas, in 1860 to 1870, it was but 12 per cent. The production of cotton advanced from 1540 million lbs. in 1870 to 2773 millions in 1880. More than two-thirds of the world's cotton crop is grown in the states. Till 1859 the U. S. used occasionally to import wheat from Europe; now they produce one-fourth of the world's crop, and have a yearly surplus of 150,000,000 bushels. Between 1870 and 1880 the horses in the U. S. increased from 8,690,000 to 12,550,000; cows from 28,000,000 to 33,600,000; sheep from 28,500,000 to 38,000,000; hogs from 25,200,000 to 35,000,000. The shipments of cattle and meat from the U. S., which have enormously increased of late, exceeded, in 1880, the value of $25,000,000. The wine produce has steadily increased to about 20,800,000 gallons. Other important agricultural products are sugar, rice, tobacco, and vast quantities of fruits, varying in the various sections of the Republic. It has been estimated that the annual income of the U. S. from agricultural industries is about $3,000,000,000, as compared with $1,900,000,000 for France, and $1,325,000,000 for the United Kingdom.

Fisheries.—The fisheries of the U. S. employ from 800,000 to 1,000,000 persons, and give an annual yield of $27,300,000 (the yield of the British fisheries alone exceeding this aggregate.) Pisciculture is diligently and most scientifically practised and with the best results.

Manufactures.—The manufactures of the U. S. increased about 30 per cent. in the period 1870 to 1880. In the making of flour, the states are foremost in the world, the annual product being nearly 4½ billion dollars. In regard to textile manufactures, they come next after England, and make about one-sixth of the entire produce of the world. Between 1870 and 1880 the consumpt of cotton rose from 530 million lbs. to 911 millions, and of wool from 204 to 258 millions. In 1880, the combined produce of cotton and woollen manufactures in the U. S. was valued at $420,000,000. The total silk manufactures are valued at $34,000,000. The progress of iron and steel is marvelous; iron having risen in the past decade from 1,580,000 to 4,290,000 tons a year, and steel from 40,000 to 800,000 tons (both these quantities being surpassed by Great Britain). The Americans now make one-fifth of the iron, and one-fourth of the steel of the world. The flour trade employs 3,000,000 workmen, and textile manufactures 3,500,000. The chief manufacturing states are Maine, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Maryland.

Commerce.—The total value of imports into the U. S. rose from $462,380,000 in 1870 to $760,990,000 in 1880; that of exports of American produce, from $420,500,000 to $841,501,000 (the coin and bullion imported in 1880, $93,000,000, exceeding that exported, $85,240,000). The imports from Great Britain and Ireland were nearly $175,000,000 in 1870, and a little over $154,000,000 in 1880; the exports thither were only $305,000,000 in the former year, and $535,000,000 in the latter. The chief imports into the United States are cotton goods; iron, wrought and unwrought; linen and woollen manufactures. The chief exports are wheat and flour, cotton, tobacco, pork and hams, butter and cheese. More than one half of the exports of the U. S. go to the United Kingdom, the rest mainly to Canada, France, and Germany. Port entries of the U. S. doubled between 1870 and 1880 (16,193,000 tons entered in 1879); and the value of the carrying trade by land and sea has advanced greatly, though the shipping on the high seas has declined from $43,000,000 to $40,500,000.

Railways, &c.—The U. S. possesses an enormous extent of navigable rivers, canals, and railways. The Mississippi and its

branches afford 20,000 miles of steamboat navigation. Canals unite the waters of the Hudson River with Lakes Champlain, Ontario, and Erie in New York, the Delaware and Susquehanna rivers in Pennsylvania, the Ohio with Lake Erie in Ohio and Indiana, and the Mississippi with Lake Michigan in Illinois. Other canals make with these an extent of 3500 miles. Railways extend from the lakes to the Gulf of Mexico, and from the Atlantic to the Pacific. There were in operation in 1880, 85,000 miles of railway. Railways have doubled in ten years. New main lines of communication are the Southern Pacific (from Galveston by Topeka and Santa Fe), and the Northern Pacific, from St. Paul to the west.

Education and Religion.—The benevolent, literary, and scientific institutions of the U. S. are generally state institutions, accounts of which will be found under the heads of the respective states. The exceptions are the Smithsonian Institute (q. v.), American Association for the Advancement of Science, the National Academy of Sciences, and military and naval academies and hospitals.—In the U. S. are about 350 colleges (including UNIVERSITIES, q. v.), 120 theological seminaries, 100 medical schools, 40 law schools, great numbers of academies or high schools, and female seminaries. Free common schools are established in nearly all the states, sufficient for universal education, supported by taxes, school funds, and, in all the new states, the reservation of one or two sections of land, of 648 acres each, in every township. In 1880, there were near 4000 public libraries, with near 18,000,000 volumes (including in the total the district school libraries). Literary societies abound, and courses of lectures are largely provided. The press is very active. In 1871, there were 6056 periodical publications (637 daily); in 1881, there were above 8000 (1000 daily).

Religion is free from any interference of either the Federal or state governments, and all denominations exist in entire freedom upon the voluntary principle. The numbers of the principal religions denominations were as follows in 1880:

	Churches.	Ministers.	Adherents.
Roman Catholics	5,975	6,366	6,370,858
			Members.
Methodists	19,941	16,759	2,736,594
Baptists	27,476	17,695	2,320,431
Presbyterians	10,574	8,026	891,458
Lutherans	5,556	3,102	684,570
Christians (Disciples of Christ)	4,681	3,658	567,448
Congregationalists	3,689	3,589	383,685
Episcopalians	3,104	3,564	353,049
Reformed Churches	1,873	1,271	233,659
United Brethren in Christ	2,207	2,200	155,437
Adventists	1,282	746	89,333
Mormons	654	3,906	110,377
Jews	269	202	13,683
Evangelical Association	1,332	1,340	99,607
Friends	621	876	67,643
Swedenborgians	91	81	4,734
Dunkards	710	1,665	90,000
Shakers	17	68	2,400

Constitution, Government, &c.—The government of the U. S. is one of limited and specific powers; strictly defined by a written constitution, framed by a convention of the states in 1787, which went into operation after being ratified by the thirteen original states in 1789, by which instrument the several states, having their independent republican governments, conferred upon a Federal Congress, executive, or President, and judiciary, such powers as were necessary to 'form a more perfect union, establish justice, insure domestic tranquillity, provide for the common defence, and secure the blessings of liberty.' The legislative powers granted to the Federal government are vested in a Congress of the U. S., consisting of a Senate of two senators from each state, chosen by the legislature thereof; and a House of Representatives, consisting of one or more members from each state, elected by all male citizens over 21 years of age; so that the states, large and small, have each 2 votes in the senate, and from 1 to above 30 in the House of Representatives, which consists, after 1883, of 325 members, or 1 to 154,325 of population (in 1873, 293 members). The senator must be 30 years old, and is chosen for 6 years; the representative 25 years old, and for two years. Senators and representatives, by an act of Congress passed in 1874, are paid $5000 per annum, with traveling expenses. The Senate is presided over by the vice-president; and is a high court for trial of cases of impeachment.

It also confirms the appointments of the President, and ratifies treaties made with foreign powers. Revenue bills originate in the House of Representatives. Bills passed by both Houses, within the limits of their constitutional powers, become laws, on receiving the sanction of the President; or, if returned with his veto, may be passed over it by two-thirds of both Houses.

By the constitution, the states granted to Congress power, 'to lay and collect taxes, duties, imports, and excises, to pay the debts, and provide for the common defence and general welfare of the United States;' to borrow money; to regulate commerce; to establish uniform naturalization and bankruptcy laws; to coin money, and fix the standards of weights and measures, and punish counterfeiting; to establish post-offices and post-roads; to secure patents and copyrights; punish piracies; declare war; raise armies and navy; to call out the militia, reserving to the states to appoint their officers; and to govern the district of Columbia, and all places purchased for forts, arsenals, &c., with the consent of the state legislatures. All powers not expressly granted are reserved to the states or the people; but the states, though sovereign and independent under the constitution, with all powers of local legislation, eminent domain (i. e., absolute possession of the soil), and power of life and death, with which neither President nor Congress can interfere, cannot make treaties, coin money, levy duties on imports, or exercise the powers granted to Congress.

The executive of the Federal government is a President, chosen by an electoral college, equal in number to the senators and representatives, elected by the people of the states. He must be a native of the U. S., 35 years old, and is elected for a term of four years, and may be re-elected without limit. His salary is $50,000 a year. The Vice-president, who, in case of the death of the President, succeeds him, is President of the Senate. If he should die after becoming President, his successor would be chosen by Congress. The President, by and with the consent of the Senate, appoints a cabinet, consisting of the Secretaries of State and Foreign Affairs, Treasury, War, Navy, Interior, the Postmaster-general, and Attorney-general. These officers have salaries of $8000 a year, have no seats in Congress, and are solely responsible to the President, who also appoints directly, or through his subordinates, the officers of the army and navy—of which he is commander-in-chief—the justices of the Federal judiciary, revenue-officers, postmasters, &c.—in all about 100,000.

The judiciary consists of a supreme court, with one chief-justice and seven assistant-justices, appointed by the President for life, and district judges in each district. The supreme court has jurisdiction in all cases arising under the constitution, laws, and treaties of the U. S.; causes affecting ambassadors and consuls, of admiralty and jurisdiction; controversies to which the U. S. is a party, or between a state and the citizens of another state, citizens of different states, citizens and foreign states. It has original jurisdiction in state cases, or those affecting ambassadors or consuls—in others, appellate. A person may be tried for treason, both against the federal government, and against the state of which he is a citizen. The President can reprieve or pardon a person condemned by a Federal court; but has no power to interfere with the judgments of state tribunals. Besides the supreme court, there are U. S. district courts, with judges, district attorneys, and marshals, in districts comprising part or whole of the several states. The citizens of each state are entitled to all privileges and immunities of the several states. Criminals escaping from one state to another are given up for trial on demand of the executive; and the constitution declared, before the rebellion, that 'no person held to service or labor in one state, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.' The constitution may be amended by a convention called at the request of two-thirds of the states; or amendments may be proposed by a vote of two-thirds of Congress, and ratified by three-fourths of the states; but 'no state, without its consent, shall be deprived of its equal suffrage in the Senate.'

The President, either directly or through the Secretary of State and Foreign Affairs, appoints ministers, consuls, and consular agents to foreign countries. The envoys-extraordinary and ministers-plenipotentiary receive from $17,500 to $10,000 of salary; ministers resident have $7500 to $4000.

Army and Navy.—The army of the U. S., under the command of the President, consisted, in 1790, of 1260 men. In 1861, its numbers were 14,000, and those who took part with the Confederates, or were disbanded in the Confederate States, reduced the number to about 5000. April 15, 1861, 75,000 volunteers were called out; May 4, 64,000; July and December 1861, 500,000; July 1, 1862, 300,000; August 4, 1862, 300,000; summer of 1863, 300,000; February 1, 1864, 500,000. The total number called out from 1861 till the end of the war in 1865, was 2,670,874. This vast army was procured by volunteering, by enlistment in the regular army, and by drafts or conscriptions; but the greater part by bounties of 300 to 1000 dollars to each volunteer. Large numbers of recruits were also found among newly arrived immigrants; and the negro troops recruited in the seceded or slave states, in October 1863, numbered 38,707, and increased in numbers to the end of the war. In 1871, the regular army was reduced to the legal standard of 30,000 enlisted men, and it was subsequently enacted that from 1875 there should be no more than 25,000 men


UNITED STATES
EASTERN PART
Scale of Miles
0 100 200 300
Longitude West 87 of Greenwich
97
92
87
82
77
72
67
50
45
40
35
30
25
DOMINION OF CANADA
NEW BRUNSWICK
ATLANTIC OCEAN
GULF OF MEXICO
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
LAKE ONTARIO
WISCONSIN
MINNESOTA
IOWA
ILLINOIS
MICHIGAN
INDIANA
OHIO
KENTUCKY
TENNESSEE
MISSOURI
KANSAS
NEBRASKA
INDIAN TERRITORY
ARKANSAS
LOUISIANA
TEXAS
MISSISSIPPI
ALABAMA
GEORGIA
FLORIDA
SOUTH CAROLINA
NORTH CAROLINA
VIRGINIA
WEST VIRGINIA
PENNSYLVANIA
NEW YORK
MARYLAND
DELAWARE
NEW JERSEY
MASSACHUSETTS
VERMONT
NEW HAMPSHIRE
MAINE
BAHAMA ISLANDS
FLORIDA STRAIT
ST PAUL
MINNEAPOLIS
MADISON
MILWAUKEE
CHICAGO
DES MOINES
SPRINGFIELD
INDIANAPOLIS
COLUMBUS
WHEELING
FRANKFORT
RICHMOND
WASHINGTON
HARRISBURG
PHILADELPHIA
NEW YORK
BOSTON
PROVIDENCE
HARTFORD
CONCORD
PORTLAND
AUGUSTA
BANGOR
ST JOHN
FREDERICTON
QUEBEC
MONTREAL
OTTAWA
TORONTO
KINGSTON
BUFFALO
ROCHESTER
SYRACUSE
ALBANY
CLEVELAND
PITTSBURGH
DETROIT
TOLEDO
CINCINNATI
LOUISVILLE
NASHVILLE
MEMPHIS
ST LOUIS
KANSAS CITY
OMAHA
LINCOLN
TOPEKA
ATCHISON
LEAVENWORTH
ST JOSEPH
DUBUQUE
DAVENPORT
ROCK ISLAND
PEORIA
GALESBURG
QUINCY
SPRINGFIELD
TERRE HAUTE
LAFAYETTE
SOUTH BEND
FORT WAYNE
TOLEDO
SANDUSKY
AKRON
YOUNGSTOWN
ERIE
WILLIAMSPORT
SCRANTON
READING
LANCASTER
HARRISBURG
PHILADELPHIA
TRENTON
NEWARK
JERSEY CITY
BROOKLYN
NEW HAVEN
HARTFORD
PROVIDENCE
NEWPORT
NANTUCKET I.
MARTHA'S VINEYARD
LONG I.
MONTAUK PT.
C. COD
PORTSMOUTH
LOWELL
C. ANN
MANCHESTER
CONCORD
WHITE MTS.
ADIRONDACK MTS.
BURLINGTON
OGDENSBURGH
KINGSTON
COBOURG
COLLINGWOOD
GODERICH
HAMILTON
NIAGARA FALLS
LONDON
ELMIRA
POUGHKEEPSIE
SCHENECTADY
CATSKILL MTS.
OSWEGO
ROCHESTER
GREEN BAY
MILWAUKEE
RACINE
WAUKEGAN
OSHKOSH
FOND DU LAC
WATERTOWN
LA CROSSE
WINONA
ROCHESTER
WINDOM
MANKATO
SIOUX FALLS
MASON CITY
SIOUX CITY
FT DODGE
DECATUR
DES MOINES
COUNCIL BLUFFS
OTTUMWA
BURLINGTON
IOWA CITY
MUSCATINE
DAVENPORT
DUBUQUE
GALENA
ROCKFORD
JANESVILLE
BELOIT
AURORA
CHICAGO
JOLIET
LOGANSPORT
PEORIA
BLOOMINGTON
GALESBURG
QUINCY
KEOKUK
MACON
ALTON
ST LOUIS
CAIRO
CAPE GIRARDEAU
SPRINGFIELD
JOPLIN
FT SCOTT
EMPORIA
WICHITA
ATCHISON
LEAVENWORTH
ST JOSEPH
KANSAS CITY
SEDALIA
JEFFERSON
ST CHARLES
OMAHA
COUNCIL BLUFFS
PLATTSMOUTH
NEBRASKA CITY
BROWNVILLE
LINCOLN
YANKTON
FT DODGE
SIOUX CITY
DECATUR
DES MOINES
IOWA CITY
BURLINGTON
OTTUMWA
COUNCIL BLUFFS
OMAHA
PLATTSMOUTH
NEBRASKA CITY
BROWNVILLE
LINCOLN
YANKTON
FT RANDALL
FT PIERRE
FT SULLY
FT BERTHOLD
FT STEVENSON
FT BUFORD
FT UNION
FT BENTON
FT ASSINIBOINE
FT ABERCROMBIE
FT RIPLEY
FT SNELLING
FT ATKINSON
FT CROGHAN
FT LEAVENWORTH
FT SCOTT
FT GIBSON
FT SMITH
FT WASHITA
FT WORTH
FT JESUP
FT BROWN
FT MCINTOSH
FT INGE
FT MASON
FT TOWSON
FT GAINES
FT MORGAN
FT MCPHERSON
FT MITCHELL
FT HAWKINS
FT JACKSON
FT MONROE
FT MACON
FT CLINCH
FT MOULTRIE
FT SUMTER
FT MOULTRIE
FT JOHNSTON
FT CASWELL
FT MACON
FT MONROE
FT JACKSON
FT MITCHELL
FT HAWKINS

enlisted at any one time. The militia of the U. S. is under the state governments, but is not organized. There are numerous arsenals and manufactories of arms at Springfield (q. v.), Massachusetts; Pittsburg (q. v.), Pennsylvania, &c. The Military Academy at West Point educates cadets, nominated from each state by members of Congress, and appointed by the President, who receive commissions as officers in the army.

The navy of the U. S. in 1880 consisted of about 60 cruising-ships, 20 monitors, and 2 torpedo-boats. The iron-clad turret-steamers (see TURRET-SHIP) called monitors, constitute a powerful portion of the American navy. A Naval Academy has been established at Annapolis, Maryland, for the education of naval cadets.

The Post-office Department, organized before the Revolution of 1775 by Benjamin Franklin, had in 1880 over 44,500 offices, and forwarded 868,493,500 letters; 276,450,000 post-cards; 695,000,000 newspapers; 53,472,000 magazines; books, &c., 300,855,000; articles of merchandise, 22,645,000. There were, in the same year, 11,317 telegraph offices, with 107,103 miles of lines, which forwarded 30,486,000 messages.

Revenue, Expenditure, &c.—The following table gives the expenditures (excepting interest on debt), and the debt of the U. S., for 20 different years:

Year	Civil List.	Military.	Naval.	Total Expenses.	Debt
	Dollars.	Dollars.	Dollars.	Dollars.	Dollars.
1847	6,715,854	41,281,606	7,931,633	55,929,093	45,659,659
1848	5,585,070	27,820,163	9,406,737	42,811,970	65,804,450
1849	14,017,640	17,290,936	9,869,818	57,631,667	64,704,693
1850	14,839,725	12,801,764	7,923,313	43,002,168	64,228,238
1851	17,872,967	11,811,793	8,987,798	48,005,879	62,560,395
1852	17,379,768	13,424,075	8,928,226	46,007,896	67,560,395
1853	17,175,797	15,476,826	10,891,640	48,544,263	56,336,157
1854	25,907,372	14,342,684	10,768,192	51,018,248	44,975,456
1855	24,183,487	18,900,565	13,281,341	56,365,393	39,969,731
1856	25,274,331	20,821,024	14,077,047	60,172,402	30,963,910
1857	27,531,922	24,619,049	12,726,857	64,877,828	25,165,155
1858	26,387,822	31,537,307	13,976,001	71,901,130	44,910,778
1859	23,787,810	27,997,794	14,712,610	66,346,226	58,754,699
1860	31,925,557	16,409,767	11,513,150	59,848,474	64,769,703
1861	26,947,325	22,951,150	12,428,577	62,357,052	90,867,828
1862	24,511,476	394,368,707	42,674,569	461,554,752	511,826,274
1863	27,470,448	599,298,660	63,211,105	690,080,153	1,098,793,181
1864	35,033,498	690,791,842	85,733,292	811,558,632	1,740,690,489
1872	96,479,889	35,372,157	21,249,810	153,201,856	2,253,251,328
1875	108,911,574	41,120,645	21,197,626	171,529,848	2,237,813,048

Of late years the surplus revenue has come to be so great that it has been an embarrassment; the debt has been swiftly reduced; and it has been a problem whether to reduce internal duties (on tobacco, spirits, &c.), or customs, but the prohibition system is maintained. The expenditure of 1881—1882 (chief items, legislation, executive, civil list, army, navy, post office, pensions), was $216,694,384, and left near $150,000,000 of surplus; 1880—1881, the surplus was $100,000,000.

The revenue of the U. S. up to the War of Secession, 1861, was drawn almost wholly from the sale of public lands and duties on imports. In 1850, the revenue from customs was $39,668,686; from lands, &c., $3,707,112—total, $43,375,798. In 1860, the revenue from customs was $53,187,511; lands, &c., $2,877,691—total, $56,064,606. The cost of the war compelled the government to add to these resources a system of internal revenue or direct taxation, consisting of stamps, licenses, excise, income-tax, &c., by which the revenues were increased in 1865 to $309,510,932. The *revenue* for the year 1879–80 amounted to $333,526,610 (£66,705,000), the principal items being customs, $186,000,000, and internal revenue, $124,000,000. The *expenditure* was $267,642,955 (£53,528,600). The total debt in 1880 amounted to £422,407,182; from 1865 to 1880, the nation had paid off the immense sum of £170,000,000. In the fiscal year 1879–80, the debt was reduced by £13,176,000. In 1865, owing to the Civil War, the debt per head was about £16; but in 1880 it had been reduced to about £8, 8*s*. per head.

The currency of the U. S. is a mixed one of gold, silver, and copper, and bank-notes. Specie was for many years the only money recognized by the Federal government; paper money being issued by chartered banks. The war of 1861—1865 compelled the government to issue paper-money, and to establish national banks, in 1871, for its circulation. The capital of state banks in 1880 was $456,000,000, and of private banks upwards of $190,000,000. In 1878 a law was passed making silver equally a legal tender with gold, though silver was then 11 per cent. less in value. Specie payments were resumed by the government in 1879.

The specie currency of the U. S. consists of the gold dollar (value in exchange about 4*s*. sterling); the half-eagle, $5; the eagle, $10; the double eagle, $20; silver-dollar, half-dollar, quarter; dime, 10 cents; half-dime; nickle cent, or 100th part of a dollar. The coinage of 1880 was—gold $56,157,735; silver, $27,942,437; copper, $269,971; from the establishment of the mint to June 30, 1880, $1,133,103,322.

History.—The territories now occupied by the U. S. of America, though they were probably visited on their north-eastern coast by Norse navigators about the year 1000, continued the sole possession of numerous tribes of Indians (who had succeeded earlier and extinct races), until the discovery of America by Columbus, 1492. In 1498, an English expedition, under the command of Sebastian Cabot, explored the eastern coast of America from Labrador to Virgina, perhaps to Florida.

In 1513, Juan Ponce de Leon landed near St. Augustine in Florida, and explored a portion of that region in a romantic search for the Fountain of Youth. In 1520, some Spanish vessels from St. Domingo were driven upon the coast of Carolina. In 1521, by the conquests of Cortes and his followers, Mexico, including Texas, New Mexico, and California, became a province of Spain. In 1539—1542, Ferdinand de Soto led a Spanish expedition from the coast of Florida across Alabama, and discovered the Mississippi River. In 1584—1585, Sir Walter Raleigh sent two expeditions to the coast of North Carolina, and attempted to form settlements on Roanoke Island. A Spanish settlement was made at St. Augustine, Florida, 1565. Jamestown, Virginia, was settled in 1607; New York, then called the New Netherlands, 1613; Plymouth, Massachusetts, 1620. A large part of the country on the great lakes and on the Mississippi was explored by La Salle in 1682; and settlements were made by the French at Kaskaskia and Arkansas Post, 1685; Mobile and Vincennes, 1702. The early history of the various colonies which now constitute the U. S. will be found under the heads of the different states and territories. The first effort at a union of colonies was in 1643, when the settlements in Massachusetts, New Hampshire, Rhode Island, and Connecticut formed a confederacy for mutual defence against the French, Dutch, and Indians, under the title of 'the United Colonies of New England.'

They experienced the benefits of united action in 1754, when an English grant of lands to the Ohio Company brought on the French and Indian war—the French claiming, at that period, as the first explorers, Northern New England, half of New York, and the entire Mississippi Valley. George Washington was sent on his first expedition, to remonstrate with the French authorities; and the colonies being advised to unite for general defence, a plan for a general government of all the English colonies was drawn up by Benjamin Franklin; but it was rejected by both the colonies and the crown—by the colonies, who wished to preserve their separate independence, and by the crown from a jealousy of their united strength. The colonists, however, took an active part in the war. Under Major Washington, they joined General Braddock in his unfortunate expedition against Fort Du Quesne, now Pittsburg; they aided in the reduction of Louisburg, Ticonderoga, Crown Point, and Niagara; and rejoiced in the conquest of Quebec, by which the vast northern regions of America became the possessions of Great Britain.

The principles of a democratic or representative government were brought to America by the earliest colonists. The colonies themselves were founded by private adventure, with very little aid from government. The Plymouth colony was for 18 years a strict democracy, and afterwards a republic under a charter from the crown. A representative and popular government was established in Virginia in 1620. It was not until the Protectorate and the reign of Charles II. that the colonies were considered as portions of the empire, to be governed by parliament, when navigation acts were passed to give English ships a monopoly of commerce, when the produce of the colonies was required to be sent to England, and duties were levied on commodities sent from one colony to another. Protests were made against these assumptions; Virginia asserted her right of self-government; and it was not until the English revolution of 1688 that settled and uniform relations with the different colonies were established.

In 1713, by the treaty of Utrecht, England, which, since the reign of Elizabeth, had imported slaves from Africa into her American and West Indian colonies, obtained a monopoly of the slave-trade, engaging to furnish Spanish America, in 33 years, with 144,000 negroes. A great slave-trading company was formed in England, one-quarter of the stock being taken by Queen Anne, and one-quarter by the king of Spain, these two sovereigns becoming the greatest slave-dealers in Christendom. By this monopoly, slavery was extended in, and to some extent forced upon, all the American colonies.

At this period, there was a general feeling of loyalty towards the mother country. The sons of the more wealthy colonists, especially in the south, were educated in England; English literature pervaded the colonies; the British throne was the fountain of honor; the colonies, though distinct, and differing in origin and character—Puritan in the East, Dutch Reformed in New York, Quaker in Pennsylvania, Catholic in Maryland, and Church of England in Virginia—were yet united by language, common ties, fears, and interests.

In 1761, the enforcement of the Navigation Act against illegal traders, by general search-warrants, caused a strong excitement against the government, especially in Boston. The Admiralty enforced the law; many vessels were seized; and the colonial trade with the West Indies was annihilated. In 1765, the passing of an act of parliament for collecting a colonial revenue by stamps caused general indignation, and led to riots. Patriek Henry, in the Virginia Assembly, denied the right of parliament to tax America, and eloquently asserted the dogma, 'no taxation without representation.' The first impulse was to unite against a common danger; and the first colonial congress of 28 delegates, representing 9 colonies, made a statement of grievances and a declaration of rights. The stamps were destroyed or reshipped to England, and popular societies were formed in the chief towns, called 'Sons of Liberty.' In 1766, the Stamp Act was repealed, to the general joy of the colonists; but the prineiple of colonial taxation was not abandoned; and in 1767, duties were levied on glass, paper, printers' colors, and tea. This renewed attempt produced, in 1768, riots in Boston, and Governor Gage was furnished with a military force of 700 to preserve order and enforce the laws. In 1773, the duties were repealed, excepting 3*d.* a pound on tea. It was now a question of principle, and from north to south it was determined that this tax should not be paid. Some cargoes were stored in damp warehouses and spoiled; some sent back; in Boston, a mob, disguised as Indians, threw it into the harbor. To punish this outrage, parliament passed the Boston Port Bill, 1774, by which the chief town in New England was no longer a port of entry, and its trade transferred to Salem. The people were reduced to great distress, but received the sympathy of all the colonies, and liberal contributions of wheat from Virginia, and rice from Charleston, South Carolina.

It was now determined to enforce the government of the crown and parliament over the colonies; and a fleet, containing several ships of the line, and 10,000 troops, was sent to America; while the colonists, still asserting their loyalty, and with little or no thought of separation from the mother country, prepared to resist what they considered the unconstitutional assumptions of the government. Volunteers were drilling in every direction, and dépôts of provisions and military stores were being gathered. A small force being sent from Boston to seize one of these dépôts at Concord, Massachusetts, led to what is called the battle of Lexington, and the beginning of the war of the Revolution, April 19, 1775. The British troops were attacked on their return by the provincials, and compelled to a hasty retreat. The news of this event summoned 20,000 men to the vicinity of Boston. The royal forts and arsenals of the colonies were taken possession of, with their arms and munitions. Crown Point and Ticonderoga, the principal northern fortifications, were surprised, and their artillery and stores appropriated. A Congress of the colonies assembled at Philadelphia, which resolved to raise and equip an army of 20,000 men, and appointed George Washington commander-in-chief. June 17, Bunker Hill, in Charleston, near Boston, where 1500 Americans had hastily intrenched themselves, was taken by assault by the British troops, but with so heavy a loss (1054) that the defeat had for the provincials the moral effect of a victory. After a winter of great privations, the British were compelled to evaeuate Boston, carrying away in their fleet to Halifax 1500 loyal families.

The British government now put forth a strong effort to reduce the colonies to submission. An army of 55,000, including 17,000 German mercenaries ('Hessians'), was sent, under the command of Sir William Howe, to put down this 'wicked rebellion.' The provincial Congress, declaring that the royal authority had ceased, recommended to the several colonies to adopt 'such governments as might best conduce to the safety and happiness of the people;' and the thirteen colonies soon adopted constitutions as independent and sovereign states. On the 7th of June 1776, Richard Henry Lee, of Virginia, offered a resolution in Congress, declaring that 'the united colonies are, and ought to be, free and independent states; that they are absolved from all allegiance to the British crown; and that all political connection between them and the state of Great Britain is, and ought to be, totally dissolved.' This resolution, after an earnest debate, was adopted by the votes of 9 out of 13 colonies. A committee, consisting of Thomas Jefferson, John Adams, Benjamin Franklin, Roger Sherman, and Robert R. Livingston, was instructed to prepare a declaration in accordance with the above resolution; and the celebrated Declaration of Independence, written by Mr. Jefferson, based upon the equality of men and the universal right of self government, and asserting that 'all government derives its just powers from the consent of the governed,' on the 4th of July 1776, received the assent of the delegates of the colonies, which thus dissolved their allegiance to the British crown, and declared themselves free and independent states, under the general title of the thirteen United States of America—New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, North Carolina, South Carolina, and Georgia—occupying a narrow line of the Atlantic coast between Canada and Florida, east of the Alleghanies, with a population of about 2,500,000.

After the evacuation of Boston, General Washington, with the remains of his army, thinned by the hardships of winter, hastened to New York. On the 2d of July, General Howe, being joined by his brother, Admiral Lord Howe, and Sir Henry Clinton, found himself at the head of 35,000 men; defeated the Americans on Long Island, August 27, 1776, compelled the evacuation of New York, and secured the possession of its spacious harbor, and the river Hudson. General Washington, with inferior and undisciplined forces, retreated across New Jersey, closely followed by the English, hoping to save Philadelphia. Newark, New Brunswick, Princeton, the chief towns in New Jersey, were taken, and the British awaited the freezing of the Delaware to occupy Philadelphia. On Christmas night, General Washington, by crossing in boats among floating ice, made a successful night-attack upon a Hessian force at Trenton, and gave new courage to the despondiug Americans, who recruited the army, and harassed the enemy with a winter campaign.

In the meantime, Silas Deane and Benjamin Franklin had been sent to France to solicit recognition and aid. The recognition was delayed, but important aid was privately given in money and supplies, and European volunteers—the Marquis de Lafayette, Baron Steuben, Baron de Kalb, Kosciusko, and Pulaski, rendering the most important services. Efforts were made to induce the British colonies of Canada and Nova Scotia to unite in the struggle for independence, and an expedition was sent against Montreal and Quebec, led by Generals Montgomery and Arnold. The Canadians refused their aid; Montgomery was killed, Arnold wounded, and the remains of the expedition returned after terrible sufferings. In 1777, after several severe actions in New Jersey, generally disastrous to the Americans, the British took possession of Philadelphia; and Washington, with the remnants of his army, went into winter-quarters at Valley Forge, where they suffered from cold, hunger, and nakedness.

While Washington was unsuccessfully contending against disciplined and overwhelming forces in New Jersey, General Burgoyne was leading an army of 7000 British and German troops, with a large force of Canadians and Indians, from Canada into Northern New York, to form a junction with the British on the Hudson, and separate New England from the rest of the rebel confederacy. His march was delayed by felled trees and destroyed roads; his foraging expeditions were defeated; and after two sharp actions at Stillwater and Saratoga, with but three days' rations left, he was compelled to capitulate, October 17; and England, in the midst of victories, heard with dismay of the loss of an entire army. The Americans gained 5000 muskets, and a large train of artillery. Feeling the need of more unity of action, articles of confederation, proposed by Franklin in 1775, were adopted in 1777, which constituted a league of friendship between the states, but not a government which had any powers of coercion.

In 1778, Lord Carlisle was sent to America by the British government with offers of conciliation; it was too late. France at the same time recognized American independence, and sent a large fleet and supplies of clothing, arms, and munitions of war to their aid; and General Clinton, who had superseded General Howe, finding his supplies at Philadelphia threatened, retreated to New York, defeating the Americans at Monmouth.

The repeated victories of the British armies, the aid afforded by great numbers of Americans who still adhered to the royal cause, and furnished during the war not less than 20,000 troops, and the alliance of large tribes of Indians, who committed cruel ravages in the frontier settlements, did little towards subjugating the country. Portions of the sea-coast of New England and Virginia were laid waste; but the king's troops were worn out with long marches and tedious campaigns, and even weakened by victories. Spain, and then Holland, joined in the war against England, and aided the Americans. Paul Jones, with ships fitted out in French harbors, fought desperate battles under the American flag on the English coast. But the king and parliament were determined to maintain the honor of the crown and the integrity of the empire. In 1780, 85,000 seamen were raised, and 35,000 additional troops sent to America, and a strong effort was made to subjugate the Carolinas, where the war became of a bitter partisan character, and was conducted with spirit by Sumpter, Marion, and other Southern chieftains. Lord Cornwallis, with a large army, marched from Charleston, through North Carolina, pursuing, and sometimes defeating the American General Gates. Worn out with his success, he arrived in Virginia, where he was confronted by General Lafayette. In the meantime, Admiral de Varney had arrived upon the coast with a powerful French fleet, and 6000 soldiers of the élite of the French army, under Count de Rochambeau.

Cornwallis was obliged to fortify himself at Yorktown, blockaded by the fleet of Count de Grasse, and besieged by the allied army of French and Americans, waiting for Sir Henry Clinton to send him relief from New York. October 19, 1781, he was com-


UNITED STATES
WESTERN PART
Scale of Miles
0 100 200 300
Longitude West of Greenwich
137 122 117 112 107 102
45 40 35 30
PACIFIC OCEAN
WASHINGTON
OREGON
CALIFORNIA
IDAHO
NEVADA
MONTANA
WYOMING
UTAH
ARIZONA
COLORADO
NEW MEXICO
NORTH DAKOTA
SOUTH DAKOTA
NEBRASKA
KANSAS
OKLAHOMA
INDIAN TERRITORY
TEXAS
BRITISH NORTH AMERICA
DOMINION OF CANADA
MEXICO
LOWER CALIFORNIA
GULF OF CALIFORNIA
Columbia R.
Snake R.
Colorado R.
Rio Grande
Missouri R.
Yellowstone R.
Platte R.
Arkansas R.
Red R.
Pecos R.
Brazos R.
Nueces R.
Salmon R.
Canadian R.
Cimarron R.
North Fork of Canadian R.
Republican Fork
Smoky Hill Fork
Solomon's Fork
Loup Fork
Niobrara
Kearney
Milesburg
Eldorado Springs
Boulder Pass
Marias P.
Cadotte Pass
Great Falls
Ft. Benton
Ft. Buford
Devil L.
Bismarck
Ball R.
Grand R.
Moreau R.
Cheyenne R.
Powder R.
Tongue R.
Big Horn R.
Yellowstone L.
Clark's Fork
Bridger's Pass
Ft. Hall
Malade City
Snake or Lewis R.
Silver City
Boise City
Idaho City
Salmon R. Mts.
Blue Mts.
Wind River Mts.
Big Horn Mts.
Black Hills
Deadwood
Ft. Pierre
White R.
Ft. Randall
Running Water R.
Medicine R.
Ft. Laramie
Laramie R.
Laramie Peak
Cheyenne
Fremont's Peak 13,570 Ft.
South Pass City
Sweetwater R.
Green R.
Ft. Bridger
Evanston
Uinta Mts.
Great Salt Lake
Salt Lake City
Utah Lake
Jordan R.
Weber R.
Bear R.
Provo
Sevier L.
Salt Creek
Fillmore
Parowan
Beaver
Pioche
Hamilton
Eureka
Elko
Humboldt R.
Humboldt L.
Carson L.
Carson R.
Truckee R.
Truckee Pass
Virginia City
Gold Hill
Reno
Dayton
Genoa
Carson
Sacramento
Stockton
Weber L.
Aurora
Mono L.
Mariposa
Yosemite
Whitney 14,887 Ft.
Owens L.
Tulare
Kern R.
Kern L.
Visalia
Bakersfield
Fresno
San Joaquin R.
San Francisco
Oakland
Monterey
Santa Cruz
Salinas R.
Pajaro R.
Santa Barbara
Ft. Conception
Santa Barbara Is.
Los Angeles
San Bernardino
San Diego
Mohave City
Ft. Mohave
Prescott
La Paz
Ehrenberg
Gila City
Yuma
Gila R.
Salt R.
Tucson
Tubac
Silver City
Mesilla
El Paso
Rio Grande
Ft. Davis
Ft. Stanton
Socorro
Ft. Sumner
Albuquerque
Ft. Bascom
Las Vegas
Santa Fe
Mora
Taos
Raton Mts.
Spanish Peaks
Las Animas
Pikes Peak 14,147 Ft.
Pueblo
Denver
Golden City
Georgetown
Mt. Lincoln 14,297 Ft.
Mt. Hope
Gray's Peak 14,271 Ft.
Grand R.
Green R.
Uncompahgre Mts.
Sierra Blanca
Llano Estacado or Staked Plain
Presidio del Norte
San Vicente
Fredericksburg
New Braunfels
San Antonio
Rio Grande City
Monclova

pelled to surrender his army of 7000 men—an event which produced such a change of feeling in England as to cause the resignation of the ministry, and the despatch of General Sir Guy Carleton to New York with offers of terms of peace. The preliminaries were signed at Paris, November 30, 1782; and on September 3, 1783, peace was concluded between England and France, Holland, and America. The independence of each of the several states was acknowledged, with a liberal settlement of territorial boundaries. In April, a cessation of hostilities had been proclaimed, and the American army disbanded; New York, which had been held by the English through the whole war, was evacuated November 25; on December 4, General Washington took leave of his companions in arms, and, December 23, resigned into the hands of Congress his commission as commander.

From the retreat of Lexington, April 19, 1775, to the surrender of Yorktown, October 19, 1781, in 24 engagements, including the surrender of two armies, the British losses in the field were not less than 25,000 men, while those of the Americans were about 8000.

The states were free, but exhausted, with a foreign debt of $8,000,000, a domestic debt of $30,000,000, an army unpaid and discontented, a paper-currency utterly worthless, and a bankrupt treasury. The states were called upon to pay their shares of the necessary expenditures, but they were also in debt, and there was no power to compel them to pay, or to raise money by taxation. In these difficulties, and the failure of the articles of confederation, a convention was summoned by Congress in 1787, to revise these articles. The task was so difficult, that the Convention resolved to propose an entirely new constitution, granting fuller powers to a Federal Congress and executive, and one which should act upon the people individually as well as upon the states. The constitution was therefore framed, whose provisions have already been stated, and which is still the basis of the government; and though strongly opposed by many, who believed that the extensive powers granted by it to Congress and the executive would be dangerous to the liberties of the people, it was, in 1787—1788, adopted, in some cases by small majorities, in 11 state conventions, and finally by the whole 13 states, chiefly through the exertions and writings of James Madison, John Jay, and Alexander Hamilton.

Virginia ratified the constitution with the declaration, that she was at liberty to withdraw from the union whenever its powers were used for oppression; and New York, after Hamilton had declared that no state could ever be coerced by an armed force. The country was at this period divided into two parties: the Federalists, who were in favor of a strong centralized government, and the Anti-federalists, who held to the sovereignty and rights of the independent states. George Washington and John Adams, standing at the head of the Federalist Party, were elected President and Vice-president of the United States. The President took the oath to support the constitution in front of the City Hall in New York; and the government was organized with Thomas Jefferson, Secretary of State; Alexander Hamilton, Secretary of the Treasury; General Knox, Secretary of War; and John Jay, Chief Justice of the supreme court. Congress assumed the war-debts of the several states, and chartered the bank of the United States, though its constitutional right to do so was strenuously denied by the Republican or States' Rights party. Washington was re-elected to the presidency in 1792; but party-spirit increased, excited by the events of the French Revolution. Citizen Genet, who represented the French Republic in America, fitted out privateers against England, and his recall was demanded by the President. The Federalists took the side of England in the great European contest, while the Republicans sympathized with the Revolution. There grew up also difficulties between the English and American governments. The Americans accused the English of carrying off large numbers of negroes and other property at the close of the war; while the English accused the Americans of sequestrating the property of loyalists, which they had engaged by treaty to restore to them. These controversies were happily settled by Mr. Jay.

In 1796, Washington, worn and irritated by partisan conflicts and criticisms, refused a third election, and issued his farewell address to the people of the U. S., warning them against the dangers of party-spirit and disunion, and giving them advice worthy of one who was said to be 'first in war, first in peace, and first in the hearts of his countrymen.' John Adams was elected President; and Thomas Jefferson, the second choice of the people for the presidency, became, according to the rule at first adopted, Vice-president. In 1798, the commercial regulations of France, and the assertion of the right to search and capture American vessels, nearly led to a war between the two republics. In 1799, the nation, without distinction of party, mourned the death of Washington; and, in the following year, the seat of government was removed to the city he had planned for a capital, and which bears his name. The partiality of Mr. Adams for England, the establishment of a Federal army, and the passing of the Alien and Sedition Laws, by which foreigners could be summarily banished, and abuse of the government, by speech or the press, punished, caused great political excitement, and such an increase of the Republican, or, as it was afterwards called, the Democratic party, that the President failed of a re-election in 1801; and there being no election by the people, the House of Representatives, after thirty-five ballotings, chose Thomas Jefferson, the Republican candidate, with Aaron Burr for Vice-president; and the offices of the country were transferred to the victorious party.

Internal duties, which a few years before had led to an insurrection in Pennsylvania, called the Whisky Insurrection, were abolished, and the Alien and Sedition Laws repealed. Tennessee, Kentucky, Vermont, and Ohio had now been organized as states, and admitted into the Union. In 1803, the area of the country was more than doubled by the purchase of Louisiana—the whole region between the Mississippi and Rocky Mountains—from France for $15,000,000. The infant navy waged a successful war with Tripoli. In 1805, Mr. Jefferson was elected for a second term; but Mr. Burr, having lost the confidence of his party, engaged in a conspiracy to seize upon the Mississippi Valley, and found a new empire, with its capital at New Orleans. He was tried for treason, but not convicted. The commerce of America was highly prosperous, her ships enjoying much of the carrying-trade of Europe; but, in May 1806, England declared a blockade from Brest to the Elbe, and Bonaparte, in November, decreed the blockade of the coasts of the United Kingdom. American vessels were captured by both parties, and were searched by British ships for British subjects; and those suspected of having been born on British soil, were, in accordance with the doctrine, once a subject always a subject, impressed into the naval service. Even American men-of-war were not excepted from this process. The British frigate *Leopard* meeting the American frigate *Chesapeake*, demanded four of her men, and on refusal, fired into her, and the surprised *Chesapeake* struck her flag. British ships were hereupon forbidden U. S. harbors.

Mr. Jefferson, following the example of Washington, declined a third election; and, in 1809, James Madison became President. The French decrees, prejudicial to neutral commerce, were revoked in 1810; but the English continued, a source of loss and irritation, while hundreds of American citizens were in forced service in British vessels. The feeling was increased by a night-encounter between the American frigate *President* and the British sloop-of-war *Little Belt*, May 16, 1811. In April 1812, an embargo was again declared by Congress, preparatory to a declaration of war against Great Britain, July 19, for which Congress voted to raise 25,000 enlisted soldiers, 50,000 volunteers, and 100,000 militia. General Hull, with 2,000 men at Detroit, invaded Canada; but on being met by a small force of British and Indians, under General Brock, recrossed the river, and made a shameful surrender; and was sentenced to death for his cowardice, but pardoned by the President. A second invasion of Canada was made near Niagara Falls by General Van Renssalaer. One thousand American militia stormed the heights of Queenstown, and the British general, Brock, was killed; but reinforcements arriving opportunely, the heights were retaken, and nearly all the Americans were killed or driven into the Niagara, while the American general was in vain imploring a large body of militia on the opposite bank to cross over to the support of their brethren in arms. They refused, upon the ground, that the government had no constitutional right to send the militia across the frontier. The Federal party, opposed to the war, defended this doctrine, and General Van Renssalaer resigned in disgust. American disasters on the land were, however, compensated by victories at sea.

August 19, the U. S. frigate *Constitution* captured the British frigate *Guerrière;* October 18, the *Wasp* took the *Frolic;* October 25, the frigate *United States* captured the *Macedonian;* December 29, the *Constitution* took the *Java*. The Americans in most cases had the larger ships and heavier ordnance; but the immense disparity in losses showed also superior seamanship and gunnery. American privateers took 300 British vessels and 3000 prisoners. In 1813, General Proctor crossed the Detroit river with a considerable force of British and Indians, and defeated General Winchester, with the usual results of savage warfare. In April, an American army of 1700 men captured York (now Toronto), and about the same time another American force of 800 men was defeated with great loss by the Indians under Tecumseh; but the remainder of this campaign was wholly favorable to the Americans. The attempt of the British general, Prevost, on Sackett's Harbor was repulsed; the squadron on Lake Erie, consisting of 6 vessels, 63 guns, was captured by Commodore Perry at the head of an American flotilla of 9 vessels, 54 guns; and this latter success enabled General Harrison to invade Canada, where he defeated General Proctor in the battle of the Thames, in which the great Indian warrior-chief Tecumseh was killed.

In 1813, another invasion of Canada was attempted; and York (now Toronto) was taken by General Dearborn; and an unsuccessful attempt was made to take Montreal. Villages were burned

on both sides. The British also destroyed American shipping in Delaware Bay. At the same period, General Jackson defeated the Creek Indians in Alabama and Georgia, who had been excited to make war upon the frontier settlements.

In 1814, Generals Scott and Ripley crossed the Niagara, and sharp actions, with no decisive results, were fought at Chippewa and Lundy's Lane, close by the great Cataract. General Wilkinson also invaded Canada on the Sorell River, but was easily repulsed. A British invasion, by Lake Champlain, by General Sir George Provost, with 14,000 men and a flotilla on the lake, was no more successful. On the 6th of September, the flotilla was defeated and captured in the harbor of Plattsburg, while the army was repulsed on shore, and retreated with heavy loss. In August, a British fleet ascended Chesapeake Bay, took Washington with but slight resistance, and burned the government buildings. A subsequent attack on Baltimore was unsuccessful. New York, New London, and Boston were blockaded, and a large expedition was sent against Mobile and New Orleans.

On the 8th of January 1815, General Packenham advanced with 12,000 men against the latter city, which was defended by General Jackson, at the head of 6000 militia, chiefly from Tennessee and Kentucky, aided by a small force of artillery, recruited from the Barataria pirates. The Americans were sheltered by a breast-work, and the British assault was met with so deadly a fire of riflemen, that it was repulsed, with the loss of General Packenham and several officers, with 700 killed and 1000 wounded; while the entire American loss is stated to have only amounted to 71. This ill-planned and unfortunate action was fought more than a month after peace had been concluded between England and America, and was followed by two naval actions in February and March. Though during this contest fortune at first favored the Americans on the high seas, she changed sides completely from June 1813, as if to counterbalance the disasters of the British on land. June 1, the *Chesapeake* was taken by the *Shannon;* June 3, the *Growler* and *Eagle* were captured by British gun-boats; the *Argus* was taken by the *Pelican*, August 14; the *Essex* by the *Phœbe* and *Cherub*, March 29, 1814; the *President* by the *Endymion*, January 15, 1815; the only counterbalancing success being the sinking of the British sloop *Avon* by the *Wasp*, September 8, 1814. In December 1814, the Federalists of New England held a convention at Hartford in opposition to the war and the administration, and threatened a secession of the New England states. See HARTFORD CONVENTION. In 1815, Commodore Decatur, who had taken a distinguished part in the recent war, commanded an expedition against the Algerians—whose corsairs had preyed on American commerce in the Mediterranean—and dictated terms to Algiers, Tunis, and Tripoli.

The Democratic-Republican party having brought the war to a satisfactory conclusion, the Federalists disappeared; and in 1817, James Monroe was elected to the presidency, almost without opposition, in what was termed 'the era of good feeling.' A rapid emigration from Europe and from the Atlantic states to the richer lands of the West, had in ten years added six new states to the Union. Difficulties arose with the warlike southern Indian tribes, whose hunting-grounds were invaded; and General Jackson, sent against the Seminoles, summoned to his aid the Tennessee volunteers who had served under him against the Creeks and at New Orleans, defeated them, pursued them into Florida, took Pensacola, and banished the Spanish authorities and troops. He was, however, supported in these high-handed measures by the President; and in 1819, Florida was ceded by Spain to the United States. In 1820, Alabama and Maine, a slave and a free state, were added to the Union; and the question of the admission of Missouri arose in Congress—the question of its admission with or without slavery. At the period of the Revolution, slavery existed in all the states except Massachusetts; but it had gradually been abolished in the northern and middle states, except Delaware, and excluded from the new states between the Ohio and Mississippi by the terms on which the territory had been surrendered by Virginia to the Union. Under the constitution, slaves were not counted in full as a represented population; but by a compromise, three-fifths of their numbers were added to the whites. The slave states were almost exclusively agricultural, with free-trade interests. The free states were encouraging manufactures by protection. The two sections had already entered upon a struggle to maintain the balance of power against each other.

After an excited contest, Missouri was admitted, with a compromise resolution, that in future no slave state should be erected north of the parallel of 36° 30′ N. lat.—the northern boundary of Arkansas. During the second term of Mr. Monroe, in 1824, General Lafayette visited America, and was everywhere received with great enthusiasm. In the presidential election of 1824, there were four candidates—John Quincy Adams, Andrew Jackson, Henry Clay, and William H. Crawford. There being no choice by the people, the House of Representatives chose Mr. Adams; John C. Calhoun being elected Vice-president. Party and sectional feeling became stronger. Mr. Adams and Mr. Clay, who had heretofore acted with the party of Jefferson and Madison, were henceforth identified with what was called the National Republican, and later, the Whig, and finally, in union with the Anti-slavery party, the Republican party. In 1826, two of the founders of the republic, John Adams and Thomas Jefferson, died on the 4th of July, the anniversary of the Declaration of Independence—an event which made a profound impression. The four years of Mr. Adams, during which there were violent contests on protection and the powers of the Federal government to carry out public works within the states, ended with an excited election contest, which resulted in the triumph of the Democratic party, and the election of Andrew Jackson, with John C. Calhoun as Vice-president.

The bold, decisive, and impetuous character of General Jackson was shown in a general removal of those who held office, down to small postmasters and tide-waiters, under the late administration, and the appointment of his own partisans. An act for the re-chartering of the U. S. Bank was met by a veto of the President, who declared it unconstitutional and dangerous. In 1832, an Indian war, called the Black Hawk War, broke out in Wisconsin; but the passing of a high protective tariff act by Congress caused a more serious trouble. The state of South Carolina declared the act unconstitutional, and therefore null and void, threatening to withdraw from the Union if an attempt were made to collect the duties on foreign importations. The President prepared to execute the laws by force; Mr. Calhoun resigned his office of Vice-president, and asserted the doctrine of state-rights, including the right of secession, in the Senate. A collision seemed imminent, when the affair was settled by a compromise bill, introduced by Henry Clay, providing for a gradual reduction of duties, until 1843, when they should not exceed 20 per cent. *ad valorem*.

The popularity of General Jackson caused his re-election by an overwhelming majority against Henry Clay, the leader of the Bank, Protection, and Internal Improvement party; and he entered upon his second term with Martin Van Buren of New York as Vice President. The removal of the government deposits from the U. S. Bank to certain state banks, led to the failure of the bank, and after some years, to the adoption of Mr. Van Buren's plan of an independent treasury. The Cherokee Indians in Georgia, who had attained to a certain degree of civilization, appealed to the President for protection against the seizure of their lands by the state; but they were told that he 'had no power to oppose the exercise of the sovereignty of any state over all who may be within its limits;' and the Indians were obliged to remove to the territory set apart for them west of the Mississippi. In 1835, the Seminole war broke out in Florida; and a tribe of Indians, insignificant in numbers, under the crafty leadership of Osceola (q. v.), kept up hostilities for years, at a cost to the U. S of several thousands of men and some fifty millions of dollars. In 1837, Martin Van Buren succeeded General Jackson in the presidency. His term of four years was a stormy one, from the great financial crisis of 1837, which followed a period of currency-expansion and wild speculation. All the banks suspended payment, and the great commercial cities threatened insurrection.

Mr. Van Buren was firm in adhering to his principle of collecting the revenues of the government in specie, and separating the government from all connection with the banks. His firmness in acting against the strong sympathies of the northern and western states with the Canadian insurrection of 1837—1838, also damaged his popularity; and in 1840, the election of General Harrison, with John Tyler for Vice-president, was one of unexampled excitement, characterized by immense popular gatherings, political songs, the use of symbols, and the participation of both sexes to a degree hitherto unknown in America. The Whigs triumphed in nearly every state; General Harrison was inaugurated March 4, 1841; and the rush to Washington for offices was as great as the election had been exciting and remarkable. Worn down with the campaign and the office-seekers, General Harrison died in a month after his inauguration, and was succeeded by John Tyler, who, having been a Democrat, was no sooner in power than he seems to have reverted to his former political principles. He vetoed a bill for the establishment of a national bank and other measures of the party by which he had been elected. His cabinet resigned, with the exception of Daniel Webster, Secretary of State, and others, Democratic or neutral, were appointed in their place. During Mr. Tyler's administration, the north-eastern boundary question, which nearly occasioned a war with England, was settled by Mr. Webster and Lord Ashburton; a difficulty amounting almost to a rebellion, was settled in Rhode Island; but the most important question agitated was that of the annexation of Texas. This annexation was advocated by the South, as a large addition to southern and slave territory; and, for the same reason, opposed by the Whig and anti-slavery parties of the North. Besides, the independence of Texas, though acknowledged by the U. S., England, and France, had not been acknowledged by Mexico, and its annexation would be a *casus belli* with that power. The recent admissions of Iowa and Florida into the Union had kept the bal-

ance of power even between North and South, but Texas would be an advantage to the South. But the gain of territory, and a contempt for Mexico, overcame these objections, and in 1845, Texas was formally annexed to the U. S.; and James K. Polk of Tennessee succeeded Mr. Tyler in the presidency.

M. Almonte, the Mexican minister at Washington, protested against the annexation of Texas, as an act of warlike aggression; and to guard against a threatened invasion of Texas, General Zachary Taylor was ordered, with the U. S. troops of his military district, to its southern frontier. The Mexicans crossed the Rio Grande, and commenced hostilities, April 26, 1845. General Taylor moved promptly forward, and won the victories of Palo Alto, Resaca de la Palma, Monterey, Saltillo, and finally, against great odds—20,000 to 4759—the hard-fought battle of Buena Vista, a victory that excited great enthusiasm. In the meantime, General Wool had been sent on an expedition to Chihuahua, in Northern Mexico; General Kearney to New Mexico; and Captain Fremont and Commander Stockton took possession of California. March 9, 1847, General Scott landed at Vera Cruz, which he took on the 29th, after a siege and bombardment by land and water. Marching into the interior with a force of about 9000 men, he found General Santa Anna intrenched on the heights of Cerro Gordo with 15,000 men. On April 18, every position was taken by storm, with 3000 prisoners, 43 cannon, 5000 stand of arms, &c. Waiting at Puebla for reinforcements until August, General Scott advanced with 11,000 men towards Mexico, near which General Santa Anna awaited him with large forces and in strong positions. On the 19th and 20th of August were fought the battles of Contreras and Churubusco, in which 9000 Americans vanquished an army of over 30,000 Mexicans in strongly fortified positions.

After a brief armistice, hostilities recommenced on the 7th September; and after a series of sanguinary actions, the American army, reduced to about 8000, entered the city of Mexico, which ended the war. By the treaty of Guadalupe, the U. S. obtained the cession of New Mexico and Upper California, the U. S. paying Mexico $15,000,000, and assuming the payment of the claims of American citizens against Mexico. The opposition to the annexation of Texas, and to the war and the acquisition of the newly-acquired territory, became now complicated and intensified by sectional feelings and the opposition to slavery. The Northern party demanded that slavery should never be introduced into territories where it had not existed; the South claimed the right of her people to emigrate into the new territories, carrying with them their domestic institutions. During the debates on the acquistion of the Mexican territories, Mr. Wilmot of Pennsylvania introduced an amendment, called the 'Wilmot Proviso,' providing that there should be neither slavery nor involuntary servitude in the acquired territory. This was voted down, but became a party principle. In 1849, General Taylor, the 'Rough and Ready' victor of Buena Vista, became President, with Millard Fillmore as Vice-president. The Free-soil party* had nominated Martin Van Buren, with Charles Francis Adams for Vice-president; the Democratic candidate being General Lewis Cass.

The Liberty party in 1840 had cast 7609 votes; in 1844, it had 62,300; Mr. Van Buren in 1848 received 291,263, so rapid was the growth of a party soon destined to control the policy of the government. September 1, 1849, California, rapidly peopled by the discovery of gold, adopted a constitution which prohibited slavery. Violent struggles and debates in Congress followed with threats of secession, and protests against interference with slavery. The more zealous abolitionists of the North denounced the constitution for its support of slavery, and its requirement of the return of fugitive slaves to their owners, and threatened separation. The South denounced the violation of the constitution by interference with slavery—a domestic institution of the states—the carrying off of negroes secretly by organized societies, and what was termed the 'Underground Railway,' and the passage of personal liberty bills in several states, which defeated the Fugitive Slave Law, and the requirements and guarantees of the constitution. Mr. Clay introduced a compromise into Congress, admitting California as a free state, and introducing a new and more stringent law for the rendition of fugitive slaves. President Taylor, more used to the rough life of a frontier soldier than the cares of state, died July 9, 1850, and was succeeded by Mr. Fillmore.

The election of Franklin Pierce in 1852, against General Scott, was a triumph of the Democratic, States' Rights, and Southern party. Jefferson Davis, a senator from Mississippi, a son-in-law of General Taylor, and who had served under him in Mexico, was appointed Secretary of War. New elements were added to the sectional controversies which agitated the country by the repeal of the Missouri Compromise, and the passage of the Kansas-Nebraska bill of Senator Douglas, which left the people of every territory, on becoming a state, free to adopt or exclude the institution of slavery. The struggles of Kansas, approaching a civil war between the Free-soil and Pro-slavery parties in that rapidly growing territory, resulted in the exclusion of slavery. A brutal assault upon Mr. Sumner, senator from Massachusetts, by a Southerner, named Preston Brooks, in consequence of a violent speech on Southern men and institutions, increased the excitement of both sections. The formation of an Anti-foreign and No-popery party, called the 'Know-nothing' party, acting chiefly through secret societies, was a singular but not very important episode in American politics, though it may have influenced the succeeding election.

In 1856, the Republicans, composed of the Northern, Free-soil, and Abolition parties, nominated John C. Fremont for the presidency; while the Democratic and States' Rights party nominated James Buchanan. Ex-president Fillmore received the Know-nothing nomination. The popular vote was—for Buchanan, 1,838,169; Fremont, 1,341,264; Fillmore, 874,534. Mr. Buchanan was inaugurated March 4, 1857, with John C. Breckenridge, afterwards a general of the Confederate army, as Vice-president. A difficulty with the Mormons, which caused the President to send a military force to Utah, was settled without bloodshed. The efforts of the government to execute the Fugitive Slave Law kept up an irritated feeling. There were savage fights between the northern and southern parties in Kansas, and on the western borders of Missouri. Resolute and well-armed settlers were sent out by New England emigration societies. In October 1859, John Brown, known in Kansas as 'Ossawattamie Brown,' who, with his sons, had been engaged in the struggles in Kansas, planned and led an expedition for freeing the negroes in Virginia. He made his attempt at Harper's Ferry, on the Potomac, where, after a vain attempt to induce the negroes to join him, he and his small party took possession of one of the government workshops, where he was taken prisoner by a party of U. S. soldiers, and handed over to the authorities of Virginia, tried and executed, December 2. His body was taken to his home in New York for burial, and he was regarded by the Abolition party as a martyr.

In 1860, the Democratic party, which, except at short intervals, had controlled the Federal government from the election of Jefferson in 1800, became hopelessly divided. The Southern delegates withdrew from the convention at Charleston, and two Democratic candidates were nominated, Stephen A. Douglas of Illinois, and John C. Breckenridge of Kentucky; while the Republicans, or united Whig and Abolition party, nominated Abraham Lincoln of Illinois; and the Native or American party nominated John Bell of Tennessee. The Republican convention adopted a moderate and even conservative 'platform' of principles, denounced the John Brown raid, and put forward as a principle, 'the maintenance inviolate of the rights of the states, and especially the right of each state to order and control its own domestic institutions according to its own judgment exclusively.' Still, the country was sectionally divided, and all who had labored to limit and destroy the Southern institution of slavery were acting with the Republican party.

At the election of November 1860, Mr. Lincoln received every Northern vote in the electoral college, excepting the three of New Jersey, which were given to Mr. Douglas, 180 votes; while Mr. Breckenridge received the 72 electoral votes of the South. The North and South were arrayed against each other, and the South was beaten. Of the popular vote, Mr. Lincoln received 1,857,610; Mr. Douglas, 1,365,976; Mr. Breckenridge, 847,951; Mr. Bell, 590,631. Thus, while Mr. Lincoln gained an overwhelming majority of the electoral votes given by each state, the combined Democratic votes exceeded his by 356,317, and the whole popular vote against him exceeded his own by 946,948. A small majority, or even plurality, in the Northern states was sufficient to elect him.

The South lost no time in acting upon what her statesmen had declared would be the signal of their withdrawal from the Union. On the 10th of November, as soon as the result was known, the legislature of South Carolina ordered a state convention, which assembled December 17, and on the 20th unanimously declared that 'the union now subsisting between South Carolina and other states, under the name of the United States, is hereby dissolved;' giving as a reason that 14 of these states had for years refused to fulfil their constitutional obligations. The example of South Carolina was followed by Mississippi, January 8, 1861; Florida, 10th; Alabama, 11th; Georgia, 19th; which were followed by Louisiana and Texas; and in 1861, by North Carolina, Virginia, Tennessee, and Arkansas, Kentucky and Missouri were divided, and had representatives in the governments and armies of both sections.

On the 4th of February 1861, delegates from the seven then seceded states met at Montgomery, Alabama, and formed a provisional government, under the title of the Confederate States of America. A constitution was adopted similar to that of the U. S., and the government fully organized, February 18, 1861; President, Jefferson Davis of Mississippi; Vice-president, Alexander

* The Free-soil party opposed the extension of slavery by the admission of new slave states, while recognizing its legal and constitutional existence where already established.

H. Stephens of Georgia; and, May 24, established at Richmond, Virginia. The secession movement appears to have been nearly unanimous in the more Southern states, and to have been carried in all by decided majorities. As state after state withdrew from the Union, its senators and representatives in Congress at Washington resigned their seats; and nearly all the officers of the army and navy, of Southern birth, believing that their first and final allegiance was due to their states, and that the action of each state carried with it all its citizens, also resigned their commissions, and tendered their swords to their respective states, and to the Confederacy they had formed.

President Buchanan, doubting his constitutional power to compel the seceding states to return to the Union, made a feeble and ineffectual attempt to relieve the garrison of Fort Sumter, in Charleston harbor, closely besieged by the forces of South Carolina. Commissioners were sent to Washington to negotiate for the settlement of the claims of the Federal government, and great efforts were mode to effect compromises of the difficulties, but without result.

On the 4th of March 1861, President Lincoln was inangurated at Washington. In his address, he said: 'I have no purpose, directly or indirectly, to interfere with the institution of slavery in the states where it exists. I believe that I have no lawful right to do so, and I have no inclination to do so.' On the 7th of April, a naval expedition set sail from New York for the relief of Fort Sumter; and its arrival off Charleston Harbor was the signal for the commencement of a bombardment of the fort by the Confederate batteries of General Beauregard. The surrender of the fort, April 11, was followed by a sudden outburst of excited feeling in the North. The government called out 75,000 volunteers, large numbers of whom were in a few days marching to the defence of Washington. April 18, the Confederates seized the U. S. arsenal at Harper's Ferry, and took or destroyed a large quantity of arms and machinery. On the 20th, the navy-yard, near Norfolk, Va., was destroyed by the U. S. officers, and five large men-of-war burned or sunk, to prevent their falling into the hands of the Confederates. Opposed to the Federal volunteers assembled at Washington, the Confederates took up a position at Bull Run, a few miles distant from the Potomac, under General Beauregard, where they were attacked by General M'Dowell. A severe action resulted in the repulse and complete panic of the Federals, who hastily retreated to Washington. Congress saw that it must act in earnest, and that the rebellion was not to be put down in 90 days by 75,000 volunteers. It voted to call out 500,000 men.

The Confederate States had a population of 5,582,122 free inhabitants, and 3,519,902 slaves; total, 9,102,024; and though the negroes were not called into the field except as laborers, they were not less useful in supplying the armies, by carrying on the agricultural labor of the country. The Confederates had also the strong sympathy and aid of the four slaveholding border states, prevented by their position from seceding—Delaware, Maryland, Kentucky, and Missouri.

Holding their position in Virginia, the Confederates erected fortifications on the Tennessee and Cumberland rivers, and on important points of the Mississippi, from Columbus, in Kentucky, to its mouth. They also made a strong effort to secure the state of Missouri, as well as to defend the seaports through which they must receive their most important supplies from abroad. The Federal government, on its side, blockaded the whole line of coast from Virginia to Texas, and sent large forces to secure the doubtful states. Gun-boats were rapidly built for the rivers of the west, and vessels purchased and constructed for the navy. In December 1861, the Federals had 640,000 men in the field; and the Confederates had 210,000, and had called for 400,000 volunteers.

The first important operation of 1862 was the taking the defences of the Cumberland and Tennessee rivers (February 6), which led to the occupation of Nashville, the capital of Tennessee, henceforth held by the Federals—Andrew Johnson, formerly governor and senator, having been appointed military governor. Roanoke Island was also captured, on the coast of North Carolina. In March, General M'Clellan, who had succeeded the aged Lieutenant-general Scott as commander-in-chief, commenced a movement on Richmond, the seat of the Confederate government, now defended by General Lee. On the 8th of March, the Confederate iron-clad *Virginia*, constructed from the U. S. steamer *Merrimac*, which had been sunk at Norfolk, and raised by the Confederates, attacked the Federal fleet in Hampton Roads, and in 40 minutes sunk the *Cumberland*, and set on fire and captured the *Congress* (frigates); while the other vessels took refuge in shoal water or in flight. The next day, the *Monitor*, a war vessel of entirely novel construction, low and flat, with a revolving turret, invented by Captain Ericcson, engaged the *Virginia*. The battle lasted two hours without result.

On the 6th of April, a sanguinary but indecisive battle was fought near Corinth, Alabama, the Federals being protected by gun-boats. Soon after, Admiral Farragut, with a fleet of 45 vessels, carried the forts at the mouth of the Mississippi river, and took New Orleans; while the armies and gun-boats captured the fortifications on the upper part of the river as low as Memphis, Tennessee. In the meantime, General M'Clellan had besieged and taken Yorktown, and fought his way up the peninsula of the James River, until within five miles of Richmond, when he was beaten in a series of sanguinary battles, and driven, with a loss, in six days, of 15,000 men, to the shelter of his gun-boats; while Generals Banks and Pope, sent to co-operate with him in the Shenandoah Valley, were defeated and driven back by General 'Stonewall' Jackson. On the 1st of July, the President called for 300,000, and August 4, 300,000 more men for the Federal army. Congress abolished slavery in the district of Columbia, prohibited it in the territories, and passed a resolution to compensate the masters in any state that would abolish slavery. They also authorized the President to employ negroes in the army, and to confiscate the slaves of rebels. In August, the Federals were a second time defeated at Bull Run, and General Lee crossed the Potomac into Maryland, creating great alarm in Washington, and even in Philadelphia. General M'Clellan made a rapid march, and met him at Sharpsburg or Antietam. A drawn battle resulted in the retreat of General Lee, covering an immense train of provisions, horses, cattle, &c., which was probably the object of his expedition.

A Confederate invasion of Kentucky, about the same time, was attended with similar results. Another advance on Richmond was led by General Burnside, who had superseded General M'Clellan; but he was confronted by General Lee at Fredericksburg, and defeated in one of the most sanguinary battles of the war. President Lincoln issued a proclamation declaring the freedom of all the slaves in the rebel states, which it was expected might cause them to rise against their masters; but it was without result. While the army of the Potomac was vainly endeavoring to advance on Richmond, the army of Tennessee, under General Rosencranz, with its base at Nashville, was trying to sever the Atlantic from the Gulf States, and cut off the railways that supplied the Confederate armies in Virginia. At Murfreesborough, Tennessee, the Confederate General Bragg attacked General Rosencranz with the usual result of heavy looses on both sides, but no decided victory.

Early in May 1863, General Hooker, who had succeeded General Burnside in the command of the army of the Potomac, crossed the Rappahannock, and was defeated by General Lee at Chancellorsville with great slaughter; but this victory was dearly bought by the loss of General Jackson, mortally wounded in mistake by his own soldiers. General Lee now took the offensive, and invaded Pennsylvania, advancing as far as Harrisburg; but being met by General Meade, the new commander of the army of the Potomac, he attacked him in a strong position at Gettysburg without success, and was compelled to recross the Potomac. In the meantime, the two principal fortresses of the Mississippi, Vicksburg and Port Hudson, attacked by land and water, after a long siege, were starved into capitulation, and the entire river was open to Federal gun-boats.

Charleston, blockaded since the beginning of the war, was now strongly besieged—its outworks, Forts Gregg and Wagner, taken, Fort Sumter battered in pieces, but still held as an earthwork, and shells thrown a distance of five miles into the inhabited part of the city. In September, General Rosencranz had taken the strong position of Chattanooga, and penetrated into the north-west corner of Georgia, where he was disastrously defeated by General Bragg at the battle of Chickamauga. At this period, there were great peace-meetings in the North, terrible riots in New York against the conscription and the negroes; while the banks having suspended specie payments, the paper-money of both Federals and Confederates was largely depreciated. The Confederates were, however, cut off from all foreign aid, except what came to them through the blockade, and their own resources, both of men and material, were becoming exhausted. The railways were worn, many destroyed or occupied by the Federals, and it became difficult to transport supplies and feed armies. The Federals had command of the sea, and access to all the markets of Europe.

At the commencement of 1864, the Federals held, including the garrisons on the Mississippi, nearly 100,000 prisoners of war. The Southerners also had about 40,000 Federal prisoners, whom they could feed with difficulty, and who suffered great hardships. General Ulysses S. Grant, who had been successful at Vicksburg, was appointed commander-in-chief of the Federal armies, and commenced a vigorous campaign over an immense area—in Virginia, the Carolinas, Georgia, Louisiana, and Arkansas, with the determination 'to hammer continuously against the armed forces of the enemy and his resources, until by mere attrition he should be forced to submit.' Of the Confederates, General Lee defended Petersburg and Richmond; General J. E Johnston opposed the army of Tennessee at Dalton, Georgia; General Forrest was in Mississippi; General Taylor and Kirby Smith commanded in Louisiana and Arkansas. In February, General Sherman marched from Vicksburg, making a destructive raid across Northern Mis-

sissippi to Alabama. In March, the Federals had 1,000,000 of men raised and provided for. The entire Confederate forces probably numbered 250,000. The army of the Potomac, commanded by General Meade, under the personal superintendence of General Grant, covered Washington, and advanced toward Richmond. General Butler advanced from Fortress Monroe up the James River; General Sigel marched up the Shenandoah. Sherman united the armies of Tennessee, Cumberland, and Ohio, at Chattanooga, where he had nearly 100,000 men and 250 guns. General Banks had 61,000 men in Louisiana. In March, General Banks moved up the Red River, toward Shrieveport, but was defeated on the 24th, and driven back to New Orleans. In May, the campaign of Virginia commenced, and the army of the Potomac fought a series of battles at the Wilderness, Spotsylvania Court-house, Jericho's Ford, North Anna, and Cold Harbor, with terrible losses. After each repulse, the Federals took up a new position further south, with a new base, until they had made half the circuit of the Confederate capital. General Breckenridge defeated Sigel in the Shenandoah valley, and once more threatened Washington. General Sheridan, with a strong cavalry force, drove back the Confederates, and laid waste the valley. In September, General Sherman advancing with a superior force, captured Atlanta. General Hood, superseding Johnston in the command of the Confederates, was out-generaled and beaten. While he marched west to cut off General Sherman's base, and attack Nashville, where he was defeated, Sherman burned Atlanta, destroyed the railway, and marched boldly through Georgia to Savannah. The Confederates made strong efforts and won victories, but with no permanent result.

In 1865, the Federals made a new draft for 500,000 men. Expeditions were organized against Mobile. Wilmington, the most important Confederate port, was taken by a naval and military expedition. Savannah and Charleston, approached in the rear by Sherman, were evacuated. Cavalry raids cut off the railways and canal that supplied the Confederate army in Petersburg and Richmond. Finally, on March 29, 1865, a series of assaults was made upon the Confederate works, during ten days of almost continual fighting, until the Confederates were worn down with fatigue. Richmond and Petersburg were evacuated April 2; and on the 9th, after several conflicts, General Lee surrendered at Appomatox Court-house, his army numbering 28,000. At this period, it is said that there was not lead enough remaining in the Confederate States to fight a single battle. On the 12th, Mobile surrendered with 3000 prisoners and 300 guns. Then General Johnston, in North Carolina, surrendered a few days after to General Sherman; and the Trans-Mississippi Confederate army followed his example.

The war was scarcely ended, when 800,000 men were paid off. During the war, the number of men called for by the Federal government was 2,759,049; the number actually furnished was 2,653,062. Of colored troops there were 186,097. The state of New York, with a pop. of less than 4,000,000, sent 223,836 volunteers. There was an annual waste of one-third, half of which was by wounds in battle. The Federal losses during the war were estimated at 316,000. In 1864, the Confederate army consisted of 20,000 artillery, 128,000 cavalry, 400,951 infantry; the entire available force enrolled did not exceed 600,000. The Confederate losses are said to have amounted to 300,000.

Mr. Lincoln was in 1865 triumphantly re-elected to the presidency, with Andrew Johnson as Vice-president. On April 14, while the North was rejoicing over the capture of Richmond and the surrender of the Confederate armies, the President was assassinated at a theater in Washington, by John Wilkes Booth, an actor; while an accomplice attacked and nearly killed Mr. Seward, Secretary of State. The assassin was pursued and killed, and several of his accomplices tried and executed. Andrew Johnson became President. Jefferson Davis and the members of the Confederate government were supposed to be privy to the assassination of President Lincoln, and large rewards were offered for their apprehension. Mr. Davis was captured in Georgia, and placed in Fortress Monroe, but was released without trial in May 1867. An amendment to the constitution, for ever abolishing slavery in the states and territories of the union, was declared ratified by two-thirds of the states, December 18, 1865. The vast change in the organization of the republic made by this new fundamental law was completed by the 14th and 15th amendments, passed in 1868 and 1870, which gave to the former slaves all the rights and privileges of citizenship. The seceded states were readmitted to the Union on condition of their adhesion to the constitution as thus amended. In 1867, the United States acquired by purchase the whole of Russian America (see ALASKA).

In 1872, the Alabama (q. v.) Court of Arbitration gave its decree in favor of the United States, while the San Juan boundary dispute with Great Britain was settled on the same side by the Emperor of Germany. The outrages of a secret organization known as the Ku-Klux Klan, in the Southern States, necessitated the passing of an act in 1871, giving cognizance of such offences to the U. S. Courts. In 1875, great excitement was created in the States by the discovery of grave malversations on the part of citizens holding high rank in the public service. The year 1876, memorable in the annals of the Republic as the hundredth anniversary of the Declaration of Independence, was celebrated by a great Centennial Exhibition at Philadelphia. The presidential election of the same year was of more than usual interest. General Ulysses S. Grant (q. v.), chosen President in 1869, had been re-elected in 1873. When the result of the keenly-contested election towards the close of 1876 was made known, it seemed as if fortune had favored the Democratic party. But many of the returns from the various States were disputed; and for several months the intensest excitement prevailed. At last a special tribunal, selected from the Senate, the House of Representatives, and the Judges of the Supreme Court, was appointed to examine the election returns. The result was that Mr. Hayes, the Republican candidate, was declared to have been elected President, and inaugurated March 4, 1877. His Democratic rival was Mr. Tilden.

A period of great commercial depression, not peculiar to America, reached a height in 1877, and was accompanied by alarming difficulties between labor and capital. In 1878, a measure was passed, in spite of the President's veto, making silver a legal tender equally with gold, though the former was then 11 per cent. less in value. A marvelous recovery in trade rendered comparatively easy in 1879 the resumption of specie payments, which had been strenuously opposed by the Democrats. An extraordinary movement took place amongst the negroes of the Southern States in 1879; a regular 'negro exodus' northward and westward created some anxiety. Antipathy to the Chinese immigrants in the Pacific states raised a violent agitation, which threatened a new constitution to California; but the excitement declined in 1879. Bad harvests in Europe increased the already enormous exportation of grain from the U. S. The wheat crop and exportation in 1880 were unparalleled, but the crop of 1881 was, owing to unfavorable weather, much diminished. In 1879, there was, for the first time since the Civil War, a Democratic majority in both Houses of Congress; and a term of office seemed to the Democrats at last to be at hand. But the presidental elections in 1880 gave a large majority for the Republican General Garfield, though the 'Solid South' voted for General Hancock, the Democratic candidate.

An item of special interest in the contest was the promotion of General Grant's claim to a third term of office; but the ex-president's candidature was withdrawn before the end of the struggle. President Garfield, who was an outspoken advocate of civil service reform, was installed in March 1881. To the horror of his fellow-citizens and of all the civilized communities in the world, he was struck down on 2d July by the hand of an assassin; but not till 19th September did he succumb to the effects of the fatal shot. Thereupon the vice-president, General Chester Allan Arthur, succeeded to the supreme office, assuming the presidentship on 22d September.

U'NIVALVES, in Conchology, are shells consisting of one piece, as opposed to *bivalves* (cockles, clams, &c.) and *multivalves*. They are mostly the shells of gasteropodous mollusks.

UNIVERSALISTS, a body of Christians whose distinctive peculiarity consists in their belief that 'evil' will ultimately be eradicated from the world, and that all erring creatures will be brought back to God through the irresistible efficacy of Christ's divine love. The grounds on which their faith in the final salvation of all men rests are derived more, perhaps, from reason than from Scripture; and when they *do* appeal to the latter, it is rather to the spirit and design of the Gospel than to particular passages. They argue, that when an infinitely wise, holy, and benevolent God resolved to create man, it could only be with a view to his everlasting good; that if he did allow him to be tempted and fall, it must have been because he foresaw that through sorrow and suffering man could rise to higher degrees of perfection; that therefore all punishment (or what, with our limited knowledge, we conceive to be such) is of necessity designed as a remedial agent, and not intended to satisfy God's indignation as a sovereign at the disobedience of his subjects; that no other view of the subject is compatible with the Scriptural, and especially the New Testament representation of God as a 'Father,' or with the oft-repeated declaration (in various terms) that Jesus Christ was a propitiation for the sins of the whole world.

In answer to those who adduce against them the express language of Scripture; e. g., 'And these shall go away into everlasting punishment: but the righteous into life eternal' (Matthew, xxv. 46), they reply, that the word *aionios*, translated 'everlasting,' does not necessarily bear that signification; that properly it does not express the idea of duration at all, either finite or infinite, but was rather used by the sacred writers to denote a mode of existence distinct from and wholly dissimilar to any mere *chronic* state; in proof of which they point to such passages as—'*This is life eternal*, that they might know thee, the only true God, and

Jesus Christ, whom thou has sent' (John, xvii. 3), where eternal life is affirmed to be *knowledge*—that is, a present state of mind, and not a perpetual hereafter of duration.

U., it may be observed, generally differ from the prevalent bodies of Christians in other important doctrines, though it is not because of such differences that they have received their name, nor is it necessary to merit the name that one should share these differences. Most of them agree with Unitarians—but there are eminent examples to the contrary—in rejecting the doctrine of the Trinity; they are also Pelagian in the matter of original sin, and reject the notion that the new birth is something supernatural.

Universalism, as a mode of belief, is of very ancient origin, and its modern adherents, besides urging its congruity with the divine plan of redemption, as revealed in Scripture, point to the earliest Christian writings—e. g., the Sibylline Oracles (see SIBYL). Passages in favor of the doctrine are cited from many of the church fathers—Clemens Alexandrinus; Origen; Marcellus of Ancyra; Titus of Bostra; Gregory of Nyssa; Didymus the Blind; Diodorus of Tarsus; Theodore of Mopsuestia; and Victorinus. It is said to have been held by some of the Albigenses, Waldenses, Lollards, and Anabaptists, and it probably had isolated supporters in most of the countries into which the Reformation penetrated. Nor has it wanted illustrious adherents in the Church of England and amongst the Nonconformists, among whom it is customary to rank Tillotson, Burnet, Newton, Henry More, Whiston, Jeremy White, Soame Jenyns, David Hartley, William Law, De Quincey, and F. D. Maurice. The same remark is applicable to the French Protestant and German Churches, and indeed it may safely be asserted that the *non-clerical* mind in all ages is disposed to look favorably upon the doctrine of the universal restoration to holiness and happiness of all fallen intelligences, whether human or angelic. But the existence of U. as a distinct religious sect is a feature of American rather than of English religious society.

The American Universalists affirm that their doctrines were preached as early as 1741, and maintained by several eminent divines; but the first separate Universalists' church in the United States was organized by the Rev. John Murray at Gloucester, Massachusetts, in 1780. Since his time an important body has sprung up, which contains many able, learned, and pious divines. In 1880 the organization comprised about 900 congregations, above 700 ministers, 4 colleges, 2 theological seminaries, and maintained a number of periodicals. See Ballou's *Ancient History of Universalism*, and Whittemore's *Modern History*.

UNIVERSITY (Lat. *universitas*, corporation), a corporation of teachers or students instituted for the promotion of the higher education. The prototype of the universities of modern Europe may be sought in the schools of Isocrates and Plato at Athens, and the Museum at Alexandria. These institutions certainly much resembled the university of after-times, both in their objects and their organization; and in Greece and Rome, as well as in the later Byzantine Empire, something analogous to the degree was conferred on those who had successfully passed through the *trivium* or *quadrivium*, which together comprised what was regarded as the seven liberal arts and sciences. The university is, however, usually considered to have originated in the 12th or 13th c., and to have grown out of the schools which, prior to that period, were attached to most of the cathedrals and monasteries, providing the means of education both to churchmen and laymen, and bringing together the few learned and scientific men who were to be found in Europe. Such an institute of the higher learning was at first called *studium* or *studium generale*.

When a teacher of eminence appeared, such as Abelard, or Peter Lombard at Paris, or Irnerius at Bologna, a concourse of admiring students flocked round him; and the members of the *studium generale* formed themselves, for mutual support, into a corporation, on which the general name of *universitas* came to be bestowed. In this way, the oldest universities arose spontaneously. The crowds drawn from every country of Europe to Paris, Bologna, and other educational resorts, had first local immunities bestowed on them for the encouragement of learning, and to prevent them removing elsewhere; and the academical societies thus formed were by papal bulls and royal charters constituted an integral part of the church and state. One great difference existed between the constitution of the two most important universities of early times. In Paris, the teachers alone constituted the corporation; in Bologna, the university consisted of the students or scholars, who at first held the supreme power, and appointed the academic officials. In this respect, Bologna became the model of the subsequent universities of Italy and the provincial universities of France, which were corporations of students; while the universities of Britain, Germany, Holland, and Scandinavia were like Paris corporations of teachers, and the Spanish universities occupied an intermediate position. Along with a general resemblance, there was much difference in the constitution and character of the pre-Reformation universities, the form of each being the result of a combination of various circumstances and ideas acting on an originally spontaneous convocation of teachers and scholars.

The several *faculties* of a university are subordinate corporations, consisting of the aggregate of students or teachers in a particular department of knowledge. The number of faculties has varied much in different universities. The university of Paris had at first only a faculty of arts, which, as early as 1169, existed as a separate body, with an organization of its own. Faculties of theology, medicine, and canon law were added in the 13th century. Bologna was at first exclusively, as it continued to be preeminently, a school of law. Oxford and Cambridge, in their origin, existed only in the faculty of arts. Some of the smaller French universities, as Orleans and Montpelier, were prohibited from teaching theology, lest they should become rivals to Paris. See UNIVERSITY OF FRANCE.

The granting of degrees was the mode in which the university reproduced itself. A degree is the recognition of a student having made a certain advance in his career, the degree of Doctor or Master, in its original idea, entitling the person on whom it was conferred to teach within the limits of the university. Towards the end of the 13th c., Pope Nicholas I. granted to the university of Paris the right of endowing its graduates with the power of teaching everywhere; and this universal degree, making the recipient of it a member of the community of the learned throughout Christendom, became a link of connection between the universities of Europe.

The designation of *Bachelor*, borrowed from the term indicating the probationary stage of knighthood, and implying the lowest stage of university honor, or the condition of an imperfect graduate, was first introduced in the 13th c. in the university of Paris, where the bachelor, though intrusted with certain tutorial functions, possessed no legislative power. The right of teaching (*regendi*) belonged to the master, doctor, or other perfect graduate; and a period of necessary regency was generally fixed, during which the graduates were bound to teach, and after the expiry of which they were at liberty to become non-regents. It, in the course of time, became the practice to endow a select number of the graduates as public authorized teachers; these privileged and salaried graduates were designated *Professors*, and instruction by professors more or less supplanted the original plan of teaching by graduates.

The poverty of a proportion of the students, and the desirableness of domestic superintendence, suggested the institution of halls endowed with property and corporate privileges, called *Colleges*. Though originally a provision for poor scholars, they soon assumed the character of boarding-houses for all classes of students, where they were privately trained and prepared for the public lectures. Colleges seem to have been first introduced in Paris, where most of them became appropriated to a particular faculty, or department of a faculty. The college of the Sorbonne, founded in 1250, came to be in a great measure identified with the theological faculty. Regent masters were named by the faculties as lecturers in the colleges, attendance on whom was made equivalent to attendance on the public courses in the schools of the university, and eventually the college lectures were thrown open to all members of the university; and it became obligatory in the faculty of arts, and usual in the other faculties, to become a member of some college.

The two highest university officers have generally been the *Rector* and the *Chancellor*, the former being the head of the university in everything except the granting of degrees, which are conferred by the latter as the fountain of honor. Besides the division into faculties, there was in most of the continental universities a division of the graduates and students into *nations*, in respect of the countries to which they belonged. In Paris, the faculty of arts was divided into four nations, khown as French, Picard, Norman, and German or English; and after the 13th c., these four nations, under their respective procurators, and the three subsequently added faculties under their deans, constituted the seven component parts of the university. The rector, with the procurators and deans, formed a court having cognizance of all matters relating to discipline, from which there was an appeal to the university, and from thence to the parliament of Paris. In Bologna, after faculties of philosophy, medicine, and theology had been added to those of civil and canon law, the students were classed as *ultramontani* and *citramontani*, and each class divided into nations, presided over by their several counselors or procurators.

The university, with modifications called for by the altered circumstances of society, has survived the revolutions of seven centuries. At present, Europe possesses about 100 universities, some dating from the 12th and 13th centuries, and others of various degrees of antiquity, including some founded in the present century. Above 30 belong to Germany and Austria, and 20 to Italy. Holland, Belgium, Scandinavia, Spain, Portugal, Russia, and Greece contain among them about 30 universities. England has

five—two ancient, Oxford and Cambridge; and three modern, London, Durham, and the Victoria University. Scotland has the four universities of St. Andrews, Glasgow, Aberdeen, and Edinburgh; and Ireland has Trinity College, Dublin, and the Queen's (q. v.) University.

Of the universities of Germany, the oldest are Prague, founded in 1348, and Vienna, in 1365. Heidelberg dates from 1386; Leipzig, 1409; Tübingen, 1477; Jena, 1558; Halle, 1694; Göttingen, 1737; Berlin, 1810; and Bonn, 1818. The chief administrative body of the German universities is the Senatus Academicus, composed of the ordinary professors, presided over by a rector elected yearly, or (at Halle and Tübingen) by a chancellor appointed for life, the exercise of discipline being, however, intrusted to a separate court, presided over by a judicial officer called the Syndic. There is a recognized gradation in the professorial office.

The highest class are *ordinary professors*, generally men of considerable eminence in their respective departments, elected by government out of three candidates submitted by the faculty to which they belong. Next to them are the *extraordinary professors* of the same branches, with smaller salaries; and then the class of *privat-docents*, who, in the course of time, qualify themselves to be extraordinary professors. An ordinary professor must deliver public lectures on the branch to which he is appointed; an extraordinary professor, or privat-docent, may lecture on what subject he pleases. The student is for the most part at liberty to attend what lectures he pleases; but licenses to practise certain professions, benefices in the church, and other posts, are only given to persons who have gone through a certain course of university study. In addition to the above-mentioned classes of instruction, there are attached to the university teachers of modern languages and other branches not forming part of the curriculum. The *Bursæ*, foundations resembling in their origin the English colleges, and the *Convikt*, or free table, are institutions for the benefit of the poorer students, from the former of which is derived the name *bursche*, popularly applied to a student in Germany. The German university system is admirably adapted to promote the advancement of science; its deficiency is chiefly in appliances for superintending the progress of the individual student. The professor is often more an instructor of the world at large by his writings, than of his students by his lectures.

The two great English universities are little inferior in antiquity to Paris and Bologna. From the beginning of the 12th to the middle of the 14th c., Oxford played nearly as important a part in the advancement of science and political life as Paris itself, with which it was connected by intimate ties, the most eminent doctors of Oxford acting at the same time as regent-masters in Paris. It espoused the cause of the barons against the crown, and while preserving an intimate relation with the church, generally sided against ecclesiastical abuses. Oxford and Cambridge, not unlike the continental universities in their origin, developed themselves in a manner peculiar to England. From an early period, it was the practice of the students to live in common in halls or hostels, rented from the burghers, under the charge of a common teacher. In 1280, there were no fewer than 34 halls at Cambridge, some containing as many as 20 to 40 Masters of Arts, and a proportionate number of younger students. In the course of time, colleges were endowed by benevolent persons for the maintenance of the poorer students, and the name *socii*, or *fellows*, was applied to the recipients of the endowments. This assistance was originally meant to last no longer than the completion of the course of study; but as most of the *socii* belonged to the ecclesiastical order, and had no other means of support, an understanding gradually arose that the aid furnished by the college should be continued to the *socius* till he succeeded in obtaining a benefice.

These provisions gradually increased in number and importance; and a practice was introduced of the colleges receiving wealthier students as boarders—the origin of the class of commoners or students not on the foundation. Most of the halls fell into decay, and those that remained received a collegiate character. In the 15th c., fellowships were no longer endowed to assist students going through their course of study, but as a permanent provision for poor young men of the clerical order who showed a taste for learned pursuits, and the degree of Master was made a necessary condition for holding them. In this way, the colleges became the university; the university acquired a semi-monastic character, which has since more or less adhered to it; and a tutorial system of education within the colleges was almost entirely substituted for instructions by university professors. For two centuries, the staff of professors have had little to do with academical education or discipline. The instruction of the student is committed to college tutors, assisted by private tutors, and attendance on the professors is in general neither required for university rank nor for college emoluments. The tutorial system is defended on the ground of its giving the instructor a greater hold over the student's attention. On the other hand, it lacks the advantages arising out of the division of labor in the professorial system; and it is now generally allowed that a mixture of both systems of teaching is better than either alone.

An effort has been made by the new statutes to render the professorial office in Oxford and Cambridge rather less of a sinecure than formerly. One of the most remarkable features of the English universities is their wealth in endowments. According to the *Universities Commission Report* (1874), the annual revenue of Oxford and Cambridge amounts to about £750,000, of which endowments provide £614,000. For the mode of government, see CAMBRIDGE; OXFORD.

Of the three modern English universities, London University (q. v.) was established by royal charter in 1836. It is wholly unlike the older English foundations, and is substantially an examining board, empowered to grant degrees to all persons found qualified, wheresoever their education may have been pursued. Durham (q. v.) University was opened for students in 1833, and obtained the right of conferring degrees by royal charter in 1837. The general provisions for education are similar to those of Oxford and Cambridge. The university has connected with it a medical college and one of natural science in Newcastle. The charter granted to the Victoria University in 1880, is meanwhile relevant to Owens College (q. v.) only, but contemplates the affiliation of other suitably equipped colleges.

The universities of Oxford and Cambridge have since 1603 returned two members each to parliament; the university of Dublin has the same privilege; while London University elects one.

The universities of Scotland approached much more nearly to the type of Germany and the Low Countries than of England. The teaching as well as governing body were the professors. Though nearly all the students were Scotchmen, they were nevertheless divided, according to continental usage, into four nations, named from the parts of Scotland to which they belonged. In St. Andrews, there were from the first the separate faculties of divinity, arts, and canon law. A pædagogium was erected in 1430 for the faculty of arts. In 1450, Kennedy, Bishop of St. Andrews, established and endowed the college of St. Salvator, to which Pope Paul II. accorded the privilege of conferring degrees in theology and the arts, constituting it to that effect a separate university. St. Leonard's College was founded in 1512, and St. Mary's in 1537, with power of conferring degrees. After the Reformation, St. Mary's was restricted to the study of theology; and in 1747, St. Salvator and St. Leonard were united. Glasgow had its lecturers in canon and civil law, and theology, from the beginning. The faculty of arts, however, alone received a definite shape and constitution; it had, as at St. Andrews, a pædagogium; and prior to the Reformation, had nearly absorbed the university.

During the Reformation period, Glasgow University was nearly annihilated; but it was restored by the exertions of Queen Mary and James VI. 'The university of Aberdeen, as now constituted, derives its origin from two different foundations—one, the university and King's College of Aberdeen, founded in 1494 by William Elphinstone, Bishop of Aberdeen, under the authority of a papal bull obtained at the instance of King James IV.; the other, Marischal College and University of Aberdeen, founded in 1593 by George Keith, Earl Marischal, by a charter ratified by act of parliament' (*Aberdeen University Calendar*). By the Universities (Scotland) Act, 1858, King's and Marischal College have been incorporated into one university and college as the university of Aberdeen—King's College being reserved for the faculties of arts and divinity, and Marischal College for law and medicine. The university of Edinburgh, founded after the Reformation, had but little of the ancient university character, being a professorial seminary on a royal foundation, rather than a society of graduates or students. James VI.'s charter of foundation placed it in the hands of the magistrates of the city, who remained its patrons till 1858. Besides a large number of small bursaries, there are now a few more considerable scholarships at the Scotch universities; but the endowments of this kind are still inconsiderable, compared with those of the universities of England.

The act of 1858 gave a uniform constitution to all the Scottish universities, each of which has now three governing bodies, the Senatus Academicus, the University Court, and the General Council; the chief officers being the principal, the rector, the chancellor, and the vice-chancellor. The universities of Edinburgh and St. Andrews, and the universities of Glasgow and Aberdeen, form two constituencies, each represented by one member of parliament.

In Ireland, the university of Dublin (q. v.) was founded in 1591. It consists of a single college—Trinity College—with a constitution like that of the colleges in Oxford and Cambridge; but the professorial element is to a large extent united with the tutorial. The university sends two members to parliament. The Queen's University in Ireland, having its seat in Dublin Castle, was founded by royal charter in 1850, and empowered to grant degrees to the students of the three Queen's colleges, respectively at Belfast, Cork, and Galway. A bill was passed in 1879, altering its title to the Royal University, and giving it leave to grant

degrees to all comers who shall be qualified. The Catholic University of Ireland, depending for its maintenance largely on voluntary subscriptions, has no state charter, but has several affiliated colleges connected with it.

The English colonies have not a few universities. In Canada, numerous institutions claim the title; amongst the more important are Macgill University, Montreal; the university of Toronto; Dalhousie College, at Halifax in Nova Scotia; and Laval University in Quebec, a Catholic institution. Australia has well-equipped universities at Melbourne (founded 1854), Sydney (1852), and Adelaide (1874); New Zealand has one at Dunedin; and Cape Colony has a recent but thriving university at Cape Town. Malta has had a university at Valetta since 1388. The three universities of India, at Calcutta, Madras, and Bombay, have several affiliated colleges.

Of universities in the United States of America, it is difficult to speak generally. It is impossible to draw a line between those institutions which may fairly be called universities, and the rest of the 350 'universities and colleges' of the government Reports. Of these, some are extremely insignificant and rudimentary, but most of them grant degrees of some sort. There are even about 100 establishments that call themselves universities, though differing about as widely as possible in rank. The United States government exercises no control over education, save in the matter of the military school at West Point. Some of the schools of higher education have, however, been founded by the particular state in which they stand, and are wholly controlled by the state; some, partly endowed by the state, and to some extent regulated by representatives of the state, are non-sectarian; the numerous sectarian ones are founded and managed by religious bodies. Into these three classes the 'universities,' in the American usage, fall to be divided.

The best type of college is a corporation with a charter from the state, and supported by endowments, donations, and fees. Its head is called president, generally chosen by trustees; the chief authority is committed to a body of trustees or overseers, some of whom are appointed by the state; while the executive is mainly in the hands of the faculty, consisting of professors and other instructors. The course of study, comprising the chief subjects of a liberal education, extends over four years. The degree usually conferred at graduation is B.A. As instances of colleges that may fairly claim to be regarded as universities, are Harvard (q. v.), the Cornell University at Ithaca, Princeton College (q. v.), Columbia College in New York, Yale College (q. v.), and the unique Johns Hopkins University in Baltimore, endowed by its founder with over $3,000,000, inaugurated in 1876, and already recognized as an important center of scientific research.

Some of the most ancient and famous European universities are now defunct, as those of Cologne (founded 1388), Erfurt (1392); or incorporated with more recent ones, as Wittenberg.

See Savigny, *Geschichte des Römischen Rechts im Mittelalter;* Von Raumer, *Geschichte der Pädagogik;* Von Sybel, *Die Deutschen und die Auswärtigen Universitäten;* Crevier, *Histoire de l'Université de Paris;* Malden, *History of Universities and Academical Degrees;* Kirkpatrick, *Historically Received Conception of a University;* Huber, *History of English Universities;* Wood, *History and Antiquities of Oxford;* Dyer, *History of the University of Cambridge;* Mallinger, *History of the University of Cambridge;* Hart, *German Universities; Reports of Royal Commissions concerning the Universities of Scotland; Report of Commissioners on Oxford and Cambridge Universities.*

UNIVERSITY COLLEGE, the oldest college in the university of Oxford, is said to have been founded as early as 872 by Alfred the Great. It was restored by William of Durham, rector of Wearmouth, who, at his death in 1249, left a sum of money to form a permanent endowment for a certain number of 'masters,' preference being given to those who were born nearest the city of Durham. Among the subsequent benefactors are found King Henry IV., who founded (1403) three fellowships, at the request of Bishop Skirlaw of Durham (who consequently is also ranked as a 'benefactor'); Henry Percy, Earl of Northumberland, who founded (1442) three fellowships; Sir Simon Bennet, Bart., who founded (1631) four fellowships and four scholarships; &c. In 1714, Dr. John Radcliffe, attached to this college 2 fellowships, tenable for 10 years by Masters of Arts, who must travel abroad during 5 years. The present foundation consists of 1 master, 13 fellows, 12 scholars, and several exhibitioners. The patronage consists of 10 livings.

UNIVERSITY OF FRANCE. In France, since the Revolution, the word University has acquired a meaning widely different from that which it bears in other countries; the expression 'Université de France' being nearly equivalent to 'National system of education of France.' All the old universities of the country having been swept away at the Revolution, education had fallen into abeyance. After various attempts at the establishment of primary, secondary, and central schools in the departments, the imperial government adopted a new system, by which the whole educational machinery of the country was centralized at Paris, and committed to a body called the University, with a Grand-master at its head, assisted by a council. The system has since undergone various alterations. The governing body, as well for the higher educational institutes as for the elementary schools, is the Ministry of Public Instruction, supported by a supreme educational council and 18 inspectors-general. France is divided into 16 educational districts, the so-called *Academies*, within the bounds of which exist one or more of the *Faculties* of theology, law, medicine, and science and literature. Such faculties are found in 18 towns besides Paris; but only in the latter are the five co-existing faculties organized into a university.

The monopoly, hitherto enjoyed by the U. of F., of opening schools of law and medicine, and of conferring degrees, was abolished by a law passed in 1875. The Catholics have taken advantage of this to institute colleges claiming the dignity of universities, but under ecclesiastical control. There is now, for example, a Catholic university of Paris. For the Paris faculties of the U. of F., see SORBONNE.

UNKIAR-SKELESSI, a small town on the Asiatic shore of the Bosporus, in the neighborhood of Scutari, gives its name to a treaty concluded between Turkey and Russia, July 8, 1833. This treaty, which consisted of six articles, was one of mutual defensive alliance; but a separate and secret article was subjoined, by which the sultan, in place of the military or naval aid which, by the first article of the treaty, he was bound to furnish to Russia, agreed to close the Strait of the Dardanelles, allowing no foreign vessels of war to enter it under any pretext whatever. By the terms of the treaty concluded at London, July 13, 1841, the stipulations of U. were annuled.

UNLEA'VENED BREAD, USE OF, in the Eucharist, has long been a subject of controversy between the Latin Church on the one hand and the Greek and other oriental churches on the other; with the latter of whom the Reformed churches in later times have conformed in their practice of celebrating the Lord's Supper. The early history of the usage is very obscure; but the Western Church had certainly, from a very remote date, employed *Azyms*, or unleavened bread, in the consecration and distribution of the Eucharist; nor was this usage made a subject of controversy with the Latins by Photius, on occasion of the dispute between the churches, which arose during his patriarchate. In the later controversy, however, under Michael Cerularius (see GREEK CHURCH), the question of azyms became very prominent, and the diversity of practice still continues a subject of controversy between the Greeks and Latins. The principal argument alleged by the advocates of the use of leavened bread, is founded on the assumption that the Last Supper of Our Lord took place on the eve of the Passover, that is, on the 13th day of the month Nisan, on which day common bread, and not the azyms, must have been used; and on this and some other grounds, some writers, even among the Roman Catholics themselves, and especially the learned Jesuit Sirmond, have maintained that the Last Supper was actually celebrated in leavened bread.

On the other hand, however, it is contended that the Last Supper, being held in the evening of that day, was, in the strictest sense, Our Lord's celebration of the Passover, and therefore (Exodus, xii. 8—20), that the bread can have been no other than azym, or unleavened. It must be added that all Roman Catholic writers, and the more learned among the Greeks, are agreed that the Eucharist may be *validly* consecrated whether the bread be leavened or unleavened.

U'NNA, a small town of Prussia, in Westphalia, 19 miles north-west of Arnsberg. It was formerly fortified, was one of the Hanse Towns, and played a *rôle* in the history of the Femgerichte (q. v.). About a mile to the north are the famous salt-works of Königsborn, which yield 120,000 cwts. of salt annually. Pop. (1880) 7690, who are employed in weaving linen and hosiery, and in brewing and distilling.

UNST, the most northern of the Shetland Islands, in lat. 60° 45′ N., is 12 miles long, and 3½ miles in average breadth; area, 36 sq. m.; pop. (1881) 2173. The coast is much broken, and the headlands are rocky, mural, and lofty. There are 2000 acres under cultivation, and about as many in pasture. Valuable minerals abound, and chromate of iron is an article of commerce. The island contains numerous tumuli, a chain of Scandinavian dunes, and the ruins of upwards of 20 ancient chapels. Fishing and agriculture are the chief employments.

UNTERWALDEN, one of the four Waldstätten, or Forest Cantons of Switzerland, forms part of the Hill Country which surrounds the Lake of Lucerne (see SWITZERLAND). It is 25 miles in length, and has an area a little larger than Middlesex. In 1870, the pop. was 26,116; in 1880, it was 27,348. U. is bounded on the E., S., and W. by lofty hills, and subsidiary ridges divide it into two parallel valleys—both of which open on

the north into the Lake of Lucerne. The eastern valley is drained by the Engelberger Aa, the western by the Sarner Aa. Great highways run up these valleys from the shores of the lake, and in several places communicate with each other; but they do not connect U. with surrounding cantons. The canton is chiefly pastoral. Some attempts have been made to cultivate the vine, but they have not proved successful. The language of the people is a Swiss-German dialect; their religion is Roman Catholic.

U. is divided into two parts; not, however, corresponding with the two river basins of which it is formed. The forest of Kerns, or Kernwald, formed the line of separation between these two districts, which were separate so early as 1150. One is named the Obwald, or district above the Forest, and includes the whole of the western valley. The other is the Nidwald, which includes only the lower part of the eastern valley. Each division forms an independent republic, with its own administration. Both have a *landesgemeinde*, or parliament composed of all the inhabitants 20 years of age, with the exception of a few *heimathlosen* (tramps); and each forms a half-canton, that is, a canton which returns one member to the Swiss Council of State. The landesgemeinde of each half-canton assembles in the open air late in the spring, when it passes new laws, pays off accounts, imposes taxes, and appoints the executry officers. The capital of the Nidwald is Stanz (pop. above 2000), remarkable for its fine church and statue of Winkelried. The capital of the Obwald is Sarnen, with a population of about 4000.

UPANISHAD is the name of those Sanscrit works belonging to the Vedic literature which contain the mystical doctrine of the Hindus on the nature of a supreme being, its relation to the human soul, and the process of creation (see INDIA, sec. *Religion*). The word (derived from the Sanscrit prefixes *upa*, 'beneath,' or 'near,' and *ni*, 'in,' combined with the radical *sad*, 'sit') is explained by the great theologian *S'ankara* (q. v.), and others after him, as meaning the 'science of Brahman,' or 'the understanding of the identity of Brahman and the soul,' because 'in those devoted to it, this science *sets to rest* (or destroys) the world, together with (ignorance) its cause;' or, in other words, because it shows to them that the world has, besides Brahman, no reality. Grammatical commentators explain its etymology as implying that 'eternal bliss *reposes on it* (*upanishîdati s'reyo 'syâm*);' and Professor M. Müller has surmised that the word 'Upanishad meant originally the act of sitting down near a teacher, of submissively listening to him,' whence it came to mean 'implicit faith, and at last truth or divine revelation.' But apart from the artificialness of all these interpretations, it deserves notice that the earliest sense of the word appears to be that of 'secret' or 'mystery' (literally, 'that which *sits* or rests *beneath*'). In this sense, it is mentioned by the grammarian Pân'ini; and as it is very probable that, in his time, the works bearing the name of Upanishads were not yet in existence (see Goldstücker's *Pân'ini*, &c., p. 141), it may be assumed that these works derived their name from the mysteriousness of the doctrine contained in them; and perhaps also from the mystical manner in which they propounded it.

In order to understand the origin and purport of the Upanishads, as well as the relation in which they stand to the Vedas, properly so called, it must be borne in mind that, though the Vedic hymns are based on the worship of the elementary powers, and the Brâhman'a portion connected with them is chiefly concerned in legendary and ritual matter relating to that worship, yet in both these portions of the Vedas, and especially in the Brâhman'as, the beginnings of a period become already visible when the poets raised the questions as to the origin of the world and the true nature of the gods. See INDIA, sec. *Religion*. A first attempt at a systematic answer to these questions was made in works which bear an intimate relation to the Brâhman'as; and so great was the awe in which, on this account, these works were held, that they had to be read in the solitude, where the mind could ponder in perfect calmness over the mysterious problems in which they are engaged. These are the *Aran'yakas* (from *aran'ya*, a forest). But as the style and contents of the Aran'yakas are extremely obscure, and as, through the close alliance of these works to the Brâhman'as, of which some of them form part, the theological questions of which they treat are much overlaid with ritual and other matters which properly belong to the Brâhman'as, a further progress made in the same direction, led to the composition of works and treatises, the diction of which is somewhat clearer, and less entangled with subjects extraneous to the problems they intend to solve.

Such works and treatises are the *Upanishads*. Their object, like that of the Aran'yakas, is to impress the mind with the belief in one Supreme Spirit (*Brahman*, as a neuter, and different, therefore, from the same word as a masculine, which is the name of the first god of the *Trimûrti*, q. v.), to show that this Supreme Spirit is the creator of the world; that the world has no reality if thought of besides Brahman, and that the human soul is identical in nature with that same Spirit whence it emanates. The reward the Upanishads hold out to the believer, who understands their doctrine, and firmly adheres to it, is freedom from Transmigration (q. v.), and consequent eternal bliss. The object and aim of the Upanishads are therefore the same as those propounded in the philosophical systems (see SANSCRIT, sec. *Literature*); and the Upanishads may therefore be looked upon as the forerunners of these systems themselves—those Upanishads, at least, which we may call the older Upanishads; for as to the more recent ones, and those which bear the stamp of a sectarian character, their claim to be ranked among the Vedic writings is extremely doubtful, if at all admissible.

Though agreeing in the main points of their doctrine, it is easily understood that works of this nature, ranging over different periods of Hindu religion, will also differ from one another both in the manner and detail in which they deliver their subject-matter, and in the degree of completeness with which they treat of it. Thus, in some, the legendary narrative, and even ritual detail, are still considerably blended with the theosophical speculation—and these stand nearest, therefore, the Aran'yakas, probably also in time; in others, more philosophical, the nature of Brahman and the human soul is the only subject of inquiry; in others, the process of creation is also enlarged upon, with detail which harmonizes more or less either with the ulterior views of the Vedanta (q. v.) or those of the Sânkhya (q. v.) philosophy; some Upanishads, again, especially emphasize the inefficiency, for the attainment of eternal bliss, of the performing religious acts and of worldly studies—the knowledge of Brahman being the only means that leads to this end; others, on the contrary, in conformity with the Yoga (q. v.) doctrine, assign a prominent place to the exterior means, by using which the soul would qualify itself for union with the Supreme Spirit; while the sectarian Upanishads, which identify this Spirit with Vishn'u and S'iva, have, besides, the tendency of reconciling the popular with the philosophical creed.

Of the older Upanishads, a typical instance is furnished in the Chhândogya Upanishad of the Sâmaveda, the framework of which is legendary throughout, and its contents allegorical and mystical. Other shorter Upanishads, freer from narratives and allusions to the mysterious import of ritual acts, aim at a more intelligible exposition of the doctrine of the soul. Of their mode of treatment, the following passage from the *Kât'haka* Upanishads will serve as an example: *Nachiketas*, the son of Vâjas'ravas, having come to the abode of Yama, the judge of the dead, and obtained from him the grant of three boons, asks of him, for his third boon, an answer to the following question: 'There is this doubt: some say that (the soul) exists after the death of a man (in connection with another body than this); others say that it does not. This I should like to know, instructed by thee.' And Yama, after some hesitation, explains to him that the soul and Brahman are one, but that a man attains immortality only by understanding this unity, and that, to arrive at this understanding, he must free his mind from sensual desires, and get a correct knowledge both of the nature of Brahman and of the soul. 'Know the soul as the rider, and the body as the car; know intellect as the charioteer, and *manas* (the organ of volition) as the rein. The senses, they say, are the horses, the objects (their) roads; and the enjoyer (i. e., the rider) is (the soul) endowed with body, senses, and manas. Thus say the wise.

'If he (the charioteer) is unwise, and his manas is always unbridled, his senses are uncontrolled like vicious horses; but if he is wise, and his manas is always bridled, his senses are controlled like good horses. He who, always impure, is unwise, and whose manas is unbridled, does not attain *that* abode (of immortality), but comes to the world (of birth and death); he, however, who, always pure, is wise, and whose manas is bridled, he attains *that* abode whence he is not born again. The man who has a wise charioteer, and whose manas is bridled, reaches the other shore of the road (of the world), the highest abode of Vishn'u. Higher (i. e., subtler), indeed, than the objects are the senses; higher than the senses is manas; higher than manas, intellect; and higher than intellect, the great one, the soul. Higher than the great one is that which is unmanifested, and higher than the unmanifested is Purusha, the supreme spirit. But higher than Purusha there is nothing; he is the goal, the highest resort. This highest spirit is the soul hidden in all created beings; it is not manifest, but is beheld by those who can see what is subtle with an attentive, subtle intellect.' The coincidence between the allegory, in the foregoing passage, and that in Plato's *Phædrus*, imparts an additional interest to this Upanishad, which is valuable, moreover, on account of the evidence it affords as to points of agreement and difference between its views of the development of the world and those expounded in the Sânkhya (q. v.).

The *Mun'daka* Upanishad is important for the relative position which it assigns to the teaching of the Vedas, and the doctrine of the Upanishads. 'Two sciences,' it says, the knowers of Brahman tell us, 'must be known, the higher and the inferior. The inferior is (the knowledge of) the R'igveda, the Yajurveda, the Sâmaveda, and the Atharvaveda, the knowledge of pronunciation,

the ritual, grammar, explanation of Vedic texts, prosody, and astronomy. But the higher knowledge is that by which that imperishable Brahman is comprehended. That which is invisible, unseizable, without descent (or origin), without either color, eye, or ear, without hand or foot, eternal, manifold (in creation), all-pervading, very subtle, undecaying—the wise behold it as the cause of created beings.' And in another place, the performers of the sacrificial rites ordained by the Veda are said to attain, indeed, to Indra's heaven in virtue of their pious work; but this state of bliss is declared to be unstable and perishable, and these 'fools . . . . drop (from their heaven) as soon as this heaven (the reward of their acts) has faded away. Fancying that pious acts, ordained by the Vedas and codes of law, are the highest (object of man), these ignorant people do not know that there is something else which leads to eternal bliss. Having enjoyed (the reward of their deeds) on the happy summit of paradise, they enter again this world, or one that is (even) lower. Those, on the contrary, who practise penance and faith, and, with subdued desire, live in the forest, under the vow of a religious mendicant, they, free from sin, enter through the sun to that abode where resides that immortal spirit, that spirit, indeed, of undecaying nature.'

The *Talavakâra*, or *Kena*, Upanishad, which, being one of the shortest, is in form one of the most philosophical treatises of this kind, puts in clearer language, perhaps, than any other Upanishad, the doctrine that the true knowledge of the supreme spirit consists in the consciousness which man acquires of his *incapacity* to understand it, since the human mind being capable only to comprehend finite objects, cannot have a knowledge of what is infinite.

The Upanishads are not supposed to have been revealed in the same manner as the Vedic hymns. See VEDA. Nevertheless, with the exception of a few confessedly modern Upanishads, they are not assigned to human authorship, but looked upon as inspired writings, to which the term *S'ruti* (q. v.) applies. In several Upanishads, no special mention is made of their divine origin; in some, however, this is done. Thus the *Chhândogya* Upanishad, in its concluding section, relates: 'This (knowledge of the soul) Brahman (the god of the Trimûrti) imparted to Prajâpati (a lord of creation—the patriarch Kas'yapa, as S'ankara explains); Prajâpati imparted it to Manu, and Manu to mankind;' the *Br'ihadâranyaka* Upanishad, which on three occasions gives long lists of teachers who handed it down to their pupils, always ascribes itself, in the last instance, to the authorship of 'the self-existent Brahman (the supreme spirit);' and in a similar manner the *Mun'd'aka* Upanishad says that it was Brahman (the god of the Trimûrti), the creator of the universe, who first taught the science of the supreme spirit to his eldest son, Atharvan. As in the case of most ancient works of Sanscrit literature, the date of the Upanishads also still remains quite uncertain, and, wherever given, is purely conjectural.

According to the native system, they are classified as belonging to one or the other of the four Vedas, with which they are held to stand in immediate connection. There are Upanishads, consequently, of the R'ig-, Yajur-, Sâma-, and Atharvaveda. But this classification has no reference whatever to chronology.—For a fuller account of these works, see Professor Weber's *Indische Studien*, vols. i. ii. (Berlin, 1850—1853), and his *Akademische Vorlesungen über Indische Literatur-geschichte* (Berlin, 1852); Professor M. Müller's *History of Ancient Sanskrit Literature* (Lond. 1860); John Muir's *Original Sanskrit Texts*, vol. i.—iv. (Lond. 1858—1863); and the edition and translation of several of these Upanishads by E. Roer, *Râjendra Lâla Mitra*, and E. B. Cowell, in the *Bibliotheca Indica;* also Raja Rammohun Roy's *Translation of several Principal Books, Passages, and Texts of the Veds* (Lond. 1832). The names of 149 Upanishads, as compiled from various sources by Professor M. Müller, may be found in the *Zeitschrift der Deutschen Morgenländischen Gesellschaft*, vol. xix. See also Max Müller's translation of the U.

UPAPURAN'A. See PURAN'A.

U'PAS (the Malay word for *poison*) is the name given to a number of vegetable poisons in the Eastern Archipelago and the Philippine Islands. The most celebrated poison of this kind is produced by the *Antjar* (*Antiaris toxicaria*), a tree which grows in the Sunda and Philippine Islands. It attains a height of upwards of 100 feet, and belongs to the natural order ARTOCARPACEÆ (q. v.), the same order with the bread-fruit. The leaves are lanceolate. The female flowers are solitary; the male flowers congregated beneath them in numbers upon the receptacle, which has a long stalk, and is of the shape of a watch-glass. The fruit is a kind of drupe, covered with fleshy scales. From the milky juice of this tree (called in some of the islands *Pohon-Upas, Antjar* in Java, and *Ipo* in the Philippines), mixed with black pepper, and the juice of galanga root and of ginger, the Malays prepare a poison for their arrows, which proves speedily fatal to men and to the larger mammalia. The only hope of relief is by means of severe vomitings and the excitement of profuse perspiration. Although the fresh juice of this tree, brought into contact with the skin, acts as a poison, the story of a poison-vale in Java, in which the exhalations of numerous poison-trees extinguish all animal life, and even all other vegetable life, is a mere fable.



Antjar (*Antiaris toxicaria*).

There is a narrow valley in Java, where neither animal nor vegetable life can subsist; but this is owing to carbonic acid gas emitted from the ground, as in the *Grotto del Cane*, near Naples, and the upas-tree is as incapable of living there as any other. It is found in forests, and does no harm to the other trees around it. The prepared upas or antjar poison is kept in closed tubes of bamboo, and is of the consistence of molasses. The flesh of animals killed by this poison may be eaten with perfect safety; although the virulence of the poison is shown by its extremely rapid action. It is not perfectly known what the substance is which gives to the juice of the upas tree its poisonous properties, but it appears to be an alkaloid. The fibre of the bark of the upas tree is sometimes made into cloth, but unless the fibre is thoroughly cleaned, garments made of it produce a painful itching.—A still more powerful poison than the upas antjar, employed in the same part of the world, is the *Upas Tjettek*, or *Upas Tieute*, which is prepared in a similar manner from the root of the *Strychnos tieute* (see STRYCHNOS). It abounds in strychnine.

UPHEA'VAL or UPTHROW OF STRATA, the change in stratified rocks from their original horizontal position to one more or less inclined, produced by an expansive subterranean force, or other power, like the pushing forward of the crust itself, as in the case of the Appalachian Mountains (q. v.). In slight changes of level, the continuity of the rock is unbroken; but frequently immense cracks are formed, into which igneous rocks penetrate, and form a back-bone for the upraised mass, or dykes penetrating the strata. Upheavals may take place slowly, like the present gradual change in the Scandinavian coast, or may be more rapid when produced by some sudden earthquake.

UPHO'LSTERY, that branch of trade which relates to the furnishing of a house with curtains and other kinds of hangings. It is also applied more generally, and is made to include bedding, carpeting, and the covering of chairs, couches, &c.

UPOLU', one of the richest and most beautiful of the islands of the Pacific, belongs to the Samoan group, lying about 60 miles west of Tutuila. It is 140 miles in circumference, and has 16,000 inhabitants. The island has been a mission-station for many years, and the English consul was till 1875 the son of Mr. John Williams, the missionary, whose melancholy fate is well known. Many of the inhabitants are Christians. The chief harbor is Apia, a civilized-looking place, with many edifices on the European model. Many of the natives are turning their attention to the cultivation of cotton, and the cotton-seed grows wherever it is cast on the ground; the only trouble experienced in raising cotton is the clearing and keeping down the weeds. On an average, about 200 acres annually are under this crop. Coffee is also cultivated. The principal article of export, however, is cocoa-nut oil. U. affords a plentiful supply of fruits and vegetables, and is visited annually by numerous English and American whalers.

UPSA'LA, an ancient and beautiful town of Sweden, on the Fyrisä, a navigable stream, 45 miles north-north-west of Stockholm. The eastern part of the town stands on a wide and fertile plain; the west part, containing the chief buildings, occupies a high range of ground looking over an apparently boundless plain to the north and east. U. is the seat of an archbishop, who is the primate of the whole country. The great attraction is the

cathedral, once a beautiful structure, and handsome still, though disfigured by restorations. It is in the Gothic style, built of brick, was founded in 1258, and completed 1435; is 330 feet long by a 140 broad, and 105 feet high; and contains the tombs of Linnæus, and of Gustavus Vasa and several other Swedish kings.—The university of U.—the chief institution of the kind in the country—founded in 1477, is attended by about 1400 students, taught by 30 professors, and 70 other teachers. The library contains 160,000 vols. and 8000 MSS., several of which are very valuable. Pop. (1880) 15,675, the mass of whom are dependent upon the university for their livelihood.—Two miles north of the town is Old Upsala, now a village, which, during the heathen period, was the seat of the Odin worship, with a splendid temple and sacred grove, which have now disappeared. Also, about four miles from U. are the famous Mora-stones, where in the middle ages the election and crowning of the Swedish kings took place.

U'RACHUS, The, in the adult human subject, is a small fibrous cord formed by the obliteration of a tubular canal, which in the embryo runs from the apex of the bladder to the umbilical cord. In other mammals, it remains open, and is continuous with one of the fœtal membranes; and it has been found pervious in the human subject at birth.

U'RAL, a river of Russia, called *Rimna* by the ancients, later, *Jaik*, and since 1775, by its present name, rises in the southern section of the Ural Mountains, near the east frontier of the government of Orenburg. It flows south through the district of Troitzk, past the town of Virchni-Uralsk, to its confluence with the Kisil; and in this region its course is over hilly meadows, and its current is very rapid, owing to its narrow and uneven bed. At the town of Orsk, the river bends westward, and runs in that direction as far as the mouth of the river Tchagan, after which it flows directly south, and falls into the Caspian Sea. It is deep enough for navigation; but owing to the scarcity of wood for shipbuilding, and the number of sandbanks that bar the river, no navigation can be carried on. This, loss, however, is compensated by the fisheries of the river, which abounds in the most highly esteemed varieties of fish, and yields to the Cossacks settled along its banks an annual revenue of 600,000 rubles (£93,750). The U. has long served as the frontier separating Russia from the Kirghis Steppes, and many forts have been erected, and a settlement of Cossacks—known as the Ural Cossacks—establisbed along the river. The direct length of the U. is estimated at 550 miles; with windings, 1040 miles. The principal affluents are the Kisil and Sakmara on the right, and the Or and Ilek on the left.

URAL MOUNTAINS (probably the Tartar word *ural*, belt), the *Hyperborean Mountains*, or *Rhipæi Montes*, of the ancients, form part of the boundary between Europe and Asia, and separate European Russia on the west from Siberia on the east. The chain extends south from the Kara Sea, an arm of the Arctic Ocean, to the middle course of the Ural river, or from lat. 70° to of that 50° N., and is 1333 miles in length, with a breadth varying from 16 to 66 miles. Although the U. M. form really a single uninterrupted chain, geographers have agreed to consider them as divided into three sections—the Northern, Middle, and Southern Ural. The Northern Ural separates the basins of the rivers Petchora and Ob, is for the most part rocky, does not rise higher than 3000 feet, and is commonly called *Poustoi* (empty), because it is extremely poor in ore. The middle Ural, commonly called *Roudnoi* (metalliferous), the principal seat of the mineral riches of the whole chain, comprises the highest peaks, as the Kanjakovski Kamen, rising to 5000 feet; but in some places, the height is so insignificant, and the slope so gentle, that travelers can scarcely distingnish it from the lowlands.

The Southern Ural divides itself into three branches, two of which extend to the east of the Ural river, and gradually disappear in the Uralo-Caspian deserts, while the third branch extends along the right—the western—bank of the Ural. The chain is composed chiefly of crystalline and metamorphic rocks, granite, gneiss, porphyry, chloritic, and micaceous schists. The U. M., especially the middle and the north part of the Southern Ural (the governments of Perm and Orenburg), abound in mines of gold, platinum, copper, and iron. These mines, or *zavods*, are partly the property of the state, partly that of private individuals. Of the latter, the chief are the Nijni-Tagilsk, belonging to the Demidoff family; the Verchisetsk and Neviansk, belonging to the Takosleff family. The gold diggings occur on both slopes of the mountains, and gold is sometimes found in nuggets of considerable weight—the heaviest ever found in the chain being about 80 English lbs. in weight. During the past fifty years, the annual value of the mineral raised in the Ural mines has gradually increased from 50 millions of rubles annually to nearer 80 millions. In the period 1870 to 1880, the gold production reached 9600 lbs. per annum. In the same period, as much as 3400 lbs. of platinum were obtained in a year. More than four-fifths of the iron of Russia is got from the Ural districts; nearly 270,000 tons of iron being annually procured here.

The magnetic ironstone of the Urals is admirably suited for making steel and wire, and is largely exported for this purpose. Copper to the extent of some thousands of tons is raised annually. Immense quantities of rock-salt are quarried. Among precious stones, the most notable are the emerald, found on the eastern slope in the district of Ekaterinburg; some of these have weighed upwards of thirteen cwts. Other precious stones are found, as the beryl, topaz, amethyst, and diamond, the last discovered in accordance with the prediction of Humboldt, but of small value. Malachite and jasper also occur. The pop. inhabiting the U. M. and supported by the mines is 155,000.

URA'LSK, a Russian town, belonging to the territory of the Ural Cossacks, and included within the governorship of Orenburg, stands on the right bank of the Ural, 150 miles south-south-east of Samara. It was founded in 1622 by the Ural Cossacks, and was till 1775 known under the name of Jaitsk. A good trade is carried on—the principal articles being fish, isinglass, caviare, tallow, and cattle. There are three great yearly fairs—in July, October, and January. Pop. (1880) 4597.

URA'NIA (i. e., 'the Heavenly Muse') was a daughter of Zeus and Mnemosyne. She was regarded as the Muse of Astronomy, and was represented with a celestial globe, to which she points with a little staff.



Urania.

URA'NIUM (sym. U, equiv. 60—new system, 120—sp. gr. 18·4) is a very hard but moderately malleable metal, resembling nickel or iron in its lustre and color; but in a finely comminuted state, occurring as a black powder. It is not oxidized by exposure to air or water at ordinary temperatures; but if heated in the air, it burns brilliantly, and is converted into oxide. It is a comparatively rare metal, which never occurs native; its sources being *Pitch-blende*, which contains nearly 80 per cent. of black oxide; *Uranite*, which contains a hydrated double phosphate of lime and uranium; and *Chalcolite*, which is a similar phosphate of copper and uranium.

U. forms at least four oxides, viz., two principal ones—a *protoxide*, UO, and a *sesquioxide*, U_2O_3; and two intermediate oxides—the *black oxide*, $2UO,U_2O_3$, and the *green oxide*, $UO.U_2O_3$. For the methods of preparing these oxides, the reader may consult any of the larger chemical text-books. The black oxide is of much value as a pigment for coloring porcelain; and compounds of the sesquioxide (or peroxide) with the earths are employed to communicate a peculiar yellow tint to glass. The salts of the protoxide have a green, and those of the peroxide a yellow color. None of them are of any special importance. The metal is extracted from pitch-blende; and its isolation in a pure form is due to Peligot in 1841. The metal was not obtained in the compact form till 1856.

URARI, another form of the name of the poison discussed under the heads Curari, Woorali.

URBAN, the name of eight popes, of whom the following deserve to be specially noticed.—Urban II., a Frenchman by birth, and originally a monk of Cluny, was elected in a council held at Terracina, in the year 1088, during the schismatical pontificate of the anti-pope Guibert, styled Clement III. U.'s name was Otho, and he had been Bishop of Ostia. Soon after his election, he resumed possession of Rome, the fortresses of which had been occupied by the anti-pope, whom he compelled to withdraw. Guibert, nevertheless, was still supported by his patron, Henry IV. of Germany, who had long been at feud with the papal see; and U., in concert with the celebrated Countess Matilda, having formed a strong party in Italy, Henry once more led an army thither, and excited in Rome against the pope a party, whom he induced to recall Guibert—U. establishing himself at Anagni.

The revolt of Conrad, the eldest son of Henry, against his father, and his coronation as emperor at Milan in 1093, and still more the

successful appeal of Henry's queen, Adelaide, turned the tide of affairs in Italy. A great council was held at Piacenza in 1095, in which the anti-pope and his adherents were excommunicated. In the same council, the Crusade was proclaimed; and in the following autumn, U., in a council held at Clermont, made the well-known appeal on the same subject, which called forth that enthusiasm which was destined to lead to the long series of efforts for the recovery of the Holy Land, which forms so striking a characteristic of medieval history. In his later pontificate U. pursued the same course, and in the end, succeeded in driving Henry IV. out of Italy. The most important event of the last years of his pontificate was the holding of a council at Bari in 1098, in which many Greek bishops were present, and in which the addition of the words *filioque* to the Creed was discussed. Thence he returned to Rome, of which he obtained full and undisturbed possession; and he died in the close of 1099, just at the time when the first Crusade which he had organized terminated in the successful occupation of Jerusalem.—URBAN V. (originally William de Grimoard) is remarkable as practically the last of the popes who resided at Avignon, and the one by whom the papal seat was for a time re-transferred to Rome. He was a native of France, and had been Abbot of St. Victor at Marseille.

On the death of Innocent VI. in 1362, he was elected at Avignon, where he continued to reside, sending his legate, Cardinal Gil de Albornoz, to reduce the rebellious subjects of the papal see in Rome. After various alternations of peace and contest, U. took the resolve of returning in person to the ancient seat of the papacy. He set out in 1367; and landing at Corneto, proceeded first to Viterbo, and in the end to Rome, which he reached in October 1367. He found the papal city in a condition all but ruinous, and the whole of Italy overrun by bands of mercenaries, and a prey to intestine divisions of the worst character. He endeavored, in concert with the queen of Naples, Joanna, in the following year, and of the Emperor Charles IV., to repress these disorders, but with little success; and in 1370, he resolved once again to repeat the experiment of a withdrawal of the papal residence from Rome. He set out in September of that year; but only outlived his return to Avignon by a few weeks, and died in December 1370, leaving the reputation of great personal piety, disinterestedness, and zeal for the interests of religion and morality.—URBAN VI. deserves a special notice, as being the pope under whom the great Western Schism had its origin. His name was Bartolomeo Prignano, and at the time of his election he was Archbishop of Bari.

On the death of Gregory XI. (1378), who had finally returned from Avignon to Rome, and died in that city, Prignano was elected in a conclave held at Rome under circumstances of great excitement, owing to the apprehension, on the part of the populace, of an intention to elect a French pope, and again abandon Rome. The cardinals in the conclave numbered 16, of whom 12 were French, and 4 Italians. Prignano, although not a cardinal, was elected, April 8, 1378, and after the election had been made, the populace having broken into the hall, the cardinals dispersed; on the following day, however, they returned, confirmed the election, Prignano assuming the title of Urban VI., under which name he was crowned, April 18, in the presence of the 16 cardinals. In July of the same year, the 12 French cardinals assembled at Anagni, and revoked the election of U., in which they declared that they had been acting under the fear of violence. To this course they are said to have been led by the rigor and the intemperate severity with which U. was proceeding in the reforms of discipline, and especially of the simony and the irregular life of the clergy, including the cardinals themselves. They were joined by three of the Italian cardinals (one of them having died). On the 20th September, they proceeded to elect the cardinal bishop of Cambray (born Count of Geneva) pope, under the name of Clement VII. Clement took up his residence at Avignon.

U., on the contrary, remained at Rome, where he appointed 26 new cardinals, and excommunicated Clement and his adherents. This conflict of claims was the origin of the WESTERN SCHISM (q. v.). U. was recognized as the lawful pope by one portion of the West, Clement by the other, and each maintained his claim by measures of the most extreme character. U. especially, although his title seems to have been best founded, weakened his cause by his excessive violence. Having engaged in a dispute with Charles, king of Naples, whom he had himself crowned, he was besieged by that prince at Novara, whence he withdrew to Genoa, taking with him, as prisoners, the cardinals of his party with whom he had quarreled, and several of whom he is said to have put to death. In 1389, while he was on his way to Ferentino, he fell from his horse, and having been conveyed to Rome, died from the injuries thus sustained in October of that year.—URBAN VIII. was the successor of Gregory XV. His family name was Maffeo Barberini. He was born at Florence in 1568; and after a long series of brilliant services, both in the domestic administration and in foreign nunciatures, he was elected pope in September 1623. In the difficult position of Roman affairs, as complicated between France, Austria, and Spain, in the war of the Valtellina, to which he succeeded on his first election, he acquitted himself with much dexterity. His pontificate was also signalized by the acquisition to the Holy See of the duchy of Urbino (q. v.) in 1626. U. died in 1644. His memory has suffered through the imputation of nepotism; but his administration was, on the whole, vigorous and enlightened. He was the founder of the celebrated college of the Propaganda, and to him Rome is indebted for many public works, including large and important additions to the Vatican Library. Some of the early stages of the Jansenist controversy (q. v.) fall within this pontificate.

U'RBI ET O'RBI (Lat. to the city and the world), a form used in the publication of papal bulls, for the purpose of signifying their formal promulgation to the entire Catholic world, as well as to the city of Rome. By the canon law, one of the conditions required in order that any new law shall be held to have force is 'promulgation;' but a very celebrated controversy arose in the 17th c. as to the kind of promulgation which should be regarded as sufficient. In ancient times, the practice of the popes had been to send copies of their bulls to the primates, metropolitans, and other ecclesiastical heads of the several churches, to be by them communicated to their suffragan bishops; but in progress of time, the practice of publicly proclaiming or of posting up the decree in the Campo dei Fiori in Rome was substituted for this transmission; and decrees addressed URBI ET ORBI, and published in this way, were held to be thus sufficiently promulgated to the various churches, and to be thenceforth of full force. The French jurists of the 17th c. strenuously controverted this view. The controversy is of little importance, even in the Roman Catholic Church, in these days of universal publicity and of rapid and simultaneous diffusion of intelligence.

URBI'NO, in Central Italy, capital of the province of Urbino and Pesaro, situated 20 miles south-west of Pesaro, and between the rivers Metauro and Foglia. Its walls date from the 14th c.; it has a magnificent palace, once the residence of the Dukes of Urbino, where was the famous library of the Della Rovere family, afterwards removed to the Vatican. Another handsome palace is that of the Albini, belonging to an Albanian family escaped from the ferocity of the Turks, and subsequently settled in U., where they became rich and powerful, and gave a pope to the church, who took the name of Clement XI. U. is an archiepiscopal see. Its manufactures are unimportant, except a pin-factory. It is the birthplace of Raphael. Pop. 8000. U. was a *municipium* under the Romans, and during the middle ages became the seat of a race of independent dukes, who existed up to 1626, when, on the death of Francesco, the last duke, Urban VIII. took possession of the duchy as a vacant fief; and it continued to form part of the papal states till 1860, when it became part of the kingdom of Italy.

U'RCHIN, SEA. See ECHINIDÆ.

URE, ANDREW, M.D., a distinguished chemist, was born at Glasgow, in 1778, educated at Glasgow University, subsequently prosecuted his medical studies at Edinburgh, and returned to Glasgow, where he received the degree of M.D. in 1801. In 1802, he became Professor of Chemistry and Natural Philosophy in the Andersonian Institution (q. v.), took an active part in the establishment (1809) of an observatory at Glasgow, and was appointed its first astronomer. In 1813, he made his appearance in the literary world as the author of a *Systematic Table of the Materia Medica*, which was followed in 1818 by *New Experimental Researches on some of the leading Doctrines of Caloric*, a memoir which, read before the Royal Society, and printed in the *Philosophical Transactions*, brought U. prominently into notice as a natural philosopher. Several papers on chemical subjects, the fruits of his accurate and extensive researches, followed. In 1821, appeared his *Dictionary of Chemistry;* in 1822, a paper *On the Ultimate Analysis of Animal and Vegetable Substances*, one of the earliest contributions to organic analysis, and a translation of Berthollet on *Dyeing;* and in 1829, a *System of Geology*, in which the hypothesis of a general flood was maintained.

In 1830, U. removed to London, and in 1834 was appointed analytical chemist to the Board of Customs. The products of his pen from this time assume more of a technological character, as the *Philosophy of Manufactures* (1835), *The Cotton Manufacture of Great Britain Compared with that of other Countries* (1836), and *Dictionary of Arts, Manufactures, and Mines* (1839). A seventh edition of this last work was edited by Robert Hunt in three volumes (1875), and a supplementary volume was added in 1878. U. was chosen a Fellow of the Royal Society in 1822, as well as of the Geological, Astronomical, and other societies. He died in London, 2d January 1857.

URE'A ($C_2H_4N_2O_2$) is an organic matter which derives its name from its having been originally discovered in the urine, of which it forms the most important and characteristic ingredient. It was until recently regarded as an organic base or alkaloid; but dur-

ing the last few years it has been placed amongst the *amides*, a group of neutral, and for the most part crystallizable compounds, of the *ammonia type* (see TYPES, CHEMICAL), in which one of the three equivalents of hydrogen is replaced by the radical of an organic acid. For example, if R represent the radical, $\left.\begin{matrix}R\\H\\H\end{matrix}\right\}N$ represents the corresponding amide; and the character of the type is not affected by doubling the entire number of molecules, or changing it into $\left.\begin{matrix}R_2\\H_2\\H_2\end{matrix}\right\}N_2$. Now, if in this formula we substitute C_2O_2 (carbonic oxide or carbonyl, as it is now often termed) for R_2, we obtain $\left.\begin{matrix}C_2O_2\\H_2\\H_2\end{matrix}\right\}N_2$, which is identical with $C_2H_4N_2O_2$, and possesses the advantage of showing the probable grouping of the elements in urea.

Pure urea, which has been allowed to crystallize slowly, occurs in white, glistening, streaked, four-sided prisms; but when the crystallization is rapid or disturbed, it separates in small white silky needles. It is devoid of smell, has a coolish, bitter taste, like that of saltpetre (which it closely resembles in its external form), and is very slightly deliquescent. It is readily soluble in water and alcohol, but only slightly in ether. When heated to about 248°, it fuses, evolves ammonia, and becomes completely decomposed. A solution of pure urea in distilled water may be kept for a long time, and may even be boiled without undergoing decomposition; but if heated in a closed tube to about 284°, each equivalent combines with four of water, and is converted into carbonate of ammonia, according to the formula

$$\overbrace{C_2H_4N_2O_2}^{\text{Urea.}} + 4HO = \overbrace{2H_4NO,C_2O_4}^{\text{Carbonate of Ammonia.}}$$

A similar change takes place slowly at ordinary temperatures in the urea contained in the urine, the mucus of the bladder acting as a ferment, and thus rendering urine ammoniacal after it has been kept for a few days.

The following are some of the most important of the compounds of urea. *Nitrate of urea* ($C_2H_4N_2O_2,NO_5.HO$) and *oxalate of urea* $\{2(C_2H_4N_2O_2),C_4O_6,4HO\}$ are readily crystallizable salts, formed by the direct addition of the respective acids to a moderately strong solution of urea. As nitrate of urea requires eight parts of cold water, and is still more insoluble if an excess of free nitric acid is present, and the oxalate is more insoluble than the nitrate, while urea dissolves in its own weight of water, these salts may be employed to test for, and approximately determine the quantity of, urea. Amongst the compounds of urea with metallic oxides, those which it forms with the oxides of mercury are especially interesting, and have been completely examined by Liebig. A result of his researches is his celebrated method, which is now in universal use, of determining the amount of urea volumetrically.

Urea occurs as the main and characteristic ingredient of the urine of man and mammals, being most abundant in that of carnivorous, and least so in that of vegetable feeders. The average quantity excreted by the human subject is mentioned in the article URINE. It is also a constituent of the fluids of the eye, of the sweat, and (in minute quantity) of the blood, and of the liquor amnii (of the fœtus). There can be no doubt that it is a final product of the regressive metamorphosis of the living tissues, or of their disintegration into simpler compounds, by means of which the final elimination of the worn-out structures is facilitated. Thus, we find that urea may be obtained by oxidizing agents from uric acid, creatine, allantoine, &c., in the laboratory, and there is every reason to suppose that similar changes may occur in the system. Whether, when an excess of food is taken, a portion of it may be formed in the blood into urea, and then at once separated without ever having entered into the structure of the higher tissues, is a point which is scarcely decided.

Until the discovery by Liebig and Wöhler of the artificial formation of urea, its only source was the urine, from which, after evaporation, the nitrate was separated, purified by animal charcoal, and the urea liberated by the addition of carbonate of baryta, and finally extracted by alcohol, from which it was allowed to crystallize. It is now known that there are many different ways of forming it, as (1) by the action of chlorocarbonic oxide or phosgene gas ($C_2O_2.2Cl$) on dry ammonia; or (2) by heating a mixture of carbonic ether ($2C_4H_5O,C_2O_4$) and an alcoholic solution of ammonia to about 356° in a closed tube (both of which methods show that urea is truly the *amide of carbonic acid*); but the best practical method is essentially the original one of mixing watery solutions of cyanate of potash and sulphate of ammonia, and evaporating the solution, which leaves a residue consisting of urea and sulphate of potash, the former of which may be extracted by alcohol.

URE'AS, THE COMPOUND, include a large class of singular organic bodies, for the knowledge of which chemistry is mainly indebted to Professor Hofmann. Compounds of this kind are most readily formed by the action of cyanic acid on the amide or amidogen bases of the alcohol radicals, such as methylamine, ethylamine, &c. (the methylia, &c., of Miller and other chemists), instead of on ammonias. Thus, while ordinary urea is formed by the action of this acid on ammonia, methyl-urea, ethyl-urea, &c., are formed by its action on methylamine, ethylamine, &c., as shown in the following formula:

$$\overbrace{H_3N}^{\text{Ammonia.}} + \overbrace{C_2NO,HO}^{\text{Cyanic Acid.}} = \overbrace{C_2H_4N_2O_2}^{\text{Urea.}}$$

$$\overbrace{C_2H_5N}^{\text{Methylamine.}} + \overbrace{C_2NO,HO}^{\text{Cyanic Acid.}} = \overbrace{C_4H_6N_2O_2}^{\text{Methyl-urea.}}$$

$$\overbrace{C_4H_7N}^{\text{Ethylamine.}} + \overbrace{C_2NO,HO}^{\text{Cyanic Acid.}} = \overbrace{C_6H_8N_2O_2}^{\text{Ethyl-urea.}}$$

These are the simplest forms of these compounds; amongst the more complicated ones are ethyl-methyl-urea, $C_8H_{10}N_2O_2$, phenyl-ethyl-urea, $C_{18}H_{12}N_2O_{21}$, &c. All these compound ureas combine like ordinary urea with acids, and form crystallizable salts.

URE'DO, a genus of minute parasitic fungi, of the order *Coniomycetes*. The original genus U. has been divided into many genera, forming a group called *Uredineæ*, which contains a multitude of species, parasitic on phanerogamous plants of almost every natural order, and in all parts of the world, at the equator and at the extreme limits of arctic and antarctic vegetation. Different plants have their own peculiar parasites of this kind, or the same *Uredineæ* are at least confined to plants nearly allied. A few species occur on ferns, but not very frequently. Every external part of plants, except the roots, is liable to be infested with these fungi, and some of them attack the inner tissues, their spores at length breaking through the outer strata of cells. Submerged parts of plants are never affected by them, for fungi dislike water; but the floating portions of aquatic plants are not exempt; and in all cases a moist atmosphere seems to be favorable to their development. Rank luxuriance of growth is often attended by their appearance. A plant once attacked is afterwards subject, if perennial, to the same parasite, even if removed to another situation. There is reason to believe, from experiments made by Fée, that the spores of the *Uredineæ* are taken up by the roots of plants from the soil, and find their way with the sap to the place proper for their growth. See BRAND, BUNT, MILDEW, RUST, and SMUT.

URE'NA, a genus of herbaceous plants of the natural order *Malvaceæ*. The bark is very fibrous; and the fibre of *U. lobata* and *U. sinuata*, weeds common in most parts of India, is used as a substitute for flax. It is strong, and tolerably fine.

U'RETERS (Gr. *ouron*, urine, and *terein*, to keep), the canals by which the urine is conveyed from the pelvis of the kidney (see KIDNEYS) on either side to the base of the bladder. Each ureter is about eighteen inches in length, and enters the bladder in so slanting a direction as to prevent regurgitation.

When a concretion is formed in the kidney, the ordinary and most favorable event is that it should descend through the ureter to the bladder. The passage of a stone through this tube gives rise to a series of violent symptoms, which are thus summed up by Druitt: 'The patient complains of sudden and most severe pain, first in the loins and groin, subsequently in the testes (in the male) under the thigh. The testes are also retracted spasmodically. At the same time, there are violent sickness, faintness, and collapse, which may last two or three days, and are only relieved when the stone reaches the bladder.'—*The Surgeon's Vade-mecum*, 8th ed. p. 594. The treatment consists in the warm bath, and the inhalation of chloroform, or opium in large doses (both of which serve to allay spasm and deaden pain), the free use of diluents to wash down the concretion, and if the sickness is very severe, an occasional tumbler of hot water containing half a teaspoonful of carbonate of soda.

URE'THRA is the term given in Anatomy to the canal by which the urine is discharged from the bladder. Its most common affections are the special inflammatory condition of its mucous lining, known as Gonorrhœa (q. v.), and stricture (q. v.).

U'RFA, or ORFA, the modern name of EDESSA (q. v.)

U'RGA, a town of Mongolia, on the river Tola, stands in a valley, at the height of 4100 feet above sea-level, 350 miles south-east of Irkutsk. In one of the suburbs of the town is a college of Mongolian priests, which is the seat of the Lama of the Mongols. See LAMAISM. The college or convent covers an extensive area, and includes the dwellings of the priests. The population is made up of a colony of Chinese and about 25,000 Mongols, 10,000 of whom are priests. Each family educates one of its

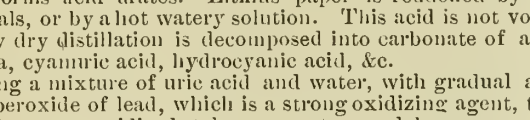
children to be a priest. The buildings of the college have of themselves more the appearance of a town than the other quarters of Unga. The number of the inhabitants is not stated.

U'RI, one of the Waldstädten or Forest Cantons of Switzerland, forms part of the Hill Country (see SWITZERLAND) which surrounds the Lake of Lucerne, and is bounded on the west by the cantons of Unterwalden, Bern, and Valais. It has an area of 414 sq. m.; and its pop. in 1870 was 16,107; in 1880, 23,694. It consists of one valley, that of the Reuss, about 30 miles in length and enclosed on all sides by lofty mountain-chains which also include the south-eastern bay or reach of the lake into which the river falls. A great high-road passes through the valley, and terminates on the south at the St. Gothard Pass, which connects the Uri with Ticino, and forms part of one of the great routes into Italy. Uri is almost entirely pastoral, and its products are those of its herds and flocks. Goats are very numerous. In the low grounds, there are a few fields of corn and potatoes, and gardens and orchards, but even this cultivation is limited. The population speak a Swiss-German dialect, and are Roman Catholic. Uri is a democracy. The landesgemeinde, held in a meadow once a year, is formed of the whole male population who have reached 20 years of age. The highest power resides in this assembly. The preconsideration and superintendence of the law belongs to the *landrath*, which consists of 7 members chosen by the landesgemeinde, and 61 by the several communes.

A governing council of 11 members, with the landamman as president, discharges executive functions. Civil justice is administered in the highest instance by a cantonal court of 11 members. A tribunal of 7 members decides in criminal causes. Altorf, the capital, is a small town, with (1870) 2724 inhabitants. A fountain surrounded by stone statues of Tell (q. v.) and his son marks, according to tradition, the spot where the former took his aim, and another that where the boy stood with the apple on his head.

U'RIC or LITHIC ACID ($C_{10}H_4N_4O_6$) derives its names from its being a constituent of urine and of urinary calculi respectively. In a state of purity, it occurs in the form of a loose white powder or scales consisting of minute crystals, devoid of smell or taste, only very slightly soluble in water (1 part requiring about 15,000 parts of cold, and 1800 of boiling water), and quite insoluble in alcohol and ether. This acid is, however, soluble without decomposition in strong sulphuric acid, and it may be thrown down from this solution by the addition of water. It is also soluble in the carbonates, borates, phosphates, lactates, and acetates of the alkalies, extracting from these salts a part of their base, with which it forms acid urates. Litmus paper is reddened by its moist crystals, or by a hot watery solution. This acid is not volatile, and by dry distillation is decomposed into carbonate of ammonia, urea, cyanuric acid, hydrocyanic acid, &c.

On heating a mixture of uric acid and water, with gradual additions of peroxide of lead, which is a strong oxidizing agent, the uric acid becomes oxidized, takes up water, and becomes converted into urea, allantoine and oxalic acid, as is shown by the equation:



the lead being left in combination with the oxalic acid. This is a most important result in its physiological bearing, since it shows how uric acid is a probable stage towards the formation of urea, and as explaining a probable source of the oxalic acid, which is often present in the urine in cases of deficient respiration and aëration; and this view is confirmed by the experiment of introducing uric acid into the stomach or veins of an animal, when the presence of oxalate of lime, and the augmentation of urea, are very soon perceived in the urine.

Uric acid is a very weak vibasic acid, forming with bases two series of salts, the neutral and the acid, of which the former are the more soluble. Amongst the most important of these urates are—(1.) *Neutral Urate of Potash*, which occurs in the form of a white granular crystalline powder, difficult of solution in water (requiring 44 parts of cold, and 35 of boiling water), but readily soluble in an excess of potash, from which solution carbonic acid throws down the *Acid Urate of Potash* in the form of a transparent jelly, which sometimes falls in the form of a powder; (2.) Two *Urates of Soda*, each of which is less soluble than the corresponding potash salt; (3.) *Acid Urate of Ammonia;* (4.) *Acid Urate of Magnesia;* (5.) two *Urates of Lime;* and (6.) *Urate of Lithia*, which is more soluble than any other urate; and hence lithia water is an important therapeutic agent in converting uric acid and the more insoluble urates into a soluble salt in the living body.

Uric acid is widely distributed throughout the animal organism. It occurs not only in the urine of man and carnivorous animals, but is the chief constituent (either free or in combination) of many calculi occurring in the kidneys or bladder, and of numerous urinary sediments. The urinary secretion of birds and reptiles consists almost entirely of urates, which are also found in the excrements of caterpillars, butterflies, beetles, &c., and of many mollusces. Moreover, in very minute quantities, it occurs as a urate in healthy blood, in which fluid it has been found in excess in gout and Bright's disease, and is a constituent of the aqueous extract of the spleen, liver, lungs, pancreas, and brain. The *chalk-stones* occurring about the smaller joints, and in the lobes of the ear of gouty patients, consist mainly of urate of soda.

The best and most ready mode of obtaining pure uric acid is from the semi-solid urine of serpents, which consists almost entirely of urates. The mass is boiled with potash, which expels any ammonia that is present, and a stream of carbonic acid is then passed through the strained potash solution, which throws down acid urate of potash. This precipitate is dissolved in water, and decomposed by hydrochloric acid, which throws down the uric acid in minute crystals. The form in which this acid crystallizes is liable to great variations, as may be seen in the accompanying figure. Sometimes we have flat tablets resembling whetstones, or sections with a double knife through biconvex lenses; at other



Magnified view of Uric Acid in different forms:
The dumb-bell shaped forms seen in upper part of the figure were formerly supposed to consist of oxalate of lime. It has recently been shown that they are a form of uric acid crystal.

times more or less perfect rhombic tablets, and sometimes hexagonal plates, barrel-shaped prisms, and toothed crystals. If there is any doubt as to the nature of the crystals, they should be dissolved (under the microscope) in a little potash solution, and a drop of hydrochloric acid then added, when sufficiently characteristic forms are sure to appear.

The marvelous researches of Wöhler and Liebig on the products of decomposition of uric acid by nitric acid, constitute an epoch in organic chemistry. The most important products, some of which are obtained directly, and others indirectly, are: (1.) *Alloxan*, $C_8H_2N_2O_8$ (which under the influence of various reagents, yields *alloxanic acid*, *mexoxalic acid*, *mykomelinic acid*, and *dialuric acid*); (2.) *Parabanic acid*, $C_6H_2N_2O_6$ (which yields *oxaluric acid*); (3.) *Alloxantine*, $C_8H_6N_2O_{20}$ (which yields *alloxan*, *allituric acid*, *uramel thionuric acid*, *oxaluric acid*, and *murexide*); (4.) *Murexide*, $C_{16}H_8N_6O_{12}$ (which yields *murexan*, or *uramel*, and *alloxan*); and (5.) *Urea*, which breaks up into carbonic acid and ammonia. Moreover, by boiling oxaluric acid with water it is decomposed into oxalic acid and urea. Of these substances, we shall only notice *murexide*, which has two special claims to notice. It is used as a pigment in dyeing, being probably the old *Tyrian Purple* (see MUREXIDE), and it affords a ready test for a mere trace of uric acid. In using it for the latter purpose, the substance supposed to contain uric acid is heated on a slip of glass with a drop of nitric acid, and carefully evaporated to dryness. If uric acid is present, the residue has a red color, which is converted by vapor of ammonia into a fine crimson, and the addition of a drop of a solution of potash develops a splendid purple tint, which disappears on the application of heat.

Uric acid must be regarded, like urea, as a product of the disintegration of the tissues; and it is far from improbable that all the urea which is secreted may have pre-existed in the form of uric acid. Whatever (like excessive exercise or water-drinking) increases the amount of urea, decreases that of uric acid, and *vice versâ*. See URINE.

URICO'NIUM, an ancient Roman city of Britain, the site of which is about four miles to the east of Shrewsbury, and is partly occupied by the village of Wroxeter. The original name seems to have been *Viroconium* which was changed in the later Roman-British period to Uriconium. It is mentioned by Ptolemy as existing in the beginning of the second century A.D. The remains of the city show it to have been a place of much importance. The wall can still be traced near the banks of the Severn, forming an irregular oval rather more than three miles in circum-

ference. It appears that one of the principal streets of the city occupied the line of the *Watling Street Road*. The remains of U. have recently been explored by an association formed for the purpose at Shrewsbury, and many curious relics of antiquity have been discovered, throwing great light on Roman civilization in Britain. The human remains found in the excavations which have been made, affording proof of death by violence or by suffocation, show that the city did not slowly decay, but was sacked and burned by enemies, which probably took place about the 5th century. Of this, however, there is no certain historic record.

The ruins seem to have remained with little change, except the gradual process of decay, till about the 12th c., when they were used as materials for other buildings. Some of the churches of the neighborhood were built of the old Roman bricks. The walls of buildings are now found, perfect as far as the previous accumulation of earth rendered it difficult to remove the bricks of which they were constructed. The most remarkable relic of antiquity in U. is the *Old Wall*, a great mass of Roman masonry, which appears to have been the side of a great edifice, remains of mosaic pavements having been found near it, and apparently connected with it. The edifice to which the Old Wall belonged is supposed to have occupied a corner at the junction of two principal streets. The excavations which have been made, however, leave it very difficult to explain the character and purpose of the remains discovered. Several inscriptions have been found at U., but none of great interest. A museum has been formed at Shrewsbury, in which most of the antiquities from this spot are collected. Hair-pins, combs, and rings are particularly numerous amongst them.

U'RIM AND THU'MMIM (Heb.), a mysterious contrivance in or on the High-Priest's breast-plate, either consisting of the four rows of precious stones upon which the names of the 12 tribes were engraved, or of two images personifying—most probably—'Truth' and 'Revelation.' Luther's translation, 'Light and Truth,' has no more real foundation than that of the LXX. and the Vulgate, which is 'Utterance and Truth.' To this translation, the fact of the picture of 'Truth' (Aletheia)—in sapphire or other precious stones—being suspended from the Egyptian high-priest's breast, had probably given rise. The etymology of the two words, which, derived from Arabic roots, would indicate 'Brilliant Amulet,' 'Perfect Light,' &c., is in reality no more satisfactory than the account of the manner in which the contrivance was used for oracular purposes, or of the time when, in reality, it ceased to act. It is never mentioned after Solomon's time.

U'RINARY SEDIMENTS is a general term which includes all those substances which occur in a non-dissolved state in the urine. Most of these sediments are not formed until after the urine has been discharged and has cooled; some, however, are formed in the urinary organs, and under favoring conditions may give rise to urinary concretions. Hence it is a point of importance to ascertain whether a sediment occurring in a specimen of fresh urine has been formed before or after its discharge.

The chemical and microscopical characters of these sediments has a double bearing on the detection of disease: (1.) 'From the investigation of these sediments,' says Professor Vogel, 'we can draw sure conclusions regarding special changes that are going on in the general nutrition of the body. They show us that an excessive quantity of certain substances (as, for example, uric, hippuric, or oxalic acid) is being discharged with the urine, and has therefore been produced in the body; and we thus often obtain at a glance information of great importance, which could otherwise only be procured by a tedious process; and (2.) they point out to us certain local diseases of the urinary system. Thus, from a sediment containing pus, we infer that suppuration is going on in some part of that system; and the presence of cylindrical casts or tubes in the sediment informs us of certain morbid changes in the structure of the kidneys; and if the ordinary symptoms reveal the presence of stone in the bladder, we can ascertain its probable nature from the character of the sediment or gravel.'

The mode of formation of morbid sediments is well illustrated by a sketch of the changes which healthy urine undergoes after prolonged exposure to the air. In the course of two or three days, the acidity of the urine is found to have increased, and this condition of *acid fermentation* will frequently continue for some weeks, giving rise to the deposition of (1.) free uric acid; (2.) acid urates (chiefly urate of soda); and (3.) oxalate of lime. In a few weeks, or often much sooner, the urea becomes alkaline, or *alkaline fermentation* is established, in consequence of the urea being converted into carbonate of ammonia. The urine now becomes paler, while the red or yellow crystals of uric acid are replaced by white amorphous granules and colorless refracting prismatic crystals. In other words, the former precipitate is replaced by (1.) phosphate of ammonia and magnesia (commonly known as triple phosphate); (2.) phosphate of lime; and (3.) urate of ammonia.

In certain forms of disease, these changes take place much more rapidly, and the second change—the alkaline fermentation—may occur without a pre-existing acid fermentation, and even within the bladder. The general characters of the deposits occurring as results of the acid and of the alkaline fermentations are shown in figs. 1 and 2. In addition to the above-named sub-



Fig. 1.

Magnified urinary sediment, consisting of uric acid, urate of soda, and oxalate of lime; from a person convalescent from typhus fever. The uric acid crystals are here chiefly seen in large dense bundles, joined two and two by their bases, each bundle being composed of an enormous number of the long whetstone crystals described and figured in the article URIC ACID (q. v.). The dark crystals with light cross-bars are composed of oxalate of lime; while the dark-colored granules occurring either singly or in masses are urate of soda.

stances, which arise from the decomposition of healthy urine, others occur in various morbid conditions of the system; and we may divide the urinary sediments generally into the two great groups of (1.) the unorganized and (2.) the organized deposits. The unorganized sediments include uric acid, the urates (chiefly



Fig. 2.

Magnified urinary sediment, consisting of large prismatic crystals of triple phosphate (or phosphate of ammonia and magnesia), and globular bodies often studded with points, which consist of urate of ammonia; from the alkaline urine of a patient suffering from paraplegia, consequent on disease of the spinal cord.

urate of soda), hippuric acid, oxalate of lime, earthy phosphates (viz., phosphate of lime, and triple phosphate), cystine, xanthine, hypoxanthine (formerly known as guanine), and tyrosine; while the organized sediments include mucus and epithelial scales, blood corpuscles, pus corpuscles, cancerous and tubercular matter, fibrinous casts of the tubes of the kidney, spermatozoa, fungi, infusoria, &c. Of the unorganized sediments, uric acid, the urates (excepting urate of ammonia), hippuric acid, and cystine occur only in acid urine; and urate of ammonia, triple phosphate, and phosphate of lime, in alkaline or neutral urine.

Oxalate of lime and the organized sediments occur both in acid and alkaline urine; but alkaline urine is the more natural *habitat* for fungi and infusoria. It is comparatively seldom that a sediment consists of a single ingredient. The crystalline forms of two mixed sediments, one consisting of uric acid, urate of soda, and oxalate of lime, and the other of triple phosphate and urate of ammonia, as seen under the microscope, are shown in figs. 1 and 2 respectively. Most of our knowledge on this important subject is due to the labors of English physicians, amongst whom the names of Prout and Golding Bird are especially deserving of notice. For details regarding the mode of treatment suitable in the most important of the sediments, we may refer to the articles LITHIC ACID DIATHESIS, OXALURIA, and PHOSPHATIC DIATHESIS, in this work, and to Dr. G. Bird's *Urinary Deposits and their Treatment;* while for details regarding their chemical and microscopical characters, Neubauer and Vogel, *On the Urine*, translated under the auspices of the New Sydenham Society, may be consulted.

U'RINE is the fluid which is secreted or separated by the kidneys from the blood, and it is the principal means of removing the worn-out tissues, especially the nitrogenous and saline matters, from the system. It is a very complex fluid, and its composition varies considerably in different classes of animals, and mainly in accordance with the nature of the food.

Healthy human urine, when freshly discharged, is a clear fluid of a bright amber color, a bitter, saltish taste, and a peculiar aromatic odor. Its normal reaction is acid, and its specific gravity ranges from 1·015 to 1·025. From a table published in Day's *Physiological Chemistry*, p. 352, is appears that an adult man of ordinary weight (about eleven stones) secretes in 24 hours about 52 fluid ounces (or rather more than two pints and a half) of urine. the range extending from 40 to 70 ounces; and that these 52 ounces yield, on evaporation, 935 grains of solid constituents, the remainder being water, which is expelled by heat. Of these 935 grains, 520 (or more than an ounce) are composed of Urea (q. v.), and 266 of chloride of sodium (or common salt); while the remaining 149 grains are made up of Uric Acid (q. v.), Hippuric Acid (q. v.), sulphuric acid, 32 grains; phosphoric acid, 54 grains; earthy phosphates, 15 grains; ammonia (in the form of hydrochlorate), 11 grains; with smaller quantities (in most cases mere traces) of Creatinine (q. v.) and Creatine (q. v.), xanthine, hypoxanthine, coloring matters, mucus (from the walls of the bladder), iron, silica, and fluorine. The fluid also holds an undetermined quantity of gases (carbonic acid and a little nitrogen) in solution. The most characteristic and important of these ingredients is the *urea*, the daily excretion of which is modified by various circumstances.

On a purely animal diet, Lehmann found that he secreted two-fifths more urea than when he was living on an ordinary mixed diet; while on a mixed diet there was secreted almost one-third more than on a purely vegetable diet; while finally, on a non-nitrogenous diet, the amount of urea was less than half the quantity secreted during a mixed diet. The free use of common salt increases the daily excretion of urea, in consequence, doubtless, of its augmenting the rapidity of the destructive action, always going on in all the tissues; while alcohol, tea, coffee, and tobacco (whether smoked or chewed) diminish the daily quantity. The only medicine which increases its quantity to any marked degree is *Liquor Potassæ*. The daily quantity is increased in many diseases (typhoid fever and many other acute diseases, especially inflammation of the membranes of the brain), while in Bright's Disease and a few other disorders, it is diminished. The daily amount of excreted *uric acid*, like that of urea, varies with the nature of the food. Thus, for instance, Professor Haughton found that the mean daily quantity of uric acid excreted by meat-eaters and wine-drinkers was 4·5 grains, while vegetarians yielded an average of only 1·48 grains, part of which, moreover, was hippuric acid.

As an excess of uric acid is likely to give rise to gravel or stone, it should be generally known that the free ingestion of water diminishes its excretion, while at the same time it increases the amount of urea, into which the uric acid is probably transformed by oxidation. The daily amount is diminished by strong bodily exercise, and increased by repose; the reverse of what holds good in relation to the urea. The amount is increased when the digestive functions are disturbed, as after the use of indigestible food or excess of alcoholic drinks; in those conditions of the system which are associated with much disturbance of the functions of respiration and circulation; and in disorders accompanied with severe febrile symptoms, such as acute rheumatism. Its entire absence seems compatible with perfect health. With regard to *hippuric* acid, there has been much discussion, not only as to the quantity in which it occurs, but as to whether it actually exists in healthy urine. Thus, Weissman, a German chemist, finds that on a mixed died he secreted more than 40 grains of this acid daily, and on a purely animal diet, only 12 grains. Duchek and Höfle deny that it is a constant ingredient of healthy human urine; and Professor Haughton only met with it once in the urine of ten men.

Dr. Bence Jones, a very trustworthy chemist, found that a man, A, weighing 152 lbs., and a man, B, weighing 202 lbs., living on a mixed diet, excreted daily, on an average, 4·9 and 6·5 grains of hippuric acid, the corresponding quantities of uric acid being 7·7 and 12·6 grains. In cases of jaundice, no traces of hippuric acid are present, even after the administration of benzoic acid.* which is usually converted in the system into hippuric acid. Hence it may be inferred that a healthy condition of the urine is essential to the formation of this acid in the system. Nothing is known with certainty regarding the diseases in which this acid is secreted to excess. The only other characteristic ingredient of the urine is its *coloring matter*.

Professor Harley believes that he has isolated the normal urine-pigment, to which he applies the term *urohæmatin;* and from its always containing iron, and on other grounds, he regards it as modified hæmatin or blood-pigment. Mr. Schunck has also shown that indigo-blue, in very small quantity, is almost always present.*

It has been already stated that fresh healthy human urine presents an acid reaction. This reaction mainly depends upon the presence of acid phosphates of the alkalies and earths, although the presence of free acids, such as free hippuric, or possibly lactic acid (which, however, is not a normal ingredient), may occasionally contribute to increase the acidity. To determine the acidity of the collective 24 hours' urine, we take a solution of oxalic acid of known strength, and ascertain the relative quantities of a solution (of definite strength) of caustic soda which are required to perfectly neutralize equal volumes of the urine and of the oxalic acid solution. In this way it is found that the total quantity of free acid in the daily urine of a healthy man corresponds in neutralizing power to about 36 grains of oxalic acid.

The degree of acidity varies in different parts of the day. Dr. Bence Jones first mooted the idea (in 1849), that the respective acidities of the secretions of the kidneys and stomach stood in an inverse relation to one another, and that the urine thus loses its acidity, and may even become alkaline during stomachal digestion. Dr. Roberts of Manchester, who has subsequently investigated this point, finds that the effect of a meal on the acidity of the urine begins to show itself in the second hour afterwards, is most marked during the next three hours, and disappears by the end of the sixth hour, the fluid being almost always positively alkaline during the third and fourth hours. Independently of this periodic alkalinity, the urine may be made alkaline at will by the administration of caustic alkalies, their carbonates or their salts, with organic acids (citrates, tartrates, &c., such as occur in many fruits); whilst after the administration of acids the acidity is much increased.

In disease, the urine may either contain only its ordinary ingredients in abnormal proportions, or it may contain ingredients not occurring in the healthy fluid. Thus there may be an excess or diminution of urea, an excess of uric acid, a diminution of chloride of sodium, which, in cases of inflammation of the lungs, may fall from 266 grains to a mere trace, and, by its daily diminution or augmentation, tells with certainty whether the disease is gaining or losing ground; an excess of coloring matter or of mucus, &c.; or, on the other hand, the urine may contain albumen, sugar, oxalic acid (in combination with lime), fat, leucine and tyrosine, bile-pigment, biliary acids, &c. The subject of 'the urine in disease' is, however, so wide a one that we must refer our readers for details to Lehmann's *Physiological Chemistry*, 3 vols. (translated for the Cavendish Society), to Dr. Parkes's excellent work on *The Urine*, and to the various works of Dr. Beale.

We conclude with a few remarks on the urine of mammals generally. The urine of the Carnivora is clear, of a light-yellow color, a disagreeable odor, a nauseous taste, and an acid reaction. It contains much urea, little pigment, and little or no uric acid. The urine of the Herbivora is turbid, yellow, of a less unpleasant odor, and alkaline. In addition to urea, it contains hippuric (but no uric) acid, alkaline lactates, carbonates of potash and of the earths, oxalate of lime, and a small quantity of phosphates. By reversing the natural food of these classes, we reverse the characters of the urine.

The urine in many forms of disease becomes turbid on cooling, and soon deposits a sediment; and even healthy urine, after a few days exposure to the air, loses its clearness, and throws down a deposit of mucus and various kinds of crystals. The investigation of the nature of the deposits thrown down by comparatively fresh urine in disease, is a subject of the highest importance in medicine, and is noticed in the article URINARY SEDIMENTS.

U'RINE, INCONTINENCE OF, or ENURESIS, is a troublesome affection, far more common in childhood than in more advanced life. The child may have no bad symptom of any kind that can be detected, but it is in the constant habit of discharging its urine in bed during sleep. It sometimes wakes with a consciousness that it is performing the act, but most commonly it is not disturbed. The act may take place once, or several times, during the night, and sometimes there is an interval of a night, but seldom more. The child may often be broken off this unpleasant habit by proper domestic management, as withholding any excess of fluids before going to bed, and by waking it, and making it discharge the contents of the bladder at the time when the elder members of the family retire to bed. When such means as these fail, recourse must be had to medical advice. Blisters to the sacrum, which prevent the patient from lying flat on the back, and consequently prevent the urine from gravitating towards the most irritable part of the bladder, are often useful; and cold douches to the spine, combined with the internal use of chalybeates, are frequently serviceable. The most certain remedy,

* Duchek found that when 1 gramme (15·44 grains) of benzoic acid was taken, 0·714 of a gramme of hippuric acid was excreted; when 2 grammes were taken, 1·857 grammes of hippuric acid, and 0·421 of benzoic acid, were excreted; and the ingestion of 4 grammes was followed by the exerction of 1·714 of hippuric acid and 2·500 of benzoic acid. Hence the limit of conversion had been already exceeded.

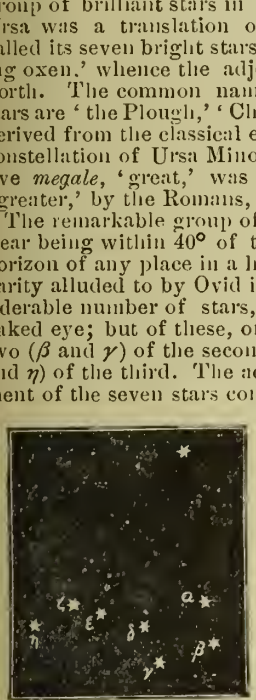
* He failed to detect it in only one case out of forty. He only succeeded in obtaining *one grain* by working for several weeks on the urine of two persons. The urine of the horse and cow yielded comparatively large quantities.

however, is extract of belladonna, given at first, according to the age of the patient, in doses varying from $\frac{1}{10}$th to $\frac{1}{4}$th of a grain, twice daily, and increasing it, if required, till it gives rise to marked constitutional disturbance.

The various forms of mechanical pressure that have been suggested, with the view of preventing the passage of the urine, cannot be too strongly reprobated.

U'RSA MA'JOR, 'the Greater Bear,' and URSA MINOR, 'the Lesser Bear,' are two celebrated constellations in the northern hemisphere of the heavens. *Ursa Major* was distinguished as early as the time of Homer by the names *Arktos*, 'the Bear,' and *Hamaxa*, 'the Wagon,' the vivid imagination of the Greeks discovering a fanciful resemblance between these objects and the group of brilliant stars in this constellation. The Roman name Ursa was a translation of the Greek *Arktos;* the Romans also called its seven bright stars the *Septemtriones*, 'the seven ploughing oxen,' whence the adjective *septentrionalis* came to signify north. The common names throughout Europe for these seven stars are 'the Plough,' 'Charles's Wain,' 'the Wagon'—evidently derived from the classical epithets above mentioned. When the constellation of Ursa Minor was generally recognized, the adjective *megale*, 'great,' was annexed by the Greeks, and *major*, 'greater,' by the Romans, to the name of this constellation.

The remarkable group of stars in the hinder part of the Great Bear being within 40° of the north pole, never sinks below the horizon of any place in a higher north latitude than 40°, a peculiarity alluded to by Ovid in his *Metamorphoses*. It contains a considerable number of stars, 17 of which are easily visible by the naked eye; but of these, only one (α) is of the first magnitude, two (β and γ) of the second, and eight (among whom are δ, ε, ζ, and η) of the third. The accompanying figure shows the arrangement of the seven stars constituting 'the Plough.' α and β are known as 'the Pointers,' from their use in detecting the *Pole-star* (q. v.). A line drawn from the Pole-star through η of the Great Bear, and produced its own length, passes close to the star Arcturus of the first magnitude.—*Ursa Minor* is less prominent in the heavens. It was also *Arktos* and *Hamaxa* among the Greeks, and *Arctus* and *Ursa* among the Romans, from the close resemblance of its chief star-group to that of Ursa Major; but was, besides, distinctively denominated *Kynosoura* or *Kynosouris*, and *Cynosura*, 'the Dog's Tail,' from the circular sweep, resembling the curl of a dog's tail, formed by three of the stars in it. The star α in the extremity of the tail of the Little Bear, at present the Pole-star (q. v.), is the brightest in the constellation, though only of the third magnitude.



Constellation of the Plough.

According to the later mythical stories of the Greeks, Ursa Major was the metamorphosis of Callisto, one of Diana's nymphs, who, having violated her vow, and being transformed by her indignant mistress into a bear, was slain by her son Arcas, and afterwards transferred to the heavens as a constellation by Jupiter; Arcas being at the same time metamorphosed into Boötes, the Arktophylax; 'Bear-warden,' of the Greeks. According to the other but less common legend, which represents the seven stars of Ursa Major as the oxen of Icarius, Arktophylax became *Boötes*, 'the Ox-driver.'

U'RSIDÆ. See BEAR.

U'RSON (*Erythizon dorsatum*), a quadruped nearly allied to the Porcupine, and often called the Canada Porcupine. The genus *Erythizon* differs from *Hystrix* (Porcupine) in the flatter head, the



Orson (*Erythizon dorsatum*).

shorter and not convex muzzle, the longer tail, and in having the quills short and half hidden in the hair. The U. is about the size of a small hare. It is found as far south as Virginia and Kentucky, and as far north as lat. 67°. Its quills are dyed by the Indian women, and worked into ornamental articles of various kinds.

URSULA, ST., a celebrated saint and martyr, of the Roman calendar, especially honored in Germany, and particularly at Cologne, which is the reputed place of her martyrdom. The legend substantially, in its present form, can be traced as far back as the end of the 11th or beginning of the 12th c., as it is found in the revised edition of the Chronicle of Sigebert of Gemblours (Pertz, *Rerum Germanicarum Scriptores*, viii. 310), which was made between 1106 and 1111. According to this writer, U. was the daughter of the British king Deonatus; and on account of her distinguished beauty, was sought in marriage by the son of a heathen prince who was originally named Holofernes, but afterwards, when a Christian, was called Ætherius. Her father was forced to yield to the demand; but U. made it a condition that her suiter should become a Christian, and that she should be allowed a space of three years, during which she proposed, in company with her maidens, to each of whom should be assigned a thousand companions, and a three-oared galley to convey them, to make a voyage of pious pilgrimage. The conditions were accepted; the maidens, to the number of 11,000, were collected from all parts of the world; and at length the expedition set sail from the British coast.

Arriving at the mouth of the Rhine, they sailed up the river to Cologne, and thence upwards to Basel, where, leaving their galleys, they proceeded by land to visit the tombs of the apostles at Rome. This pilgrimage accomplished, they descended the river to Cologne, which, however, had meanwhile fallen into the hands of an army of Hunnish invaders, under the headship of a chief, who, although not named, is plainly the Attila of history. Landing at Cologne in ignorant security, the pious virgins fell into the hands of these barbarous heathens, by whom they were all put to sword, with the exception of U., who, for her beauty's sake, was reserved as a prize for the chief. She, too, however, as well as another maiden, who had at first concealed herself in terror, demanded to join her companions in martyrdom; and thus the full number of 11,000 victims was made up. Heaven, however, interposed. A host of angel warriors smote the cruel Huns; Cologne was again set free; and in gratitude to their martyred intercessors the citizens erected a church on the site still occupied by the church now known under the name of St. Ursula. Such is the legend as told by Sigebert, although it has undergone some modifications in later hands. The improbabilities and anachronisms of this legend were early observed; and it became the subject of an animated controversy soon after the Reformation.

On the one hand, the centuriators of Magdeburg exposed its weak points with unsparing severity; on the other, a Jesuit father, Crombach, devoted an entire folio volume to the vindication of the substantial truthfulness of the narrative. Many suggestions have been offered as explanations of its most startling improbability—viz., the alleged number of the martyred victims, 11,000. One of these is, that this belief arose from the name of a virgin who was really the companion of U.'s martyrdom—*Undecimilla*. The record of the martyrdom in the calendar thus being 'Ursula et *Undecimilla VV.*,' 'Ursula and Undecimilla Virgins,' was easily mistaken for 'Ursula et *Undecim millia VV.*,' 'Ursula and *eleven thousand virgins*.'

Secular inquirers into the origin of the U. legend deny that it has the slightest foundation in any historical facts. They find the first traces of the reverencing of these virgins in martyrologies and missals of the latter half of the 9th c., in which mention is made either of a very small number of virgins whose names are given, or a larger indefinite number without names.

In one metrical martyrology of this period, by Wandalbert, a monk of Prüm, they are already spoken of as thousands; and after the end of the 9th c. the number of 11,000 is found in the calendars. The name of U., however, does not occur till after the 10th c.; and it was not till the 12th c., that the reverence for U. became predominant over that of the associate virgins. With the 12th c. begins the discovery of the sacred bones. The *ager Ursulinus* was revealed by a vision in 1106; and at first single skeletons were raised with the greatest solemnity; but beginning with 1155, the digging up of the field was carried on systematically for nine years, in the course of which thousands of skeletons were found, male as well as female, besides coffins, stone tablets with inscriptions, and the like. What the several relics were, was revealed to a nun named Elisabeth, then living in the diocese of Trier, to whom the holy martyrs appeared in visions. In this way were identified a pope of the name of Cyriacus, an archbishop, several cardinals, bishops, and priests, and also Ætherius, U.'s bridegroom, along with whose title the cross, a crown, and other royal insignia were represented. It was also explained how all these men came to be in the company of the pious virgins. Even the children's bones found among the others were accounted for by revelations made forty years later to an abbot at Arnsberg, which confirmed and supplemented those of Elisabeth.

The numerous human remains found in the Ursulan field at the north side of the city have been accounted for by antiquaries, by making it out to have been the burying-ground of the ancient Roman *Colonia Agrippina*. The origin of the legend is accounted for by Schade in his work *Die Saga von der Heiligen Ursula* (Han. 1854), on the theory that it is a Christianized relic of old German paganism, in which U. has taken the place of the ancient goddess worshiped by the Scandinavians as Freyja (q. v.), and still remembered by the German people under the names of Berchta (q. v.), Hulda (q. v.), &c., and in Sweden by the very title of 'Old Urschel.'

But without pursuing further this curious inquiry, it will be enough to say, as concerns the Roman Catholic view of the matter, that while the most learned of the Catholic hagiographers, putting aside the idea of a directly and intentionally invented narrative, have traced the origin of the legend to a real historical massacre of a very large number of Christian maidens, which took place during the invasion of Attila, and soon after the celebrated battle of Chalons in 451, all the modern writers of that church are agreed in regarding the details of the narrative, the number, the pilgrimage to Rome, the interposition of the heavenly host, &c., as legendary embellishments of the medieval chroniclers.—See for the full exposition and vindication of the history, Crombach, *Ursula Vindicata* (fol. Coloniæ, 1647); and for a more critical exposition of the historical foundations on which it rests, Binterim's *Calendarium Eccles. Germ. Colon.* (1824); *Zeitschrift für Phil. u. Kathol. Theologie* (1850); Kellerhoven, *La Légende de Sainte-U.* (1862).

U'RSULINES, a religious order of females in the Roman Catholic Church, taking their name from the saint and martyr who forms the subject of the above article. They take their origin from Angela Merici, a saint of the modern church, born, according to the more received account, at Desenzano, in the latter part of the 15th century. She formed at Brescia an association of young females who bound themselves by a vow to labor for the tending of the sick, the instruction of children, the relief of poverty, and other such works of charity. After a time, a rule, in twenty-five chapters, was projected by Angela, and finally approved by the Bishop of Brescia, Cardinal Francis Cornaro. Angela was herself chosen as the first superior, in the year 1537, the community even at that time numbering as many as 76 sisters. During the lifetime of Angela, and for more than twenty years after her death, which occurred in 1540, the congregation was confined to the diocese of Brescia; but in the year 1565, a house was opened at Cremona; and with the approval of Popes Gregory XIII. and Clement VIII., it was spread over many dioceses of Italy. It was warmly encouraged by St. Charles Borromeo, and at his death there were no fewer than 28 convents of the order in his diocese, comprising above 600 nuns. Soon afterwards, it was established in France, where one of its most distinguished members was the celebrated sister, Madeleine de St. Beuve.

It was in France that the sisters, although from the beginning they had been engaged in teaching, first formally added to their religious vows that fourth vow to devote themselves to the instruction of female children, which has since formed the great characteristic of the order. They were introduced into Savoy by St. Francis de Sales in 1635; and in 1639, a convent was opened in Quebec, in Canada. About the same time they were introduced into Germany—at Vienna in 1660, and at Freiburg, Kitzingen, and Prague soon afterwards—where they have continued to teach with great success; and their convents in various parts of Germany, but especially in Austria, at present number 36. The Ursuline sisters have several educational establishments in Ireland, in England, and in the United States, and may fairly claim the merit of having been mainly instrumental in maintaining among Catholics the education of female youth of the higher order though the 17th and 18th centuries. They have found many competitors among the younger sisterhoods of modern times.—See *Journal des Illustres Religieuses de l'Ordre de Ste Ursule*, 4 vols. 4to (1690); *Chroniques de l'Ordre des Ursulines*, 2 vols. (Paris, 1676).

URTICA'CEÆ, or URTI'CEÆ, a natural order of exogenous plants, consisting of trees, shrubs, and herbs, natives of almost all parts of the world. According to many botanists, the order includes about 600 known species; whilst others, restricting it by separating from it several distinct orders, reduce it to about half that number, of which the common nettle may be regarded as the type. The leaves of all are alternate, furnished with stipules, and generally very rough, sometimes with stinging hairs. The inflorescence is various; the perianth usually divided, but sometimes a mere scale; the stamens inserted into the perianth, equal in number to its segments, when it is divided, and inserted at their base; the ovary free, one-celled, containing a single ovule. The fruit is a kind of nut, surrounded by the persistent and sometimes fleshy perianth, sometimes winged; and sometimes the fruits are variously aggregated. Under this description are comprehended *Cannabinaceæ* (q. v.), *Ulmaceæ* (q. v.), *Moraceæ* (q. v.), and *Artocarpaceæ* (q. v.), as well as the restricted U., which have filaments curved in bud, and turning backwards elastically when the anthers are bursting, the fruit an unopening nut. The juice of the restricted U. is watery, not milky; the wood in the arboreous or shrubby species, which are all tropical, is remarkably soft and light. The fibre of the bark of some is valuable. It is amongst the restricted U. that species covered with stinging hairs are found. See BŒHMERIA, NETTLE, NEILGHERRY NETTLE, and PELLITORY.

URTICA'RIA. See NETTLE-RASH.

URUGUAY', otherwise BANDA ORIENTAL DEL URUGUAY—i. e., 'the Eastern Bank of the Uruguay,' is a small South American state, bounded on the N. and N.-E. by Brazil, on the E. and S.-E. by the Atlantic, on the S. by the Rio de la Plata, and on the W. by the Uruguay. It is nearly square in shape, and its greatest length and its greatest breadth are over 300 miles. Area, 71,752 sq. m.; pop. (1880) 438,245. The interior of U. is very imperfectly known. In the south, all along the Rio de la Plata, and as far north as the Rio Negro, the country is a sort of terraced upland, with a bold, broken, treeless coast-line, possessing some excellent harborage; while the shores facing the Atlantic are low and sandy. Further east, rises a woody plateau; but high, bare, grassy plains, traversed by ranges of low hills, seem to be the predominant feature. The climate is mild; rain falls pretty copiously in winter, but is rare in summer. The most important rivers are the Rio Negro, the Daiman, the Arapey, the Yaguaron, and the Sebollati. Agriculture is in a very backward state, although the soil is naturally rich.

Small quantities of wheat, maize, barley, rice, peas, beans, flax, hemp, and cotton are raised, and fruit trees thrive well; but the wealth of the country consists in its splendid pasturage, which supports great herds of horned cattle, horses, and sheep. The wool of these Uruguayan sheep is of a superior quality. The wild animals embrace the tapir, deer, ounce, monkey, paca, rabbit and fox; and large packs of wild dogs infest the plains. U. has almost no manufactures, and very little commerce, as yet. The chief exports are jerked and salted beef, tallow, hides, horn, and hair; and the chief imports woollen goods, household furniture of all kinds, sugar, cordage, agricultural implements, timber, &c. The value of the imports in 1877 amounted to about £2,800,000; and that of the exports to about £3,000,000. Nearly all the imports and exports pass through Monte Video (q. v.), the capital. The towns of note besides the capital are Maldonado and Colonia del Santo Sacramento.

U. was originally colonized by Spanish settlers from Buenos Ayres, on the other side of the La Plata; but the territory which forms the natural limit of Brazil on the south was claimed by Portugal, and a war ensued between the two nations for its possession, which terminated in favor of Spain. U. was now attached to the vice-royalty of Buenos Ayres, and received the name of *Banda Oriental*—i. e., as has been explained above, the country on the eastern bank of the Uruguay. Its independence was secured by treaty in 1828, when it took the title of *Republica del Uruguay Oriental;* but like most of the South American republics, it has suffered incessantly from internal discords.

URUME'YAH, URUMIJAH, URMEA, LAKE, called also the *Lake of Maragha* (q. v.), *Lake of Tabriz*, and by the neighboring peoples, *Kapauta* (Armen. *kapoit*, blue), the principal lake of Persia, is situated in the west of Azerbijan, about 34 miles west from Tabriz. The lake, which is 4320 feet above sea-level, is about 80 miles in length from north to south, has an average width of 25 miles, and contains more than 1900 Eng. sq. m. It is one of that class of lakes which receive, but do not emit streams; and despite the fact that its feeders include such rivers as the Aji-su, 180 miles long; the Jage-tu, 140 miles long; and the Ta-tu, 90 miles long, it has only an average depth of 12 feet. The water is largely impregnated with saline substances (according to one authority, the salts constitute 25 per cent. of the whole weight), and is so heavy as to be little ruffled by the strongest wind. No fish or mollusca are found in it. Six large isles, and a multitude of islets and rocks, show themselves just above its surface, being mostly grouped together near its center. The lake is fast drying up, leaving a gradually widening beach of thick saline incrustation, which supplies with salt the whole of Kurdistan. The lake was known in ancient times as *Matiana*, or *Mantiana*.

URUMEYAH, a town of Persia, situated 10 miles west of the lake, in a wide and fertile plain, is surrounded with a mud wall and moat, but has no gates. Extensive fruit and vegetable gardens are situated both within and without the walls. The houses of the better classes are lofty, spacious, and sumptuously furnished; and many of those of the poorer classes are tastefully adorned with flowers and vines. U., the seat of a Nestorian bishop, and of an American mission, has a pop., of about 50,000, many of whom are Nestorian Christians. U. was anciently known as *Thabarma* or *Thebarmæ*, and was said to be the birthplace of Zoroaster (q. v.).

URUMTSI, a city of southern Dzungaria, Mongolia, at the northern base of the Thian-Shan Mountains. It is in a fertile district, and has a large trade with all the adjoining lands. Pop. about 150,000.

U'RUS, a great animal of the ox-kind, which anciently inhabited the forests of Central Europe, and is described by Cæsar (*Bell. Gall.* vi. 28) as common in the great Hercynian Forest; as scarcely less than an elephant in size—an evident exaggeration—but otherwise resembling an ox, of great strength, of great swiftness, and of great fierceness. He mentions that the horns were very different from those of the oxen of Italy—large, spreading, and sharp. This character is found in the wild cattle of Chillingham and other parks in Britain, and in some of the Highland breeds of oxen; and the probability seems to be that the U. was the wild original of the domestic ox, and not a bison, nor any now extinct species, although some authors maintain a contrary opinion. See a monograph by Storer on the *Wild Cattle of Great Britain* (1879).

URVAS'I. See PURURAVAS.

USBEGS, or USBEKS, a people of Turkish race, who, at the close of the 15th c. of the Christian era, invaded and conquered the numerous principalities into which Turkestan was at that time divided, and have ever since maintained dominion over the country. At the present day, they are for the most part a settled people, occupying themselves in the cultivation of the soil and in trading, and are scattered over Russian, Independent, and Chinese Turkestan. The most probable supposition regarding their origin is that they immigrated from Kiptchak (q. v.), and assumed the name of U. from Usbeg, one of their chiefs. The U. of Khiva, Bokhara, Khokan, and of Chinese Turkestan, differ from each other in language, manners, and customs. Those of Khiva speak a dialect of the Turkish, are honest and generous, and destitute of the treachery and duplicity which are so characteristic of oriental civilization, are passionately fond of music and poetry, and, though zealous Mohammedans, still retain many of their ancient heathen usages. They pride themselves much on the purity of their Usbeg descent, but most of them show evident traces of an admixture of Iranian blood.

The U. of Bokhara have become largely mingled with the Tajiks, and have consequently lost many of their national characteristics. Those of Khokan are very different from the two previous, and are as much Kirghis, Kiptchaks, and Kalmucks as they are U.; the fact that the U. have been the dominant race in Turkestan for three centuries and a half, having given the name such a prestige of nobility and good-breeding, that it is generally assumed by such members of other races as settle in cities.

USE AND OCCUPATION is the technical name given in the law of England to the beneficial enjoyment of premises by a tenant, who occupies the real property of another, such as houses and farms. In all cases where a person has had use and occupation of another's premises, with the assent of the owner, an action lies for the value thereof, which value corresponds to rent under an ordinary lease. Hence, where it is doubtful whether there has been a valid lease executed between the parties, the landlord can nevertheless recover rent under the head of use and occupation.

U'SEDOM, an island belonging to Prussia, lies at the mouth of the Oder, and together with the island of Wollin, shuts off the Stettiner Haff from the Baltic. It is of very irregular shape, being much indented by branches of the Haff, is 34 miles in extreme length, and 15 miles broad. Area about 148 sq. m. On its north-east side is the port of Swinemünde (q. v.); on the south side is the small town of Usedom, with about 1800 inhabitants.

USES, in the law of England, is the old name for trusts, which has superseded the other in most respects. Uses and trusts correspond to the *fidei commissum* of the Roman law. A use was a confidence reposed in another who was tenant of the land, or *terre-tenant*, that he should dispose of the land according to the intention of the *cestui que use*, or him to whose use it was granted, and suffer him to take the profits. See TRUST.

U'SHANT (Fr. *Ouessant*), an island in the Atlantic Ocean, belongs to France, and is included in the dep. of Finisterre, from the west coast of which it is distant about 17 miles. It is the largest of a small group of islets called the *Iles d'Ouessant*, has an area of 7 sq. m., and contains about 2400 souls. The coasts are escarped and difficult of access; the soil is fertile. The inhabitants are employed in fishing, and in rearing cattle and horses.

USHAS (from the Sanscrit *ush*, 'to shine, to burn,' and kindred with the Greek *eos* or *heos*, and the Latin *aurora*), 'the Dawn,' is one of the female deities of the Vedic religion of India (see INDIA, sec. *Religion*), and amongst these is invoked with special predilection by the poets of the R'igveda hymns. The invigorating influence which the dawn exercises on body and mind, and the luminous and other phenomena connected with the beginning of the day, form the subject of some of the best portions of Vedic poetry; and out of them Ushas arises as one of the most pleasing goddesses of the ancient Hindu pantheon.

She is invoked as 'the affluent,' as 'the giver of food,' and 'the bringer of opulence;' she is asked to bestow on the pious 'riches with horses and cattle,' 'posterity and troops of slaves;' and she is praised for the many boons she has showered on the worshipers who were liberal to her. She is the goddess 'endowed with an excellent intellect,' and the 'truthful,' or fulfiller of her promises. 'She animates the diligent;' when she appears, 'bipeds and quadrupeds (are in motion),' 'the winged birds flock around from the boundaries of the sky,' and 'men who have to earn their bread quit their homes.' She rides in a 'golden chariot,' which is 'ample and beautiful;' and the Sanscrit word *go* meaning a cow (or, as a masculine, an ox), and also a ray of light, she is not only 'the mother of the rays of light,' or attended by them, and rays of light are her banner, but her chariot is drawn by 'ruddy *kine*,' or, as they are sometimes called, 'ruddy oxen.' Less frequently she is spoken of as traveling with horses; for the horse, as a symbol of light, is more especially appropriated to the god of the sun.

The relation of Ushas to other Vedic deities is of a twofold, a physical and a ritual, character, inasmuch as the phenomena of dawn are connected with other phenomena of nature, and as certain religious ceremonies are performed at daybreak. On these grounds, she is frequently addressed as 'the daughter of heaven;' and when her 'parents' are spoken of, the commentator explains this word as implying 'heaven and earth.' She is further called the daughter of night (night being the precursor of the dawn); but, on other occasions, she is also spoken of as having night for her sister. She is, besides, the sister of the two luminous deities, *Bhaga* and *Varun'a*, and the faithful wife of *Sûrya*, the sun. According to an old commentator (*Yâska*), she would in one passage of the R'igveda also be the deity 'who has the sun for her child,' 'either because the sun is her companion, or because he absorbs the moisture (i. e., the frost);' but as *rus'advatsá*, the word, so interpreted, admits also of another rendering, it is doubtful whether she bears this epithet, the more so as in another passage the sun is said to follow Ushas as a man follows a woman.

The As'wins being the luminous twin-gods, who probably represent the transition from darkness to light, and therefore that intermingling of both which becomes inseparable (see John Muir's 'Contribution to a Knowledge of the Vedic Theogony and Mythology,' in the *Journal of the Royal Asiatic Society*, new series, vol. ii., 1866), Ushas is called their 'friend'—according to Sâyan'a, also their sister; she 'follows their lustre,' and 'awakes' them to partake of the Soma prepared for them; and in their turn they are asked 'to unite with the dawn.' Another god, who originally on physical grounds is associated with Ushas, is *Indra* (q. v.), the ruler of the bright firmament. He 'generates (i. e., causes to appear) sun and dawn,' and 'appoints them to their office,' which is that of dispelling darkness; but though, 'when (in the morning), desiring (the Soma), he honors the dawn,' his ascendency during the day becomes fatal to her; for then 'he slays her,' 'breaks her chariot;' and 'her shattered chariot reposing on (the banks of) the river Vipás', she departs from afar.' Most of these deities become, in consequence, associated with Ushas also as sharers in certain sacrifices which are offered to her; and besides these, Agni, the god of fire, who carries the offerings to the gods, and Soma (q. v.).

Like many of the most poetical deities of the Vedic creed, also Ushas is excluded from the Hindu pantheon of the classical period. Her place is there taken by *Arun'a* (the ruddy), whom the epic poems and the Purân'as make the son of the patriarch Kas'yapa and his wife Vinatâ, and the younger brother of Garud'a, the bird-vehicle of Vishn'u. According to the *Mahâbhârata*, he was appointed by the gods to the office of charioteer of the sun, in order to intercept his fiery heat, when the sun, angry with the gods for being exposed to the enmity of Râhu (q. v.), it was feared, would consume the world. Where represented *Arun'a* is therefore seated before the sun on his chariot, driving his horses; but as the legends deprive him of his legs, his body is seen perfect to his knees only.

USHER, JAMES, Archbishop of Armagh, and by common consent the most learned prelate that ever adorned the Irish Protestant Church, belonged to one of the oldest Anglo-Irish families, and was born in Dublin, January 4, 1580. His father, Arnold Usher, one of the clerks in Chancery, was a gentleman of good estate, and his uncle, Henry Usher, preceded him in the archbishopric of Armagh. At the age of 13, he entered Dublin College, where his predilection for history soon revealed itself. Having resolved to devote himself to the service of the church, he proceeded, after the solid fashion of the times, to read up the entire literature of ecclesiastical antiquity—a task which occupied him from his twentieth to his thirty-eighth year! In 1601, he was ordained deacon and priest, and was shortly after appointed preacher at Christ Church, Dublin. In 1607, he was chosen to the chair of Divinity, a post which he held for 13 years. In 1609, he made one of his numerous visits to England, in the course of

which he made the acquaintance of the most distinguished scholars of the age. In 1613, his first publication appeared, entitled *De Ecclesiarum Christianarum Successione et Statu*, which was designed as a continuation of Bishop Jewel's *Apology*. The work was divided into three parts, of which only the first, reaching to the period of Hildebrand, and part of the second, were finished.

In 1615, he was appointed, by a convocation of the clergy held at Dublin, to draw up a series of articles (the number amounted to 104) relating to the doctrine and discipline of the Irish Protestant Church, in which the doctrines of predestination and reprobation (of which U. was an unflinching apologist) found prominence. These and other views, such as, that bishops were not a different *order* from presbyters, that the Sabbath should be strictly enforced, that no toleration should be granted to Catholics, laid him open to the charge of Puritanism; but as his loyalty to the principle of monarchy was undoubted, he suffered no diminution of the royal favor; on the contrary, King James promoted him to the bishopric of Meath in 1620; and in 1623, constituted him a privy-councilor of Ireland. Two years later, he was raised to the highest ecclesiastical dignity in the kingdom, the archbishopric of Armagh, and in his official capacity 'vigorously' opposed the toleration of popery and the spread of Arminianism.

In 1632, U. published *Veterum Epistolarum Hibernicarum Sylloge*, a collection of letters out of several ancient MSS., concerning the state of the Irish Church from 592 to 1180; in 1638, *Emmanuel, or a Treatise on the Incarnation of the Son of God;* in 1639, *Britannicarum Ecclesiarum Antiquitates*, which is said to contain 'a most exact account of the British Church, from the first planting of Christianity, twenty years after our Saviour's crucifixion, down, both in Britain and Ireland, to the end of the 7th century;' in 1641, *The Judgment of Dr. Reynolds concerning the Original of Episcopacy defended, The Original of Bishops, The Power of the Prince and the Obedience of the Subject*, &c. When the Civil War broke out, U., who was in England at the time, espoused the side of the king, refused to sit, when nominated, among the Assembly of Divines at Westminster, and made himself very obnoxious to the parliament by the sermons which he preached at Oxford.

When the fortunes of the king began to decline, U. left Oxford; his property and revenues in Ireland were seized, and after a residence in Wales and elsewhere, he came to London in 1647, where, in spite of his royalist sympathies, he was chosen by the benchers preacher of Lincoln's Inn, a post which he retained till his death, March 21, 1656. Cromwell, who had a great respect for his learning, ordered his remains to be interred with great magnificence in Erasmus's Chapel, in Westminster Abbey. U. was a man of undoubted ability and of enormous erudition, pious and free from worldly ambition; but he lacked force of character, real insight and intellectual power; hence, though pronounced by Dr. Johnson 'the great luminary of the Irish Church,' he exercised less influence over the course of contemporary events than the humblest of Cromwell's Ironsides. Nor can it be shown that posterity is very deeply indebted to him for more than the example of a virtuous and studious life.

U.'s chief works, besides those already mentioned, are his edition (1644) of the *Epistolæ* of Polycarp and Ignatius; his treatise *De Romanæ Ecclesiæ Symbolo* (1647); *Dissertatio de Macedonum et Asianorum Anno Solari* (1648); and *Annals of the Old Testament* (1650—1654), a chronological work. After his death, there were published (from his numerous MSS.), *Chronologia Sacra*, &c. (Oxford, 1660), by which and his *Annals* he is most widely known; a volume of *Sermons; Historia Dogmatica Controversiæ inter Orthodoxos et Pontificios de Scripturis et Sacris Vernaculis* (Lond. 1690); *A Collection of three hundred Letters written to James Usher, Lord Archbishop of Armagh*, to which is prefixed a life of the archbishop by his chaplain, Richard Parr, D.D. (Lond. 1686). A collected edition of U.'s works, in 16 vols., with a new biography, was published at Dublin in 1841, by Dr. Elrington.

USHER OF THE BLACK ROD, one of the officers of the order of the Garter (q. v.), coevil with the institution of the order, and originally called 'Hostiarius capellæ regis infra castrum de Windsor.' The rod from which his title is derived is of ebony, mounted with gold, 3½ feet in length, having at the top a lion sejant, holding before him in his fore-paws a gold shield charged with the royal cipher in gold surrounded with the Garter. He has a mantle like that of Garter King of Arms, and his badge is a gold knot surrounded with the Garter, and ensigned with the royal crown. It is the practice to unite this office with that of the king's first gentleman usher daily waiter at court, who is one of the chief officers of the House of Lords. In this capacity, it is one of the functions of the Gentleman Usher of the Black Rod, or of his deputy, who is known as the Yeoman Usher of the Black Rod, to desire the attendance of the Commons in the House of Lords when the royal assent is to be given to bills by the sovereign or Lords Commissioners; also to execute orders of commitment for breach of privilege and contempt, and to assist at the introduction of peers, and other ceremonies of the Upper House.

USHER OF THE GREEN ROD, one of the officers of the order of the Thistle (q. v.), whose duties consist in attendance on the sovereign and knights when assembled in chapter, and at other solemnities of the order. The rod from which the title is taken is of green enamel, three feet in length, ornamented with gold, having on the top a unicorn of silver, holding before him an escutcheon charged with the cross of St. Andrew.

U'SKUP, or SCO'PIA, a town of European Turkey, in Monastir, on the Vardar, 120 miles north-west of Salonica. The town, which is built on hilly ground, contains 16 mosques, with black domes and minarets, interspersed among fruit trees. Here are the ruins of an ancient Roman aquaduct, consisting of 55 arches Leather is manufactured. Pop. estimated at 10,000.

U'SNEA, a genus of lichens, having a much branched thallus, with an elastic thread in the center. Some of the species are natives of Britain. They grow on trees, and are generally pendulous. They contain the vegetable principle called *Usnine*, which, however, is also found in many other lichens. They are sometimes used in dyeing, like archil and cudbear. From their appearance, many of the species of U. receive the popular name of BEARDMOSS.



Usnea barbata.

USTILA'GO. See SMUT.

U'SUFRUCT, in Scotch Law, is adopted from the Roman law, to denominate one of the three personal servitudes, which were use, usufruct, and habitation. Usufruct is better known under the name of Liferent (q. v.), or Estate for Life (q. v.).

U'SURY. See INTEREST.

U'TAH (named from an Indian tribe Utah, or Yuta [Utes?], dwellers in mountains), a territory of the U. S., lying between lat. 37°—42° N., and long. 109°—114° W., containing 84,476 square miles, bounded north by Idaho and Wyoming; east, by Colorado; south, by Arizona; and west, by Nevada. Its chief town and capital is Salt Lake City (q. v.). U. is an immense basin, 4000 to 5000 feet above the level of the sea, surrounded by mountains, which at some points reach the altitude of 8000 to 13,000 feet. Excepting the Green and Grand rivers, in the east and south-east, Santa Clara river in the south-west, and the head-branches of the Colorado, which flows through a cañon 1200 feet deep, its rivers empty into the Great Salt Lake, in the northern center of the territory, and similar salt lakes or inland seas. This great valley, which includes the new territory of Nevada, is formed by a branch of the Rocky Mountains on the east, and the Sierra Nevada on the west. The formations are primitive and metamorphic, with secondary basins 15 or 20 miles wide.

The principal mountains lying within the territory are the Humboldt range, 6600 feet high, in the west, and the Wahsatch in the south, 12,000 feet. There are numerous lakes, many thermal springs, and salt springs. The rocks are mostly primitive, and rich in granite, jasper, syenite, porphyry, and quartzes, showing everywhere evidences of volcanic action. There are also ridges of carboniferous limestone containing calcareous spar; and near Salt Lake City occur boulders of serpentine, fine gray granite, sandstones, conglomerates, talcose and striated slates, gypsum, limestone, and marble of every hue in large masses. Iron is abundant; and there have been found gold, silver, copper, zinc, lead, inexhaustible quantities of bituminous coal, sulphur, alum, borax, and petroleum. Among the animals are the antelope, elk, deer, Rocky Mountain sheep, congar, catamount, wolves, foxes, beavers, porcupines; quail, grouse, swans, wild geese, pelicans, ducks; perch, pike, bass, and salmon-trout of 30 lbs. weight. Generally, vegetation is not luxuriant, and timber, except pines and firs in the mountains, scarce.

The country has good grass for grazing, and some wild fruits. The climate is bleak and changeable, with deep snows and intense

cold in winter, and heats in summer, accompanied with storms of thunder and dust. The soil, as a whole, may be described as barren, with spots of remarkable fertility, producing 60 to 100 bushels of grain to the acre. Much of the soil is strongly alkaline. The chief crops are wheat, oats, barley, maize, buckwheat, flax, hemp, fruits. Cattle and sheep are abundant. The chief manufactures are those required in a new country, as farming-implements, furniture, carriages, woollen goods, leather, steam-engines, and machinery and cutlery, in which are employed a large number of skilled English artisans.

The pop. of U. consists largely of Mormons (q. v.). In 1860, the pop. was 40,295; in 1880, 143,906, besides about 1200 tribal Indians (Utes, Shoshones, and Snake Indians). Most of the Mormons come from Great Britain; there is now considerable immigration of 'Gentiles' or non-Mormons. Provision has been made for a university of the state of Deseret—the name under which U. hopes to come into the American Union. In 1880, there were 17 periodicals. There is a United States territorial government, with governor, secretary, marshal, and judges, appointed by the president, and a legislative assembly, elected by the people. Actually, the influence of the Mormon organization is supreme. In 1880 there were in U. above 600 miles of railway; the Central Pacific crossing Northern U. The taxable property, real and personal, was in 1880, $24,985,072.

U'TERUS. See WOMB.

U'TICA, an ancient city of North Africa, originally Phœnician, in the territory of Carthage; it stood to the N.W. of the present city of Tunis. During the third Punic war, U. submitted to Rome, and became the seat of a Roman governor. It was afterwards the see of a Christian bishop. Here Cato the younger (q. v.) died.

UTICA, a city of New York, U. S., 95 m. W.N.W. of Albany. The city, regularly and handsomely built, rises from the south bank of the river to an elevation of 150 feet. Among its buildings are a city hall, public halls, 34 churches, 6 large hotels, 4 banks, a cotton mill, 2 woollen mills, a state lunatic asylum with 500 patients, Catholic and Protestant orphan asylums, academies, and schools. There are also manufactories of flour, starch, organs, pianofortes, clothing, carriages, machinery, carpets, oil-cloth, &c.; and 11 newspapers and periodicals, of which 2 are Welsh and 1 German. At the period of the revolution, U. was a frontier trading-post, and the site of Fort Schuyler, built to guard the settlements against the French and Indians. In 1813, it had a pop. of 1700; and in 1880, of 33,913.

UTILITA'RIANISM, the name of the peculiar theory of Ethics, or of the ground of moral obligation, that adopts, as the criterion of right, the happiness of mankind. The word 'Utility' was employed, in this acceptation, by Jeremy Bentham; the form 'Utilitarianism' was first used by John Stuart Mill.

The doctrine of Utility is opposed to all those theories that refer us to some internal sense, feeling, or sentiment, for the test of right and wrong; a test usually described by such phrases as a Moral Sense, and Innate Moral Distinctions. See ETHICS. Whence Utility is sometimes termed the *external* or objective standard of morality. It is also opposed to the view that founds moral distinctions on the mere arbitrary will of God.

The Utilitarian theory has been maintained both in ancient and in modern times, although with considerable variation, not merely in the mode of stating it, but in important peculiarities. Thus, in ancient times, it was held by Epicurus, but in a purely self-regarding form; each person's end was his own happiness exclusively, the happiness of others being instrumental and subordinate. The modern phase of the theory may be said to begin with Hume. He employed, as the leading term of his system, not Utility, but Benevolence; whereby he gave especial prominence to the disinterested side of moral actions. He strenuously maintained, what must be regarded as the essential feature of the Utilitarian doctrine, that no conduct is to be deemed worthy of moral approbation, unless, in some way or other, it promotes human happiness; and that actions ought to be visited with disapprobation, exactly according as they have the opposite tendency.

Jeremy Bentham is, more than any other person, identified with the theory of Utility, which was in his hands, not merely the foundation of Ethics, but also the basis and justification of political and legal reforms. Having in view the state necessity of sacrificing smaller interests to greater, or, at all events, of not sacrificing greater interests to smaller, he described the ethical end as 'the greatest happiness of the greatest number.' He illustrated the doctrine by setting it in opposition to *asceticism*, which he interpreted to mean, that pleasure is forfeited, and pain incurred, without yielding a compensating amount of good, either to the agent or to other persons.

Paley advocated a form of Utility. He made the will of the Deity, enforced by future rewards and punishments, the impelling motive to duty; but in determining what that will was, in particular cases, he included a reference to the beneficial tendency of actions.

James Mill maintained substantially the views of Bentham. Sir James Mackintosh, while differing in some points from Bentham and from Mill, in the main adhered to Utility as the ultimate standard of right. John Austin, in his *Province of Jurisprudence Determined*, has contributed a lucid exposition and a powerful defence of the principle. John Stuart Mill has devoted a separate work to the subject. Samuel Bailey, in his *Letters on the Human Mind*, vol. iii., has discussed the ethical problem fully, and pronounced upon the utilitarian side. Herbert Spencer ranks among the upholders of the theory; and likewise Bain, in his edition of Paley (Chambers's series), and in *The Emotions and the Will*.

Before stating the arguments for and against the principle of Utility as the basis of morals, it is proper to inquire what sort of proof an ethical system is susceptible of. Ethics is a practical science (see SCIENCES), and, as such, involves an end; having the peculiarity of being the final or comprehensive end of all human conduct. See TELEOLOGY.

Now, in the speculative or theoretical sciences, *ultimate* principles cannot be proved; it is the nature of proof to rest one doctrine on some other doctrine, so that we must come at last to what is taken without proof; we cannot prove our present sensations; nor can we demonstrate that what has been will be; we must take these things for granted. And so it is with ultimate ends in the practical sciences: we cannot prove that each person should seek his own happiness; we must assume it as an ultimate fact, and trace the consequences. The final end of all conduct cannot be reasoned; it must be gathered from the actual conduct of men; we must find by observation what ends men actually pursue, and, if we can, generalize them into one comprehensive statement. The function of argument in the case is to show where inconsistency has crept in, or to make professions accord with practice. Thus it is, that the supporters of Utility aver that men, even although refusing the theory, still proceed upon it in their conduct; and that the doctrine cannot be impugned consistently with the admitted motives of human action. Human beings, as a rule, have no other end in life but happiness, either for themselves or for others; and morality belies human nature if it does not accord with this universal object of pursuit.

Although Utilitarians hold that good and evil, right and wrong, are properly determined by a calculation of the consequences as regards human happiness, they do not all maintain that past or existing systems of morals have been on all points framed on this principle. Bentham and James Miller appear to have thought that the rule has always been kept in view, though often badly applied. But others, equally earnest in regarding it as the only legitimate rule, are of opinion that, in the past and existing ethical precepts, men have been guided partly by Utility, and partly by Sentiment—that is, liking or disliking for the act itself, irrespective of any further consequences. Thus, the veneration of the Hindu for the cow, on which ethical duties are founded, is an instance of sentimental liking; the Jewish and Mohammedan prohibition of the pig is a matter of sentimental dislike. In the ceremonial rites of ablution, so widely prevalent, there is a certain show of Utility, mixed up with the fancy of cleanliness or purity. In the doctrine of the sacredness of kings, there is a combination of Utility and Sentiment.

The following are the chief objections to the utilitarian scheme, with the arguments in reply.

I. It is maintained that Happiness is not, either in fact or in right, the sole aim of human pursuit; that men actually, deliberately, and by conscientious preference, seek other ends. For example, virtue is an end in itself, to be sought whether it yield happiness or not, and even if it should be productive of the greatest misery. The qualification, however, is always added, that virtue, in the long run, without intending it, and all the more for not intending it, is the unfailing source of happiness.

To which the supporter of Utility answers:

1. It is quite true that men seek other ends than immediate happiness to themselves and to others, and that, in particular, they cultivate the virtues as ends in themselves, without always thinking of them as means to happiness. But, then, this is by the operation of a familiar law of the mind, whereby what was originally of the nature of means, comes at length to be valued as an end; such is the well-known case of the love of money. The virtues of justice and veracity are essential to human society, just as money represents the basis of subsistence; and by frequent association, the regard that we pay to the end is transferred at last to the means.

2. It may be shown in many ways that the great social virtues derive their worth in our estimation from their subservience to human happiness, and not by any absolute title of their own. Take, first, Veracity or Truth, which, of all the moral duties, has most the appearance of being an absolute and independent requirement. A little consideration will show that even this is not in our eyes an unlimited or unqualified virtue. Men have always

approved of deception practised towards an enemy in war, to a madman, or a highway robber; also secrecy or concealment, even although misinterpreted by others, is generally allowed—unless it leads to some pernicious results; while, if the divulgence of the truth were attended with harm, it would be universally reprobated. But an absolute standard of truth is incompatible even with secrecy or disguise; in departing from the course of perfect openness, or absolute publicity of thought and action, in every possible circumstance, we renounce ideal truth in favor of a compromised, qualified veracity—a following of truth only so far as is expedient.

Again, as regards Justice, the presence of considerations of Utility is equally obvious. There is no absolute rule of justice that does not bend to circumstances. If justice be defined, giving every one his own, or what he is entitled to, there is the show of an absolute rule; but, in reality, nothing is determined. The meaning is, to give to each what *law* and *custom* have declared to be a man's own. It is declared just for an elder son to receive a larger share of the parental estate than all the rest of the children put together; but it is clear that whatever justice there is in this, must be founded on some ground of expediency. (See on this subject, J. S. Mill's *Utilitarianism*, chap. v.)

II. It is further objected to the adoption of Utility as the standard of Right, that the full consequences of actions are too numerous, involved, and complicated to be reduced to calculation; and that even where the calculation is possible, people have seldom time to make it.

To this, it is answered, first, that the primary moral duties refer to conduct that can be fully calculated to the satisfaction of any reasoning mind. Thus, to revert to the two leading examples, Truth and Justice: the habitual disregard of these duties would soon bring a society to utter confusion and ruin; without them, there could be no social co-operation; man would fall below the condition of the gregarious animals; the race could hardly be saved from extirpation. On the other hand, the observance of these duties, in a high degree, raises to a corresponding degree the means of human happiness. The balance of advantages is all on one side—there is no case for the other side at all.

There have always been moral rules or enactments where the calculation of consequences was much less easy; for example, the indissolubility of marriage is maintained in some countries, and not in others; and there have been considerable differences as to the forbidden degrees of affinity in marriage. In these usages, there are both advantages and disadvantages, and the preponderance is variously estimated by different calculators. In such cases, the utilitarian would say: Do not make a compulsory enactment restricting liberty, which restriction is an evil in itself, unless the balance of advantages is unquestionable and great.

As to the argument that it is impossible to make the calculation of consequences every time we perform a moral act, the reply is, this is unnecessary; the calculations as to the various duties have been already made, and are embodied in rules, which rules we remember and apply without thinking of the process gone through in arriving at them. The navigator at sea does not need to compute the *Nautical Almanac* every time he determines his longitude; he carries it to sea with him ready for use.

III. A third objection is, that men in all ages have distinguished between the Right and the Expedient, that is, the Useful; the two are in most languages put in opposition or contrast. The reply is, that the Expedient, when thus opposed to the Right, commonly means what is expedient for the agent at the time, but is not expedient for people generally, or even for himself in the long-run. It is sometimes expedient, in this sense, to tell a lie, to rob, or to murder; but such actions are not expedient in the sense of general utility, or the greatest happiness of mankind.

It is further to be remarked in this contrast of the Expedient and the Right, that the Expedient may mean simply an addition to our conveniences or comforts, something that it is well for us to have, but that we might do without. Thus, it is highly expedient to possess cheap postage, railways, and electric telegraphs. On the other hand, the Right points to the essentials of our existence; without the fulfillment of contracts, respect to life and property, obedience to law, society would be dissolved. The distinction was expressed in one of Cromwell's speeches, by the contrast of a nation's Being and its Well-being; what secures the one is emphatically the Right, the promotion of the other is the Expedient. Right is the highest and most imperative form of Expediency.

IV. A fourth objection against the utilitarian scheme is, that all useful things are not made obligatory; it may be useful to have railways, but it is not a duty of every man to make them. But the utilitarian, while contending that nothing should be made a moral duty but what contributes to the happiness of mankind, does not hold the converse, that whatever promotes human welfare is a moral duty.

So much for the objections. The positive ground of Utilitarianism is, that men actually recognize happiness as their paramount consideration, or highest end. This, as a general rule, is too obvious to require proof. Each one's plan of life is principally made up of ideas of happiness to self or to others. All our good wishes to one another are repetitions of the one idea, 'May you be happy.' The seeming exceptions have been noticed above.

One of the strongest confirmations of the doctrine is derived from the usual inducements to right conduct, common to all moralists. We find that no one can preach morality without making use of its bearings upon happiness. The very meaning of the terms expressive of the highest virtues—love, goodness, mercy, compassion, fidelty, honesty, integrity, justice—is something that relieves the pains, and augments the pleasures of sentient beings. To love is to make the object happier, and love is the fulfilling of the law.

Although there be duties occasionally imposed upon men that have no obvious tendency to increase happiness, but rather to diminish it, as the labors of some cumbrous ceremonial system like Hinduism, those duties have to be upheld by the fear of punishment or the hope of reward, still testifying to the predominating motives of the human mind. It is not, however, by reference to traditional observances that the happiness motive is most clearly tested. The proper plan, as remarked by Mr. Samuel Bailey, is to try it upon some fresh case, some entirely new enactment, when it will be found that the interest or happiness of the community is the *sole* consideration appealed to. If a new law of inheritance is proposed, or a new government Board constituted, nobody advances any other criterion but expediency, or the good of certain persons now or in the future; unless such expediency can be shown, no one will move in the matter at all; and the earnestness of the promoters will be in exact proportion to their sense of the resulting good. We may, through blind conservation, keep up usages not only destitute of utility, but productive of harm; but we should not now deliberately set up for the first time any practice that we did not regard as conductive to somebody's well-being. Traditional associations excepted, the strength of our approbation or disapprobation always follows our estimate of happiness or misery produced.

It is worthy of remark that Utility, or the promotion of human welfare, as it is the very meaning of the work of a public benefactor, expresses the sum of the labors of all the best men that have ever lived.

UTO'PIA (Gr. *ou*, not; and *topos*, a place, equivalent, therefore, to 'Nowhere') is the name given by Sir Thomas More (q. v.) to the imaginary island which he makes the scene of his famous political romance, *De Optimo Reipublicæ Statu, de que Nova Insula Utopia*, originally published in Latin, at Louvain, in 1516; and translated into English by Bishop Burnet. This island, which More represents as having been discovered by a companion of Amerigo Vespucci, is the abode of a happy society, which, in virtue of its wise organization and legislation, is free from the harassing cares, inordinate desires, and customary miseries of mankind. More's romance obtained a wide popularity, and the epithet *Utopian* has since been applied to all schemes for the improvement of society which are deemed not practicable. A writer in the *Athenæum* in 1880 declares that More's *Utopia* is 'a treatise on the sources of all the political evils of the time,' and is largely a satire on England; the ordinary view that it sets forth a perfect society, being a misinterpretation.

U'TRAQUISTS (Lat. *utraquistæ*, from *utrâque*—i. e., *specie*, in both kinds), a name at first given to all those members of the Western Church, in the 14th c., principally followers of John Huss, who contended for the administration of the Eucharist to the laity under both kinds; but in later times restricted to one particular section of the Hussites, although all the members of that sect alike claimed this as a fundamental principle of their church discipline. The name may be said to date from 1415, when the followers of John Huss, in Prague, and elsewhere in Bohemia, adopted 'the communion of the cup' as their rallying cry, and emblazoned the cup upon their standards, as the distinguishing badge of the association. In 1417, the university of Prague, by a formal decision, directed that all the laity should communicate in both kinds; and the Council of Constance, in consequence, prohibited students from any longer resorting to Prague for the purposes of study. The Hussite party, on the contrary, made the demand one (the second) of the four points upon which they insisted as the condition of their submission to the church.

Their demands were rejected by the Council of Constance; but the Council of Basel, in 1433, acceded to the demand for the cup, under the condition that, whenever communion was so administered, the ministering priest should accompany the ministration with a declaration that Christ was contained whole and entire under each species. A portion of the Hussite party was content with the explanation of this and the other points offered by the council, but the more violent held out. See HUSS. The former were called U., and continued to be so designated. During the Reformation troubles, this division was still maintained. The U. were favorably regarded by the imperial party; and after

the battle of Mühlberg, in 1547, they alone were formally tolerated in Bohemia and Moravia. One of the most celebrated leaders was Jacobus v. Mies. The name Utraquist is still applied to certain districts or villages in Bohemia and Moravia; but it is used not in reference to this theological controversy, but merely to convey that, in these villages or districts, *both languages*, Bohemian and German, are spoken.

U'TRECHT, a province of the Netherlands, bounded on the W. by South Holland, N. by North Holland and the Zuider Zee, E. by Gelderland, and S. by the Rhine and Leck. It is 42 miles from east to west, and 21 from north to south. Superficial extent, 346,405 acres, 62,500 of which are arable, 180,000 pasture, 39,000 in wood, the remainder waste land and water. The chief places are Utrecht, Amersfórt, Rhenen, Wijk bij Duurstede, Montfórt, and Ijsselstein (pronounced I'sselstein). There are 66 country parishes, the number having been reduced from 86 by union. Pop. (1880) 194,368; rather more than 36 per cent. are Roman Catholics; the remainder, except 1611 Jews, are Protestants.

The country is varied by beautiful hilly districts, level fields, orchards, tilled land, meadows, and moss. The hilly tract stretches from near Amersfórt to Rhenen on the Rhine, 21 miles. It is well wooded. Rye, oats, and buckwheat are sown; sheep, cattle, and bees extensively kept. To the south of this belt is rich clay land, producing excellent wheat and barley. Near Amersfórt and Rhenen, tobacco is largely planted, the crop of 1865 being 948,750 lbs. The stock amounted to 12,771 horses, 76,989 horned cattle, 32,997 sheep, 20,547 swine, 4678 goats, and 13,835 bee-hives.

U. is watered by the Rhine, Vecht, Leck, Amstel, Grebbe, and many other rivers. The inland fishing is trifling; but many herrings, eels, flounders, anchovies, &c., are taken in the Zuider Zee. Besides agriculture, the industries are soap-boiling, sawing wood, copper and iron founding, making machinery, carpets, tiles, bricks, coarse pottery, cement, &c. There are many beautiful country-seats, the climate being dry and healthy.

UTRECHT (*Ultrajectum* or *Trajectum ad Rhenum*), the provincial capital, is beautifully situated in the midst of a district composed of sand-hills, woody heaths, rich grassy meadows, extensive orchards, flower-gardens, and cultivated fields. It lies 24 miles south-east from Amsterdam. When the census was taken (1869), the pop. numbered 59,299; at the end of 1880 it was 67,633. The broad walls have been leveled, planted with trees, and formed into beautiful and well-kept promenades.

U. is favorably situated for trade, being the point from which several railways radiate, and having excellent water-communication by the Old Rhine and the Vecht. The staples are grain, cattle, and various manufactures. It is the residence of many noble families, the seat of a university, national veterinary school, national hospital, high military court, the mint, &c.

Principal buildings are the cathedral or Domkerk, the townhouse, the mint, the university, and several handsome barracks for the infantry and cavalry, especially the Willemskazerne. The cathedral was consecrated to St. Martin about 720. In 1674, a hurricane destroyed the body of the building between the choir and the tower, so that the latter (321 feet high) is now isolated. The famous university of U., founded in 1623, numbers about 500 students, and has a good library. U. has been for centuries the headquarters of the Jansenist Church (q. v.). There is a national school, for military surgeons; a grammar-school; normal school for teachers; a musical college, for elementary singing, the piano, and violin; a historical society; meteorological institute; medical society; pharmaceutical society, &c. Education generally stands high.

The charitable institutions are numerous. Principal industries are—manufacturing tobacco and cigars, woollen fabrics and carpets, making salt, furniture, baskets, tin, copper, and silver work, sawing wood, rope-making, iron-founding, book-printing, &c. The royal cigar factory alone makes 40,000 daily.

U. is one of the oldest cities of the Netherlands, and probably was founded by the Romans. Here the famed union of the northern provinces for the defence of political and religious freedom was formed January 23, 1579. For a short time in 1807, Louis Napoleon, King of Holland, resided in Utrecht. It has been the birthplace of many distinguished men, among others Pope Adrian VI., in 1459.

U. has acquired a degree of celebrity for the treaties there concluded, which brought to a close the war of the Spanish Succession. See SUCCESSION WARS. After this disastrous conflict had endured for more than ten years, Great Britain, finding that the reasons which had prompted her to engage in it no longer existed, tried to induce Austria to come to terms with France, but failing in this, at once signed private preliminary articles for herself, October 8, 1711.

On January 12, 1712, a congress was opened at U.; and France, desirous, at almost any price, of detaching Britain from the grand alliance, voluntarily made so many concessions, that the latter had only further to demand the banishment of the elder Pretender, whose sojourn in France had been a source of disquietude, the conclusion of a treaty of commerce, and indemnities for her allies—all which points were at once conceded. But the preposterous demands of Austria, which included not only the renunciation by the Bourbons of the entire Spanish Empire, but the restoration of all those places which had been ceded to France by the treaties of Münster, Nimeguen, and Ryswick, and the retention of all Austria's conquests in Italy, the Low Countries, and Spain, forced the French to break off the conferences, in the hope of making a separate peace with Britain, and compelling the other allies, by negotiation or arms, to lower their pretensions. This plan was successful; agreement on all points at issue was established between France and Britain in August 1712; and arrangements were also come to with Holland, Portugal, Prussia, and Savoy soon afterwards. As each of the contracting parties negotiated in its own name, no fewer than nine distinct treaties of peace were signed in the following spring, 11th April 1713.

By the treaty between France and Britain, the former ceded St. Kitt's, Hudson's Bay, Nova Scotia, and Newfoundland (the liberty of fishing for cod being reserved), recognized formally the reigning dynasty and the Hanoverian succession, agreed to demolish the fortifications of Dunkirk, engaged that the crowns of France and Spain should never be united, and that no part of the Spanish Netherlands should ever be ceded or transferred to France; and Spain renounced her Italian possessions in favor of Austria, and gave up Gibraltar and Minorca to Britain, with which power she also concluded the *Assiento* (q. v.) treaty. The chief of the special agreements with the other contracting parties were as follows: Ypres, Knocke, &c. to be exchanged with Holland for Douai, Bouchain, &c., and a treaty of commerce to be concluded; both banks of the Amazon to belong to Portugal; Spanish Gelders, and the district of Kessel, to be ceded to Prussia, and its ruler's title of king, assumed in 1701, formally recognized, Prussia in turn resigning all claims to the principality of Orange; the Duke of Savoy to obtain Sicily, with the title of king, &c.

The treaty of U. did not make peace with Austria and the German Empire; but in the following year, at Rastadt and Baden, they agreed to substantially the same terms as were proffered at Utrecht. The electors of Cologne and Bavaria, who had been put under the ban of the empire, were restored; Sardinia, granted to Bavaria at U., was restored to Austria; Austria renounced her claims to the Spanish succession; the cession of the Spanish possessions in Italy was confirmed; Breisach and Freiburg, in the Breisgau, were also given to Austria; the highest ridge of the Maritime Alps was made the boundary between France and Savoy; and on failure of the Spanish Bourbons, the crown of Spain was to fall to the House of Savoy.—See Lord Mahon's *History of the War of Succession in Spain* (Lond. 1832).

UTRECHT, a town in the extreme south of the Transvaal, South Africa, close on the frontier of Natal, the Buffalo River here marking the boundary. It is a place of considerable importance, with a population stated at 3400, and is the capital of a district.

UTRE'RA, an old town of Spain, in the province of Sevilla, and 18 miles by railway south-east of the city of that name. In early times, it was flourishing and populous; but fell into a state of stagnancy, from which it has begun to revive, along with the rest of Spain. It is important as a military post, contains a beautiful Gothic church, a Moorish castle, and cavalry barracks. The streets and promenades are kept clean and fresh by streams of running water. U. contained, in 1879, 15,093 inhabitants, mostly agriculturists engaged in the productive estates which surround the town. Corn, wine, oil, and fruit are produced. Sheep and cattle, as well as a breed of fierce bulls, are reared in the vicinity.

U'TRICLE is the botanical term for a kind of seed like the Achenium (q. v.). In the utricle, however, the pericarp does not lie close to the seed, but surrounds it as a loose inflated covering.

UTTERING COUNTERFEIT COIN is an offence punishable with one year's imprisonment with hard labor. The punishment is increased if, besides uttering, the person has other counterfeit coin in his possession. It is also an offence to utter false foreign coin as the Queen's coin or as foreign coin.

UTTO'XETER, a market-town of Staffordshire, on an eminence above the vale of the Dove, 16 miles north-east of Stafford. A church with an ancient tower and lofty spire is the only noteworthy building. There are two large breweries in the town, with a rapidly increasing business. Pop. (1871) 3604.

U'VULA. See PALATE.

U'XBRIDGE, a market-town in the county of Middlesex, on the Colne, 15 miles west of the city of London. Pop. (1881) 7712. Its corn-market is one of the most important in the kingdom.

UZBEKS, an important branch of the Turkish family of Tartars, who constitute the chief element in the native population in Khiva, Bokhara, and Khokand (Ferghana). Some are still nomads, but the most are settled in towns.

V.

THE twenty-second letter in the English alphabet, is derived directly from the Lat. character *v*, which represented originally both the consonant *v* and the vowel *u* (see U). The name of the letter is derived from the Phœnician and Hebrew *vau* (signifying a nail, which the form of the letter originally resembled), which stood sixth in the alphabet, and became the Digamma (q. v.) of the Old Greek, and the *f* of the Latin (see F). The Greeek *υ* (see ALPHABET), from which the Lat. *v* is taken, had, in the classical period, degenerated into a sound like the French *u*, and in modern Greek is undistinguishable from *i*. The Greeks, after they had lost the digamma, represented Lat. *v* by *ου* or *β*; e.g., Ουαρρων or Βαρρων=Varro, Βιργιλίος=Virgilius. In the beginning of Latin words, *v* must have had a consonantal sound approaching that of *v* in English, as is inferred from its persistence as compared with the Greek digamma; e.g., Vinum = (F)οἶνος, Vesta = Ἑστία. Between two vowels, on the contrary, it was often dropped out, as in *nuper* for *novumper*, *Jupiter* for *Jovipiter*, *prudens* for *providens;* from which we may conclude that it had in that position the power of a semivowel, like Eng. *w*. In New High German, *v* takes the place of Gothic and Eng. *f* (see F), and is pronounced like *f*, while the *v*-sound is expressed by *w*.

VAAL RIVER, the Dutch name of one of the most important branches of the Gariep or Orange River, and signifying yellow, from the color of its waters when in flood, its Hottentot name, Ky Gariep, having really the same signification; the Betjuans call it Namagari. It rises in the Drakenberg range, at the north-west angle of Natal, and running a very circuitous course of about 500 miles. It forms the boundary between the Orange River Free State on the one hand and the Transvaal on the other, and joins the other great branch, the Nu Gariep or Orange River, in lat. 29° 10′ S., long. 24° 28′ E.

VACA'TION, in Legal language, means the holiday usually enjoyed by lawyers in consequence of many of the courts being closed, and thereby some steps in a suit not being competent during part of the autumn of each year. There are short vacations during other parts of the year; but the long vacation is that which extends from 10th August to 24th October, and during that part of the year it is usual for legal business to be in great measure suspended.

VACCINA'TION is the process by which a specific disease, termed *vaccinia*, or cow-pox (from the Latin word *vacca*, a cow), is introduced into the human organism with the view of protecting it against an attack of an incomparably more severe disorder—viz. smallpox. For the history of this remarkable discovery of vaccination—'that master-piece of medical induction'—we must refer to the life of Jenner (q. v.). In his *Inquiry into the Causes and Effects of the Variolæ Vaccinæ*, published 1798, he establishes the following facts: (1.) That this disease casually communicated to man has the power of rendering him unsusceptible of smallpox; (2.) that the specific cow-pox alone, and not other eruptions affecting the cow, which might be confounded with it, had this protective power; (3.) that the cow-pox might be communicated at will from the cow to man by the hand of the surgeon, whenever the requisite opportunity existed; and (4.) that the cow-pox once ingrafted on the human subject, might be continued from individual to individual by successive transmissions, conferring on each the same immunity from smallpox as was enjoyed by the one first infected direct from the cow.

The *method of vaccinating* and the *phenomena of cow-pox*, as observed in the human subject after vaccination, claim our first and chief attention. Except under circumstances of special risk (as, for instance, where smallpox is in the neighborhood), children should only be vaccinated when they are in apparently good health. Diarrhœa and skin-diseases are especially to be avoided; and it is important to see that there is no chafing behind the ears, or in the folds of the neck or groin. As more than one-fourth of the whole number of deaths from smallpox in England during the six consecutive years 1856—1861, took place in children of less than one year, it is obviously expedient that children should be vaccinated in very early infancy, provided health permits. Dr. Seaton, in his comprehensive article on this subject in Reynold's *System of Medicine* (1866, vol. i. p. 489), observes that 'plump and healthy children living in large towns should be vaccinated when a month or six weeks old; in more delicate children, the vaccination might be postponed till they are two or three months old; but all except those whose state of health positively contra-indicates vaccination, should be vaccinated by the age of three months.' This early age has also the advantage of being free from the irritation of teething.

The lymph to be used should always be taken from a healthy child, and from thoroughly characteristic vesicles; and when lymph in all respects satisfactory cannot be procured, as is often the case in country districts, the operation should be postponed. Lymph is usually taken when the vesicle is fully formed, which is usually about a week after vaccination; if it is not taken till the areola (which will be presently described) is complete, its protective power is far less certain. 'Prime lymph,' says Dr. Seaton, 'has always a certain degree of viscidity; and a thin serous lymph, even from a vesicle which is not advanced, is to be avoided. Babies are much better lymph-givers than elder children or adults; and children of dark complexion, not too florid, with a thick, smooth, clear skin, yield the finest and most effective lymph.' Lymph should always, if practicable, be passed direct from arm to arm; and preserved lymph should only be had recourse to when a vaccinated child cannot be obtained. A good vesicle freely punctured on its surface exudes enough lymph or vaccine matter for the direct vaccination of five or six children, and for charging six or eight ivory points for future emergencies.

The process of vaccination consists essentially in introducing the lymph into the structure of the true skin, or in bringing it in contact with the absorbing surface. This may be effected in various ways, one of the most common being by puncture. As the operation is extremely simple, and the knowledge of the mode of performing it may prove useful to many of our colonial readers, we shall briefly describe it. The skin on the outside of the arm, below the shoulder, should be held upon the stretch, and a very sharp, clean lancet, well charged with lymph, should be made to puncture the skin from above downwards, at an angle of about 45°, and be made just to enter the true skin. The matter thus inserted is retained by the valvular character of the puncture and the elasticity of the skin. In this form of the operation, not less than five or six such punctures should be made, at a distance of half an inch from the other; and for the sake of security, three punctures may be made on each arm. If the lymph is preserved on points, each point, after being held in the steam of hot water so as to dissolve the lymph, should be inserted into the punctures made by an ordinary lancet.

Some surgeons make a number of minute superficial punctures over a patch of the size of a fourpenny-piece, and spread the lymph over this spot with the flat part of the lancet: this kind of tattooing should be repeated on three spots. Others make a number of parallel scratches, or crossed scratches, with a charged lancet; and others, again, use special scarifiers or rakes, consisting of three or four needle-points inserted in an ivory handle, and drawn either once or again at right angles over the tense skin, the lymph being then plastered over the scarified surface. Of these various plans, Dr. Seaton believes that the best marks and most successful treatment result from this last plan of cross-scratches. A far better plan of preserving lymph than that of drying it on points, is that of preserving it in a fluid state in Husband's closed capillary tubes, in which form it is ready for use without any preparation.

When the operation is successfully performed, the skin at the spot becomes slightly elevated, hard, and red, on the third or fourth day; on the fifth or sixth day, a vesicle of a bluish-white color forms, which presents an elevated edge and a depressed cup. It is distended with clear lymph, and attains its perfection on the eighth day; and now, or on the ninth day, the vesicle is surrounded by an inflamed ring or areola; on the ninth, tenth, and eleventh days, the vesicle becomes a pustule, the cupped form disappears, the areola enlarges till it becomes a circle, with a diameter of from one to three inches. On the twelfth, thirteenth, and fourteenth days, the pustule dries up; and in the course of the next week, the scab separates and falls off: it seldom remains so long as the twenty-fifth day. It leaves a cicatrix, which commonly is permanent in after-life, circular, somewhat depressed, dotted or indented with minute pits, and in some instances radiated. The establishment of the areola is accompanied with constitutional disturbances, as indicated by restless-

ness and heat of skin, frequent derangement of the stomach and bowels, and occasional swelling of the glands of the armpit. These symptoms are seldom severe, but seldom quite absent.

We occasionally meet with cases in which the course of the above symptoms is modified, as when they are simply retarded, or simply accelerated, or altogether irregular and spurious; and it should be carefully borne in mind that 'a vaccination presenting any deviation from the perfect character of the vesicle and the regular development of the areola, is not to be relied on as protective against smallpox.'—Seaton, *op. cit.* As a general rule, neither the local nor the constitutional symptoms of ordinary vaccination require any treatment.

From investigations conducted some years ago by order of the government, and published in several of the *Reports of the Medical Officer of the Privy Council*, it appears that amongst the poorer classes, vaccination is often so imperfectly performed as to leave no mark, and to exert no protective power. Mr. Marson of the Smallpox Hospital believes that with good lymph, and the observance of all proper precautions, a good vaccinator should not fail of success in his attempts to vaccinate above one in 150 cases; while Dr. Seaton puts one failure as a fair proportion in 170 cases.

The official inquiries above referred to, in the course of which the arms of nearly half a million vaccinated children were examined, prove, says Dr. Seaton, who was employed in the investigation, the great extent to which imperfect or insufficient vaccination has obtained: taking the country throughout, not more than one child in eight was found to be so vaccinated as to have the highest degree of protection that vaccination is capable of affording; and not more than one in three could, on the most indulgent estimate, be considered as well protected. The main causes of this imperfect success were the following: '(1.) The frequency with which practitioners, instead of attempting fully to infect the system, had been satisfied with insertions of lymph sufficient to produce only one, two, or three ordinary vesicles; (2.) the want of due attention to the *selection* of the lymph used in vaccinating; (3.) carelessness and clumsiness in the performance of the vaccination, so that, if the operation did not wholly fail, it very frequently resulted in a less degree of effect than it had been the aim of the operator to produce; and (4.) the great and unnecessary extent to which the use of preserved and conveyed lymph was substituted for vaccination direct from the arm.'—Seaton, *op. cit.*, p. 503.

The following observations made by Drs. Buchanan and Seaton during the epidemic of smallpox in London in 1863, on upwards of 50,000 children in various national and parochial schools, workhouses, &c., are of such extreme importance that we make no apology for inserting them. Some of the children had never been vaccinated; the large majority had been vaccinated in various manners and degrees. Of every 1000 children without any mark of vaccination, no fewer than 360 had scars of smallpox; while of every 1000 children who had evidence of vaccination, only 1·78, on an average, had any such traces: and with regard to the quality and amount of the vaccination, it was found that, of children having four or more cicatrices, only 0·62 per thousand had any trace of smallpox; while of those who had a single bad mark, 19 per thousand were scarred by smallpox. Hence the best vaccination was more than thirty times as protective as the worst, and the worst was more than forty-seven times better than none at all. The importance of the completeness of the vaccination, as shown by the cicatrices, is also well shown by the results obtained by Mr. Marson. From the study of more than 15,000 cases at the Smallpox Hospital, he finds that while the unvaccinated died at the rate of 37 per cent., the vaccinated have died at the rate of only 6½ per cent.; the mortality amongst those with four or more scars being only 0·55, while that amongst those with only a single scar was 7·73 per cent.

The statistics proving the value of vaccination and the importance of enforcing it, were powerfully stated in a paper read by Dr. W. B. Carpenter before the Society for the Abolition of Compulsory Vaccination in 1882, and subsequently republished. It must further be borne in mind, that while few unvaccinated persons do not at some period of life sustain an attack of smallpox, the cases are comparatively rare in which a well-vaccinated person catches the disorder; so that the protective power of vaccination shows itself in two ways—viz. (1.), in shielding the constitution, in the great majority of cases, from any kind of an attack of smallpox; and (2) in the exceptional cases, of so modifying the disease, as almost invariably to deprive it of danger to life, or of those terrible disfigurements which the unmodified disease so frequently leaves behind it.

With regard to the subject of *re-vaccination*, it has been amply demonstrated that its utility and necessity stand upon no speculative reasoning, but upon the broad basis of experience and observation. This operation should be performed with the same care and pains as primary vaccination, nor should it be left to periods when smallpox is epidemic, but should be performed on all persons after puberty, and this is the more necessary, for the primary operation is often very imperfectly performed. During an epidemic of smallpox, even young children, if the marks of the primary vaccination are at all imperfect, should most decidedly be re-vaccinated. In re-vaccinating it must always be remembered that 'the local results of re-vaccination of any individual give us absolutely no information whatever as to the constitutional condition in which the re-vaccinated person was with regard to the liability to contract smallpox.'

Much has been written regarding the *dangers of vaccination;* and the well-known Rivalta case, in which an infant thus communicated syphilis to a whole population in a remote district of Piedmont (see SYPHILIS); and the death some years ago of a distinguished middle-aged baronet from (as it was alleged) vaccination with impure lymph, have directed special attention to the subject. For the discussion of this subject we must refer to Mr. Simon's *Papers relative to the History and Practice of Vaccination;* and we will only remark, that those who have had most to do with vaccination, and those who have had the most extensive experience in the diseases of children, concur in the belief of the non-communicability of disease by this operation.

The relations between smallpox in man and cow-pox in the cow, claim a passing remark. Jenner believed that they were essentially the same disease, and that they had a common origin in the grease of the horse. Various experiments have been made to inoculate healthy cows with smallpox, and those of Mr. Ceely of Aylesbury in 1839, and of Mr. Badcock of Brighton in 1840, who induced vesicles by inoculating cows with smallpox virus, and thus obtained a supply of genuine vaccine lymph, place the identity of the diseases beyond all question. The disease really known as grease appears to have nothing to do with cow-pox or smallpox; but the horse occasionally suffers an affection which is precisely the same as the smallpox in man and the cow-pox in cows; and the lymph from this horse-pox has been successfully used for vaccination. (For methods similar to V. to prevent splenic fever, &c., adopted by Pasteur, see GERM THEORY.).

In 1841, the Vaccination Act made the practice of inoculating with smallpox virus unlawful. In 1853, another act, known as Lord Lyttelton's Vaccination Act, was passed, with the view of rendering the practice of vaccination compulsory, but this, though useful as far it goes, proved a very imperfect measure. The Public Health Act, passed in 1858, gives to the Privy-council the power of appointing *public vaccinators* to give instruction in all practical points bearing on vaccination, for granting certificates of proficiency, and for the vaccination of poor persons residing in unions and parishes. They have, moreover, made arrangements for supplying lymph, guaranteed by the National Vaccine Board, to all medical practitioners, who apply to 'The Registrar of the National Vaccine Establishment, Privy-council Office, London, S.W.' The Vaccination Act of 1867 was passed to 'consolidate and amend the statutes relating to vaccination in England.' By it the parent must have the child vaccinated within three calendar months from the child's birth, and the vaccination must be repeated until successful. The Vaccination Act of 1871 adds one or two new provisions.

VACCINIA'CEÆ, a natural order of exogenous plants, differing from *Ericeæ* chiefly in having an inferior ovary and succulent fruit. Many botanists make it a section of *Ericeæ*. About 200 species are known, natives of temperate climates, in all parts of the world, but chiefly in the northern hemisphere. A few species, remarkable as being parasitic, are natives of Peru. The V. are shrubs, and rarely small trees, with numerous round or angular branches, simple leaves on very short stalks, and flowers solitary or in racemes. Whortleberries (q. v.) and Cranberries (q. v.) are the most familiar examples of the order.

VACH (literally, speech) is another name of Saraswatî (q. v.), the female energy of the Hindu god Brahman.

VACHASPATI (literally, 'lord of speech,' from the Sanscrit *vâch*, speech, and *pati*, lord) is, in Hindu Mythology, one of the usual names of *Vrihaspati* (q. v.), the instructor of the gods.

VA'CUUM literally means empty space, or space wholly devoid of matter. From Aristotle to Descartes, metaphysical speculators took the question into their own hands, and, of course, wrote nonsense about it. Thus, Descartes commits the absurdity of saying that, if a vessel be perfectly empty, its sides must be in contact—confounding the totally distinct ideas of *matter* and *space*. The dictum that *nature abhors a vacuum*, was employed to account for the rise of water in pumps; but it was presently found that nature did not abhor a vacuum through more than an elevation of about 32 feet. See TORRICELLI. When the subject was taken up by its legitimate owners, the experimental philosophers, such absurdities disappeared, but real difficulties were detected. So far as experiment has yet guided us, we may assert that vacuum cannot exist. The interstellar spaces, though probably devoid of ordinary ponderable matter, or at best only occasionally visited by it, are certainly pervaded by the luminiferous medium. See ETHER, UNDULATORY THEORY. That

this is Matter (q. v.), is amply proved by the effects of its vibrations on the eye, and by the resistance which it has been discovered to oppose to the motion of Encke's comet.

It is not merely for the propagation of light and heat that we are forced to assume that the universe is a *plenum;* Newton expressly said (see FORCE, where the quotation is given at greater length) 'That gravity should be innate, inherent, and essential to matter, so that one body may act upon another at a distance through a *vacuum*, without the mediation of anything else, by, and through which their action and force may be conveyed from one to another, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty of thinking, can ever fall into it.' Nothing could be stronger than this; and we have, in addition, the results of modern observation, which show a connection between sun-spots, planetary configurations, and terrestrial magnetism, obviously requiring some material channel to exist between the sun and its secondaries. Faraday's electrical discoveries tend to the same conclusion.

But, in ordinary language, a vacuum is said to be produced (more or less *perfect*) when ordinary ponderable matter, such as air, is more or less completely removed from the interior of a closed vessel. Till the commencement of the present century, the most perfect vacuum that could be obtained was what is called the Torricellian vacuum—i. e., the space above the mercury in a carefully filled barometer tube. Such a vacuum, however, is almost useless for experimental purposes, and, besides, it contains mercurial vapor.

A suggestion of Davy's, recently re-invented and greatly improved by Andrews, gives the means of procuring a much more perfect vacuum than the Torricellian. An ordinary air-pump removes all but about the $\frac{1}{100}$th of the gas in the receiver—i. e., produces a vacuum of about $\frac{1}{2}$th inch, as it is called. But if the gas employed be carbonic acid, admitted and pumped out several times, so as to get rid, as far as possible, of the last trace of air, the remaining gas will be almost wholly taken up by means of moistened caustic potash previously placed in the receiver. Concentrated sulphuric acid should also be present, to desiccate the potash when it has done its work. In this way, Andrews easily obtained a vacuum of about $\frac{1}{4500}$th of an inch, which remained unchanged for a fortnight. Here all but $\frac{1}{186,000}$th of the air had been removed. Farther improvements, devised by Frankland, Gassiott, and others, have been made in this process, especially for the production of (so-called) vacuum-tubes for the study of electrical discharges; and the exhaustion has been sometimes carried so far that the attenuated matter remaining was unable to conduct the discharge of an induction-coil.

VA'GRANTS, or TRAMPS, a class of beggars, many thousands in number, who, having their headquarters in the large towns of England, wander about the country, subsisting upon charity and plunder. In England, the spirit of the laws and still more public opinion have always been averse to putting restraints upon the inclinations of even viciously disposed persons, and, consequently, the country has never been without a class of habitual vagrants—beggars and pilferers by profession. But there is reason to believe that the number of these social pests has, for many years past, been declining, absolutely, as well as relatively to population. The statute-book has long contained laws against vagrancy, but they have never been systematically executed. The severest of the early laws were directed against the gipsies—at one time a really formidable class of vagrants—and against wandering soldiers and marines, and persons pretending to be discharged soldiers and marines. Such vagrants were made liable to the punishment of felony. The vagrancy laws are now comprised in the acts 5 Geo. IV. c. 83, 1 and 2 Vict. c. 38, the Vagrant Act Amendment Act of 1873, supplemented by local police regulations.

Those statutes (using the descriptive phrases of previous enactments) made idle and disorderly persons—that is, persons able, in whole or in part, to maintain themselves and their families, and neglecting to do so—liable to one month's imprisonment and hard labor; rogues and vagabonds (habitual vagrants and persons suspected of living by crime), liable to three months' imprisonment and hard labor; and a third class, described as incorrigible rogues, liable to be committed for trial at the Sessions, to be kept to hard labor in the interim, and after conviction, to be sentenced to one year's imprisonment and hard labor, with whipping in the case of males. The police have authority to enter houses of reception for travelers, and to arrest persons suspected of falling under any of the above-named descriptions, and carry them before a magistrate for trial. But between the difficulty of finding satisfactory evidence of the character of persons thus found wandering, the commendable fear of making mistakes, the popular feeling that vagrancy is not a crime, and the unwillingness of magistrates to add to the expense of prison establishments, the statutory powers have never been used to such an extent as to affect the prevalence of vagrancy.

On the other hand, a direct and material support has been given to vagrancy by the arrangements which, under the new poor-law, now exist in most districts for the relief of the traveling poor. In almost every union workhouse in England, there is a casual ward intended for poor artisans and laborers making their way, as they sometimes have to do, from places where work is slack to places where it is plentiful. The casual ward has been taken possession of by the vagrant, for whom the law provides only a prison-cell. From two-thirds to three-fourths of its occupants are usually habitual vagrants. Here the vagrant gets his supper, his bed, and in most cases his breakfast. The fare is exceedingly meagre—a little bread, with occasionally a bit of cheese, or a small quantity of skilley (gruel); and the sleeping accommodation is usually worse than that of the lowest lodging-houses—cleanliness being impossible with such occupants, and there being no desire to give them comfort. But the vagrant gets supplies of food in his wanderings by begging and plundering; and he seeks the casual ward chiefly for the shelter and the society. In 1848, Mr. Charles Buller, then President of the Poor-law Board, prescribed a set of rules, which for a time almost deprived the vagrant of this resource.

Relief was to be refused to all able-bodied young men unless they produced passes or certificates declaring their character from a clergyman or some person in a public position, or unless the workhouse officials were satisfied they were actually destitute; orders for the casual ward were to be given only by the police—whom the tramp regards as his natural enemies; and a suitable task of work was to be exacted from every person relieved. But these rules were soon withdrawn. In a good many cases, the police are still employed to give away the orders, and on the whole with advantage; but passes (this was the really valuable regulation) are not required; and in not a few cases, no task of work is exacted, because the poor-law guardians found that they lost money upon the work done by vagrants. In other cases an option is given to the tramp of doing a certain amount of work, or going away in the morning without his breakfast. He almost always prefers the latter alternative. But, in general, about three hours' work is imposed; and when the workhouse authorities insist upon it, the vagrants usually—though greatly disliking work—comply with this condition.

By far the greatest number of the vagrants are men between the ages of 20 and 40, the average age being about 34. There is a small proportion of men above 40, and about an equal number of youths under 20—mostly runaway apprentices. About a fourth or a fifth are women, who are generally traveling with male vagrants; but the life seems to be too hard for women. The men often pretend to be going about in search of work, but seldom or never do work; and the majority of the vagrants are of the class who, from mental constitution, would almost die rather than work. They are, besides, it must be added, persons whom decent laborers would not allow to be associated with them. Many of them have been brought up in workhouses; others are deserters from the army, or discharged soldiers of bad character; not a few are dissipated broken-down workmen, who, while tramping about in search of work, have acquired the tramp's bad habits and love of idleness. Many of them have been brought up to crime, but want the skill and daring necessary to success in their profession. They often make some pretence of occupation, under cover of which they approach houses to beg, or steal, or bully unprotected women. They are vendors of steel-pens, paper, laces; tinkers, china-menders, umbrella-repairers, ballad-singers. They are much given to small thefts; most of them are believed to be capable of any crime; but in fact they attempt few serious crimes. They are poor timid creatures, and feel that society with its police is too strong for them.

They never unite together to commit crimes, but occasionally 20 or 30 of them, operating in twos and threes, work a district in concert. There is a free-masonry among them; and any new rule adopted at a workhouse becomes known in two or three days over a wide district. They are usually known by slang names; their language is horribly blasphemous and obscene; and neither men nor women have the smallest regard for decency, or any conception of sexual restraints. They give a great deal of trouble at the workhouses—swearing at and threatening the officials, occasionally stabbing them, refusing to do the allotted work, and not unfrequently tearing up their clothes, in the hope that the officials, out of regard to decency, will supply them with others. The officials can only threaten them with the magistrate and the jail; but sometimes—and it is then they are most insolent and troublesome—they have a desire for rest and regular feeding, and are not unwilling to go to jail. It is hard to understand what are the enjoyments of their wandering and shifty life.

Apparently, the freedom of it and the immunity from work are its chief attractions. They have been well described as wandering about 'ready for any crime, but not planning crimes, quite ready to rob, but very much afraid of large dogs, very courageous against unprotected women, but skulkers when a broad-shouldered laborer turns his eyes their way, with no purpose except

wandering, no restraint except hunger, no hope except of getting drunk upon some lucky haul, nomads in the midst of civilization, simple savages without savage resources.' The revival of the regulations prescribed by Mr. Buller, and the steady enforcement of the vagrancy laws—which should also be made more severe—are the measures most likely to put down vagrancy. There is no offence against society for which penal servitude would be a more appropriate penalty.

VAIR. See HERALDRY.

VAIS'ESHIKA is the name of one of the two great divisions of the *Nyâya* (q. v.) school of Hindu philosophy, and probably a later development of the Nyâya itself, properly so called, with which it agrees in its analytical method of treating the subjects of human research, but from which it differs in the arrangement of its topics, and more especially by its doctrine of atomic individualities or *vis'eshas*—whence its name is derived.

The topics or categories (*padârthas*) under which *Kan'âda*, the founder of this system, arranges his subject-matter, are the following six: (1) substance, (2) quality, (3) action, (4) generality, (5) atomic individuality, and (6) co-inherence; and later writers of his school add to these a seventh category, viz., non-existence. 1. Substance is the intimate cause of an aggregate effect; it is that in which qualities abide, and in which action takes place. It is ninefold, viz., earth, water, light, air, ether, time, space, soul, and *manas*, or the organ of affection. 2. Quality is united with substance; it comprises the following 24: color, savor, odor, feel, number, dimension, severalty, conjunction, disjunction, priority, posteriority, gravity, fluidity, viscidity, sound, understanding, pleasure, pain, desire, aversion, volition or effort, merit, demerit, and self-restitution. 3. Action consists in motion, and abides in substance alone. It affects a single, that is, a finite substance, which is matter. Action is either motion upwards or motion downwards, or contraction or expansion, or motion onwards. 4. Generality abides in substance, quality, and action. It is of two kinds, higher and lower—genus and species. 5. Atomic individuality resides in eternal substances, by which are meant the organ of affection, soul, time, space, ether, earth, water, light, and air; it is the ultimate difference, technically called *vis'esha;* such differences are endless; and two atoms of the same substance, though homogeneous with one another, differ merely in so far as they exclude one another. 6. Co-inherence, or perpetual intimate connection, resides in things which cannot exist independently from one another, such as the parts and the whole, quality and the thing qualified, action and agent, species and individual, atomic individuality, and eternal substance. 7. Non-existence, the last category, added to the foregoing by the modern Vais'eshikas, is defined by them as being either non-existence, which is without beginning, but has an end—as that of a jar, which did not exist until its antecedent non-existence ceased when being formed out of the clay; or non-existence, which has a beginning, but no end—as that of a jar which is smashed by the blow of a mallet; or absolute non-existence, which, extending through all times, has neither beginning nor end—as when it is said that a jar is not on the ground; or mutual non existence, which is the reciprocal negation of identity—as when it is remarked that a jar is not a piece of cloth. The nature of each of these substances, qualities, actions, &c. is, then, the subject of special investigation. Thus, *earth* is said to be that of which the distinguishing quality is odor; it is described as being of two kinds; eternal, in its atomic character; and uneternal, when in the shape of some product.

Again, products are defined as either organized bodies of five sorts, or organs of perception, or unorganic masses, such as stones, &c. Amongst the qualities, color is defined as that quality which is apprehended only by the sense of sight; which resides in earth, water, and light; which is distinguishable in earth as white, yellow, green, red, black, tawny, and variegated; in water, as white, but not resplendent; in light, as white and resplendent, &c. *Self-restitution*—to give another instance of the definition of the qualities—is described as threefold: as impetus, the cause of activity in earth, water, light, air, and the organ of affection; as the mental process peculiar to the soul, which is the cause of memory; and as elasticity, in mats and similar substances, which causes an altered thing to reassume its former position.

Though this cursory statement must here suffice to give a general idea of the Vais'eshika system, it is worthy of especial notice that, according to it, understanding is the quality of *soul*, and the instruments of right notion are treated of under the head of 'understanding (*buddhi*).' Kan'âda admits of only two such instruments, or *pramân'as*, viz., knowledge which arises from the contact of a sense with its object, and inference.

Comparison, revelation, and the other instruments of right notion, mentioned in other systems, the commentators endeavor to show are included in these two. Fallacies and other modes of inconclusive reasoning are further dealt with in connection with 'inference,' though with less detail than in the Nyâya, where these topics are enlarged upon with particular predilection.—The reputed founder of the V. is *Kan'âda*, which name the native authorities derive from *Kan'a*, minute, and *âda*, eating, and sometimes, therefore, also change into *Kan'abhuj* or *Kan'abhaksha* (*bhuj* and *bhaksha* being synonyms of *âda*). Nothing, however, is known as to the history or date of this personage, as they are involved in the same obscurity which covers most of the renowned writers of ancient India. His work is divided into ten *adhya'yas*, or books, each of which is subdivided into two diurnal lessons; these, again, being subdivided into sections containing two or more *Sûtras* (q. v.), or aphorisms, on the same topic. Like the Nyâya-Sûtras, the work of Kan'âda has been commented upon by a triple set of commentaries, and popularized in several elementary treatises.

The text with the commentary of *S'ankara Mis'ra*—who is not to be confounded with the celebrated Vedânta author—has been edited at Calcutta in 1861 by the Pan'd'it Jayanârâyana Tarka Panchânana, who added to it a gloss of his own; and some of the Sûtras have been translated by the late Dr. Ballantyne (Mirzapore, 1851). Of later works on the same system, may be mentioned the *Bhâshâparichchheda*, edited, with the commentary called *Siddhântamuktâvalî*, and translated by the late Dr. Roer in the *Bibliotheca Indica* (Calcutta, 1850), and the popular *Tarkasangraha* in several editions; edited also and translated by Dr. Ballantyne (2d edit., Calcutta, 1848), who in his preface gives a catalogue of the commentaries which this work has elicited. The reader not acquainted with Sanscrit is, for further information on the subject, referred to these translations, and to the essays on the V. system by H. T. Colebrooke (*Miscellaneous Essays*, vol. i., Lond. 1837), and Professor M. Müller, in the 6th and 7th volumes of the *Zeitschrift der deutschen morgenländischen Gesellschaft*.

VAISHN'AVAS is the name of one of the three great divisions of Hindu sects. See INDIA, section *Religion*. The word, derived from *Vishn'u* (q. v.), designates the worshipers of this deity, and comprises a great variety of sects; but this variety itself differs according to different periods of the medieval history of India, old divisions becoming extinct, and new ones taking their place. Thus, the account of the V., as given in a celebrated work of *Anandagiri*, the *'Sankara-dig-vijaya*, or the victory of the great theologian S'ankara over his religious adversaries, would no longer apply in detail to the present condition of the V.; and even some of those varieties mentioned by the late Professor Wilson in his *Sketch of the Religious Sects of the Hindus*, written in 1832, would seem to have disappeared already in our days. The common link of all the sects comprised under the name of V., is their belief in the supremacy of Vishn'u over the other gods of the Trimûrti (q. v.). Their difference consists in the character which they assign to this supremacy, and to the god Vishn'u himself, in the religious and other practices founded on the nature of their belief, and in their sectarian marks. The following sects belonging to this category may especially be noticed here.

1. The *Râmânujas*, or *Sr'î Vaishn'avas*, or *Srî-Sampradâyins*. They derive their origin from *Râmânuja*, a celebrated reformer, who was born at Perumbur, in the south of India, about the middle of the 12th c., and is considered by his followers as an incarnation of *S'esha* (q. v.), the serpent of Vishn'u. He studied at Conjeveram, resided afterwards at S'rîranga, and then traveled over different parts of India, where he was especially engaged in combating the professors of different creeds, particularly the S'aivas. On his return to S'rîranga, he was seized by the king Kerika'la Chola, but effected his escape, and found refuge with the Jain king of Mysore, Vitâla Deva, whom he converted the Vaishn'ava faith. For twelve years he then remained at Mysore; but at the death of the Chola king, returned to S'rîranga, where he spent the remainder of his life in religious seclusion. The Râmânujas address their worship to Vishn'u and his consort, Lakshmî (q. v.), and their respective incarnations, either singly or conjointly. Hence their sect consists of corresponding subdivisions, according as Nârâyan'a or Lakshmî, or Lakshmî-Nârâyan'a, or Râma, or Sîtâ or Sîtâ-Râma, or any other incarnation of these deities, is the preferential object of the veneration of the votary. Their most striking peculiarity is the preparation and the scrupulous privacy of their meals; for should the meal during its preparation, or while they are eating, attract even the looks of a stranger, the operation is instantly stopped, and the viands buried in the ground. The marks by which they distinguish themselves from other sects are two perpendicular white lines, drawn with a white earth, *Gopîchandana*, from the root of the hair to the commencement of each eyebrow, and a transverse streak connecting them across the root of the nose; in the center is a perpendicular streak of red, made with red sanders, or a preparation of turmeric and lime; other marks, representing several of the attributes of Vishn'u, they have either painted or impressed on the breast and each upper arm; and, besides, they wear a necklace of the wood of the Tulasî (holy basil), and carry a rosary of the seeds of the same plant, or of the lotus.

The sacred formula with which a member of this sect is initiated into it consists merely of the words *Om râmâya namah'*, 'Om, salutation to Râma.' Their principal religious tenet is the belief that Vishn'u is the cause and creator of all worlds; that he and the universe are one, though he is of a twofold form: the supreme spirit or cause, and the gross one, the effect or matter. In distinction from the Vedânta, with which their doctrine has otherwise many points of contact, they regard their supreme deity as endowed with qualities, all of which are of course excellent; and teach that the universe consists of *chit*, thinking or spirit, *achit*, unthinking or matter, and *îs'wara*, or god; the relation of which is that of enjoyer, the thing enjoyed, and the ruler of both. The deity, they assume, is or has been visibly present in five modifications: in the objects of worship, as images, &c.; in the incarnations (see under VISHN'U); in certain forms called Vyûhas, viz., Vâsudeva or Kr'ishn'a; Balarâma, Pradyumna, and Aniruddha; and in the subtle form which comprises six qualities —absence of passion, immortality, exemption from pain or care, absence of natural wants, love, and practice of truth—and the human soul; all of which have to be worshiped seriatim, as the votary ascends in the scale of perfection. The chief authoritative works in Sanscrit of this sect are the *Vedânta Sûtras*, with several commentaries, several works on the Vedânta (q. v.) philosophy, the *Pancharâtra* of Nârada; of Purân'as (q. v.), the *Vishn'u-*, *Nâradîya-*, *Garud'a-*, *Padma-*, *Varâha-*, and *Bhâgavata-Purân'a;* and besides, the works of *Venkat'a*, and several popular works in the dialects of the south. It is in the south that the followers of Râmânuja, and their temples and establishments, are still numerous; in the north of India, where they are better known as *S'rî Vaishn'avas*, they are not of frequent occurrence.

2. The *Râmânandas*, or *Râmâvats*. They are by far the most numerous class of sectaries in Gangetic India: in the district of Agra, they alone constitute seven-tenths of the ascetic population. They belong chiefly to the poorer and inferior classes, with the exception of the Rajputs and military Brahmans. The founder of this sect was *Râmânanda*, who, by some, is considered to have been the immediate disciple of Râmânuja; by others, the fifth in descent from that teacher, when he would have lived about the end of the 13th c.; but other more reliable accounts place him toward the end of the 14th, or the beginning of the 15th century. According to common tradition, Râmânanda seceded from the Râmânujas, to whom he originally belonged, because, having spent some time in traveling through various parts of India, and, in consequence, having been suspected by his fellow-disciples not to have conformed to the rule of the Râmânujas in taking his meals, he was condemned to feed in a place apart from the rest of them, but did not acquiesce in the affront thus offered him. His residence was at Benares, at the Pancha Gangâ Ghât', where a *Math*, or monastery, of his followers is said to have existed. The especial object of their worship is Vishn'u, in his incarnation as *Râmachandra*, and his consort *Sîtâ*, and, as amongst the Râmânujas, these deities either singly or jointly. Some members of this sect also pay adoration to other forms of Vishn'u; and the religious mendicants of the sect consider all form of adoration superfluous, being content with the incessant invocation of Krishn'a and Râma. Their practices are less precise than those of the Râmânujas; but the most important difference between them consists in the fact, that Râmânanda abolished the distinction of caste amongst the religious orders, and taught that a *Vairâgin*, or one who quitted the ties of nature and society, shook off at the same time all personal distinction. The initiatory formula of a Râmânanda is *S'rî Râma*, or 'blessed Râma.' Their sectarian marks are the same as those of the Râmânujas; except that the red perpendicular streak on the forehead is varied in shape and extent, and generally narrower than that of the Râmânujas.

There are various subdivisions of this sect, believed to have been founded by several eminent disciples of Râmânanda. Their doctrines vary often from that of the latter, but they maintain an amicable intercourse with the Râmânujas and with each other. The twelve chief disciples of Râmânanda were *As'ânand*, *Kabîr*, *Raidâs*, *Pipâ*, *Surasurânand*, *Sukhânand*, *Bhavânand*, *Dhavana*, *Sena*. *Mahânand*, *Paramânand*, and *S'rî Anand;* and besides these *Nâbhâji*, the author of the Bhaktamâlâ, *Sûr-Dâs*, *Tulasî-Dâs*, the translator in Hindi of the Râmâyan'a, and the author of many popular works which exercise a considerable influence on the Hindu population, and the poet *Jayaadeva*, the author of the Gîtagovinda. Many legends, of course, are related of these personages, especially in the Bhaktamâlâ, the favorite work of this sect.

3. The *Kabîr Panthis*. The founder of this sect, one of the most interesting and important in Upper and Central India, except, perhaps, in Bengal itself, was Kabîr, the most celebrated of the twelve disciples of Râmânanda, before mentioned, who, therefore, probably lived about the end of the 14th century. The circumstances connected with his birth, life and death are all related as miraculous; and so little is certain about his life, that even the Mussulmans claim him as one of their persuasion. But his great conversancy with the Hindu *S'âstras*, and his limited knowledge of the Mohammedan authorities, render such a supposition highly improbable. According to the doctrine of this sect, there is but one God, the creator of the world; but in opposition to the Vedânta (q. v.), they assert that he has a body formed of the five elements of matter, and a mind endowed with the three *gun'as*, or qualities: he is of ineffable purity and irresistible power, eternal, and free from the defects of human nature, but in other respects does not differ from man. The pure man is his living resemblance; and after death becomes his equal and associate. God and man are therefore not only the same, but both in the same manner everything that exists.

For 72 ages, God was alone; he then felt the desire to renew the world, which desire assumed the shape of a female form; and this form is Mâyâ (q. v.), or illusion, with whom he begot the triad, Brahman, Vishn'u, and S'iva. He then disappeared, and Mâyâ approached her offspring in order to frame the universe. Vishn'u hesitated to associate with her, and is therefore more respected by the Kabîr Panthis than the other two gods of the triad; but the latter were frightened by her, and the result of their submission was the birth of Saraswatî, Lakshmî, and Umâ, whom she wedded to the three deities to produce the world. To understand the falsehood of Mâyâ is, therefore, the chief aim of man; and so long only as he is ignorant of the source of life, he is doomed to Transmigration (q. v.), which, according to the belief of this sect, is also extended to the planetary bodies—a falling star or meteor being a proof, for instance, that it undergoes a fresh change. The moral code of the Kabîr Panthis is, in many respects, creditable to them. Life, they teach, being the gift of God, must not be violated by his creatures. Humanity and truth are two of their cardinal virtues; retirement from the world is deemed desirable, and implicit devotion, in word, act, and thought, to the Guru, or spiritual teacher, a supreme duty. But, as regards the latter point, it is characteristic that the pupil is enjoined first to scrutinize the teacher's doctrine and acts, and to be satisfied that he is the sage he pretends to be, before he resigns himself to his control. It is no part of their faith to worship any deity, or to observe any ceremonies and rites of the Hindus; but they are recommended outwardly to conform to all the usages of tribe and caste, and some even pretend to worship the usual divinities, though this is not considered justifiable. They have no peculiar mode of dress, and though some wear the sectarian marks of the V., and the necklace and rosary, all these outward signs are considered of no importance. Though, therefore, properly speaking, they can scarcely be included amongst the Vaishn'ava sects, yet their paying more respect to Vishn'u than to any other god of the Trimûrti (q. v.), and the fact of Kabîr having been a disciple of Râmânanda, also the friendly intercourse which they maintain with most of the Vaishn'ava sects, cause them always to be looked upon as belonging to them.

The doctrines of Kabîr are taught in a great variety of works in different dialects of Hindi, all of which are the acknowledged compositions of his disciples and successors. The principal are the *Sâkhîs*, 5000 in number, consisting of one stanza each; the *Bîjak*, in 654 sections; and the *Sukh Nidhân*. The sect itself is split into a number of subdivisions, and twelve branches of it are traced to the following personages: *S'rutgopâl Dâs*, the author of the Sukh Nidhân—his successors preside over the Chaura at Benares; *Bhago Dâs*, the author of the Bîjak; *Nârâyan Dâs* and *Churâman' Dâs*, the two sons of a merchant at Jabbalpur; *Jaggo Dâs*, of Kuttack; *Jîvan Dâs; Kamâl*, of Bombay; *Tâk Sâli*, of Baroda; *Jnânî*, of Majjhmî, near Sahâs'râm; *Sâheb Dâs*, of Cuttack; *Nityânand*, and *Kamâl Nâd*, in the Dekhan. The principal establishment of the sect is the Kabîr Chaura at Benares.

4. The *Vallabhâchâryas*, or *Rudra Sampradâyins*. The original teacher of this sect is said to have been *Vishn'u Swâmin;* but it is a later successor of his, *Vallabha Swâmin*, or *Vallabha Acha'rya*, who, from the influence which his teaching and writing exercised on the propagation of his doctrines, must be considered the real founder of this sect. He was born in 1479, in a forest called Champâran'ya, where his parents deserted him on a pilgrimage they had undertaken to Benares. The gods, of course, took care of the infant; and his parents, who recovered him afterwards, took him to Gokula, a village on the left bank of the Jumna, a short distance from Mathura, where he received his first education. In his twelfth year, he left this place, in order to propagate throughout India his tenets, which at that time, it must be understood, he had already framed.

On arriving at a certain town in the south of India, he became acquainted with a person of influence, *Damoradâs*, whom he converted to his doctrine. Both of them then proceeded together to the city of Vijayanagar, where the maternal parents of Vallabha resided. He was now introduced to the court of the king of Vijayanagara, Krishn'adeva, and succeeded so well in his disputation with the S'aivas and Smârta Brâhmans, that not only the king bestowed on him rich presents, but the Vaishn'avas elected him as their chief, with the title of Achârya, or spiritual teacher.

He then traveled to Ujjayin, Allahabad, and Benares, and from there, for nine years, through different parts of India, until, on his return to Brindâvan, as a reward for his exertions and faith, he was honored by a visit from the god *Kr'ishn'a* in person, who enjoined him to introduce his worship, and to found the religion now so widely diffused throughout Western India under the sectarian name of *Rudra Sampradâya*. Vallabha ultimately settled at Benares, and there composed 17 works in Sanscrit, the most important of which are a commentary on the Vedânta (q. v.) and Mimânsâ (q. v.) Sûtras, and one on the Bhâgavata Purân'a; works, however, only intended for the learned, and now very rare. He died on a hill in the vicinity of Benares, in his 53d year, after having made 84 devoted disciples. He was succeeded by his second son, *Vithalnâthji*, who was born in 1516, in the village of Parn'ât, and is known amongst the sect by the designation of S'rî Gosâin Jî, his father Vallabha's sectarian name being S'rî Achârya Jî. Vithalnâthji died in 1583, and left, besides four daughters, seven sons, who were all teachers, and formed as many communities; viz., *Girdharji* (born 1540), *Govinda Rây* (born 1542), *Bâlkr'ishn'aji* (born 1549), *Gokulnâthji* (born 1551). *Ragunâthji* (born 1554), *Jadunâthji* (born 1556), and *Ghanashyamji* (born 1561). It was, however, *Gokulnâthji* who became the most celebrated of the descendants of Vithalnâthji, for to him especially is due the vitality of this sect; and even to the present day the followers of his descendants consider their own Gosâins the only legitimate teachers of their faith, while even the adherents of the other sons of Vithalnâthji pay them the greatest respect.

It is about the period when the sons of Vithalnâthji dispersed that they first acquired the title of *Mahârâj*, or 'great king,' by which the chiefs of this sect are now best known, though besides this proud designation they have other distinctive titles, such as *Vallabha Kula*, *Agni Kula*, *Guru*, &c. The heads of the Gokulnâthji division of this sect are usually called *Gokul Gosâins*, or *Gokulastha Gosâins*. The members of this sect are widely diffused throughout Bombay, Cutch, Kattywar, and Central India, and especially the province of Malwa. Their establishments and temples are numerous throughout India; especially at Mathura, Brindâvan, and Benares. The most celebrated of all is at S'rî Nâth Dwâr, in Ajmeer; and the members themselves belong to the better and wealthier classes of the Hindu community. At present, there are about 60 or 70 'Mahârajas' of this sect dispersed over India; eight or ten of whom reside at Bombay alone, and fifteen or sixteen at Gokul. But so much degenerated are they as a body, that only two or three of them have any knowledge of Sanscrit; the rest, as a distinguished writer on this sect, Mr. Karsandâs Mulji, asserts, being grossly ignorant; for, as Wilson remarks, it is a curious feature in the notions of this sect, that the veneration in which the Gosâins are held, is paid solely to their descent, and unconnected with any idea of their sanctity and learning; and that, though they are not unfrequently destitute of all pretensions to individual respectability, they nevertheless enjoy the unlimited homage of their followers.

The chief authority of the sect is the *Bhâgavata Purân'a* (q. v.), and after it, the works of Vallabha and various books, 74 in number, 39 of which are translations from Sanscrit, and the rest original compositions in the Brijbhâshâ dialect. The object of their adoration is Vishn'u (q. v.), in his incarnation as Kr'ishn'a, whose residence is Goloka, far above the three worlds. There he originally lived alone, but in meditating on the works of creation, created a female form, which became the primary agent in creation: this was Mâyâ. He then produced crude matter, the five elements, and all the divine beings, the gods of the Trimûrti, their female consorts, and 300 millions of Gopîs, or cowherdesses, who are the especial attendants on Kr'ishn'a. The principles of the sect, as laid down by Vallabha, are the following ten—1. To secure the firm support of Vallabhâchârya; 2. To exercise chiefly the worship of Kr'ishn'a; 3. To forsake the sense of Vaidik opinion, and be a suppliant to Kr'ishn'a; 4. To sing praises with feelings of humility; 5. To believe that Vallabha is a Gopî, or mistress of Kr'ishn'a; 6. To swell the heart with the name of Kr'ishn'a; 7. To forsake his commands not for a moment; 8. To put faith in his words and doings; 9. To adopt the society of the good, knowing them divine; and, 10. To see not the faults, but speak the truth. Out of this code, however, grew up the doctrine, that the Guru or Mahârâj is the impersonation of Kr'ishn'a himself, that God and the Guru are necessarily to be worshiped, and that the sectary is bound to bestow on him 'his body, organs of sense, life, heart, and other faculties, and wife, house, family, property, with his own self.' The gross abuse which was made of this tenet became apparent in a very remarkable trial, the so-called Mahârâj Libel Case, which took place in 1861 in the Supreme Court of Bombay, and revealed the licentiousness of one of the then Mahârâjas of the sect at Bombay; the defendant sued for libel by this Mahârâj being a highly respected and distinguished member of the sect, Mr. Karsandâs Mulji, who had had the courage of calling, in a native newspaper, on the Mahârâjas to reform, and to return to the ancient Hindu faith, and whose public conduct on that occasion elicited the highest praise of the court, and, it is to be hoped, initiated a better era of this sect.

The temples of the sect have images of Kr'ishn'a, and Râdhâ, his principal wife; the former representing a chubby boy, of a dark hue, who is richly decorated, and eight times a day receives the homage of his worshipers. The ceremonials which on those occasions take place are the *mangala*, or morning levee, about half an hour after sunrise, when the image is washed and dressed, and presented with refreshments; the *s'ringâra*, when the image, having been anointed and perfumed, holds his public court—this takes place about an hour and a half after the preceding; the *gwâla*, 48 minutes after the last, the image being now visited preparatory to its going out; the *râjabhoga*, held at mid-day, when Kr'ishn'a is supposed to have come home from the pastures and sat down to dine—all sorts of delicacies are then placed before the image, and distributed to the votaries present; the *utthâpana*, three hours before sunset, when the god is summoned to get up from his siesta; the *bhoga*, or afternoon meal, about half an hour later; the *sandhyâ*, about sunset, or the evening toilet of the image; and the *s'ayana*, or retiring to repose, about seven in the evening; the image then being put upon a bed, and refreshments being placed near it, when the votaries retire, and the temple is shut till the ensuing morning. Besides these ceremonies, there are other annual festivals observed by this sect throughout India; of these, the *Rath Yâtra*, or procession of the god in a chair, is the most celebrated in Bengal and Orissa; the most popular at Benares is the *Janmâshtamî*, or the nativity of Kr'ishn'a; and the *Râs Yâtra*, or annual commemoration of the dance of Kr'ishn'a with 16 Gopîs—a very popular festival, at which all kind of rejoicings take place. The mark on the forehead of the Vallabhâchâryas consists of two perpendicular lines meeting in a semicircle at the root of the nose, and having a round spot of red between them. On the breasts and arms, they have the same marks as the Râmânujas, made with a black earth called *S'yâmabandî*, or any black metallic substance; their necklace and rosary are made of the stalk of the Tulasî (holy basil) plant.—For a fuller account of this sect, its authorities, festivals, and worship, and the practices of the Mahârâjas, see the interesting *History of the Sect of Mahârâjas or Vallâbhâchâryas in Western India* (by Karsandâs Mulji—London, 1865), which also contains the history of the 'Mahârâj Libel Case' above referred to.

5. The *Mâdhwâchâryas*, or *Brahma Sampradâyins*. This sect occurs especially in the peninsula, and was founded by a Brahman, *Mâdhwâchârya*, who is looked upon by his followers as an incarnation of Vâyu, the god of wind, after having been incarnate in preceding ages as Hânumat (q. v.) and Bhîma. He was born in the year 1199, and educated in a convent at Anantes'war. In his ninth year, he was initiated into the order of Anchorites by Achyuta Pracha, a descendant of Sanaka, a son of Brahman. At that early age he composed a commentary on the Gîtâ; then traveled to the Himâlaya, and when returned, erected at Udipi the image of Kr'ishn'a, which had been originally made by Arjuna, and miraculously recovered by him. In addition to the principal temple at Udipi, he established eight other temples in Tuluva, below the Ghâts; composed, it is related, 37 works, and on a controversial tour, triumphed over various divines. In his 79th year he went to Badarikâs'rama, where, the legend says, he continues to reside with Vyâsa, the compiler of the Vedas and Purân'as. It seems that he was originally a priest of the S'aiva faith, and one of his names, *Ananda Tirtha*, even indicates that he belonged to the class of Das'namî Gosâins, who were instituted by *S'ankarâchârya* (q. v.). He encouraged, therefore, an attempt to form a kind of compromise between the S'aivas and Vaishn'avas; and in the temples of his sect, images of S'iva are allowed to partake of the worship offered to those of Vishn'u. Votaries of the Mâdhwa Gurus and of S'ankarâchârya Gosâins offer also the reverential obeisance to their teachers mutually, and the latter visit the temple of the former to perform their adoration at the shrine of Kr'ishn'a. The essential dogma of this sect is the identification of Vishn'u with the Supreme Soul, as the pre-existent cause of the universe; and this primeval Vishn'u they affirm to be endowed with real attributes, and although indefinable, to be most excellent and independent. But besides this independent, there is also a dependent, principle; for besides the supreme soul, *Paramâtman*, there is a living soul *Jîvâtman*, which is dependent on the Supreme; and though indissolubly connected with, yet not the same with him. In consequence, they deny the absorption of the human soul into the universal spirit, and the loss of independent existence after death. In this respect, they differ, therefore, on a vital point of doctrine, from the members of other Vaishn'ava and S'aiva sects.

The manner in which they conceive the universe to have issued from the Supreme Being, is to a great extent analogous to that of the other Vaishn'avas; and they also receive the legends of the Vaishn'ava Purân'as relating to the birth of Brahman, from the lotus, which grew out of the navel of Vishn'u, &c. The modes of worshiping Vishn'u they declare to be three; marking the body

with his symbols, especially by means of a hot iron; giving his names to children and objects of interest; and the practice of virtue in word, act, and thought. That in word consists in telling the truth, giving good counsel, mild speaking, and study; that in act comprises liberality, kindness, and protection; and clemency, freedom from envy, and faith, are the practice of virtue in thought. Final liberation, or freedom from future birth, they consider as the reward for having secured the favor of Vishn'u by sedulously worshiping him; and those who have attained it, enjoy felicity in Vishn'u's heaven, under one or all of the four conditions: of being similar to him in form, of remaining in his visible presence or in his proximity, and of sharing equal power with him.

Their worship is not materially different from that of the other V., except in one peculiarity, which proves that they have a friendly leaning towards the S'aiva sect; for the images of S'iva, Durgâ, and Gan'es'a are placed by them in the same shrine as Vishn'u. The Gurus, or superiors, of this sect are Brahmans and ascetics, or profess cœnobitic observances; the disciples live in their *Maths*, or monasteries, and profess also perpetual celibacy. The lay votaries of these teachers are members of every class of society except the lowest. The Gurus adopt the external appearance of ascetics, laying aside the Brahmanical cord, carrying a staff and water-pot, going bareheaded, and wearing a single wrapper of an orange color. The marks common to them and the lay votaries are the symbols of Vishn'u upon shoulders and breast, and the frontal mark, consisting of two perpendicular lines made with the white clay *Gopîchandana*, and joined at the root of the nose, like that of the Râmânujas; but instead of a red line down the center, they make a straight black line with the charcoal from incense offered to Nârâyan'a, terminating in a round mark made with tumeric. The scriptural authorities of this sect are, besides the writings of its founder, the four *Vedas*, the *Mahâbhârata*, the *Panchârâtra*, and the original *Râmâyan'a*.

6. The *Vaishn'avas of Bengal*, the far greater number of worshipers of Vishn'u, in Bengal, form one-fifth, or, according to another estimate, nearly one-third of the population of this province. Their founder, *Chaitanya*, was the son of a Brahman settled at Nadîya, but originally from Silhet. He was born in 1485, and his birth was accompanied by the usual portentous indications, described in Hindu legends, of a superhuman event. He was, in fact, an incarnation of Kr'ishn'a, who appeared for the purpose of instructing mankind in the true mode of worshiping him in this age. Up to his 24th year, Chaitanya seems to have lived without any great pretensions to sanctity; he married, it is said, a daughter of Vallabhâchârya, and supported his mother after the death of his father, which occurred in his childhood. At twenty-four, however, he shook off the obligations of society, and became an ascetic, traveled between Mathurâ and Jagannâth, and taught his doctrine. At the end of his peregrinations, he nominated his two principal disciples, *Adwaitânand* and *Nityânand*, to preside over the V. of Bengal, and *Rûpa* and *Sanâtana* over those of Mathurâ. Chaitanya himself then settled at Cuttack, where he remained twelve years, engaged in teaching and controversy, and in intent meditation on Kr'ishn'a. There he had frequent visions of Kr'ishna, Râdhâ, and the Gopîs, and, in one of these fits of ecstasy, was nearly drowned in the Jumna. Ultimately, he disappeared—how, is not known—about 1527. Of his two chief disciples, *Adwaitânand* resided at S'ântipur, and seems to have been a man of some property and respectability. *Nityânand* was a resident of Nadîya, and a householder, and his descendants are still in existence. Besides these three Prabhus, or chiefs, the V. of Bengal acknowledge six Gosâins as their original teachers, viz., *Rûpa*, *Sanâtan*, *Jîva*, *Raghunâth Bhat't'*, *Raghunâh Dâs*, and *Gopâl Dâs;* and next to them they hold in veneration *S'rînivâs*, *Gadâdhar Pan"dit*, *S'rî Svarûpa*, *Râmânand*, and others, including *Haridâs*, who especially obtained almost equal honor with his master Chaitanya. In addition to these chiefs, the sect claims eight eminent poets, amongst whom *Krishna Dâs* is the most celebrated.

According to the doctrine of the sect, *Kr'ishn'a* is the Supreme Spirit, who, for various purposes, assumed specific shapes, in which he became incarnate (see VISHN'U); and so far there is not much real difference between the tenets of this and other Vaishn'ava sects. But an important innovation introduced by its founder, is the doctrine of *Bhakti*, or faith, which, he teaches, is infinitely more efficacious than abstraction, than knowledge of the divine nature—as enjoined by the philosophical systems—than the subjugation of the passions, than the practice of the Yoga, than charity, virtue, or anything deemed most meritorious. A consequence resulting from this doctrine is, that all castes become by such faith, equally pure, and therefore that all castes are admissible into the sect; that all are at liberty to sink their social differences in the condition of ascetics, in which character they may live with each other without regard to former distinctions, and that all members of the sect are equally entitled to the food which has been previously presented to the deity. The *Bhakti*, or faith, comprehends five stages: quietism, as that of sages; servitude, which every votary takes upon himself; friendship for the deity, such as is felt by Bhîma and others honored with his acquaintance; tender affection for the deity, of the same nature as love of parents for their children; and the highest degree of affection, such passionate attachment as the Gopîs felt for their beloved Kr'ishn'a.

The manner of expressing these feelings in acts of divine worship is about the same as that represented by the ceremonial of the Vallabhâchâryas; but the secular worshipers are generally content with paying their homage twice a day to the idol of Kr'ishn'a. Their chief ritual is a very simple one; it consists of constantly repeating the name of Kr'ishn'a—a practice of which one of their chiefs, Haridâs, set them a remarkable example, as during many years, when he resided in a thicket, he repeated the name of Kr'ishn'a 300,000 times daily. Their other duties are sixty-four, including many moral and many absurd observances, as suppressing anger, avarice, and lust, and singing and dancing in honor of Kr'ishn'a, and fasting every eleventh day.

The most important of all their obligations, however, is their servile veneration of the spiritual teacher, whom they are bound to look upon as the deity himself, and even as possessed of more authority; for they are taught that 'the prayer is manifest in the Guru, and the Guru is Vishn'u himself;' again: 'First, the Guru is to be worshiped, then I (Vishn'u) am to be worshiped;' and, 'When Vishn'u is in anger, the Guru is our protector; but when the Guru is in anger, we have none.' In this respect, the doctrine of the V. of Bengal is similar to that of the Vallabhâchâryas, and their practice also agrees in so far as the V. look upon the dignity of their Gurus as hereditary, and not depending on personal capacity or sanctity; but, as in the case of the Vallabhâchâryas, this practice does not appear to have been enjoined by their original teachers. Liberation from terrestrial existence, most votaries of this sect do not conceive in the spirit of the Vedanta, which teaches that final deliverance is the absorption of the human soul into the divine essence; but, in their opinion, it is twofold, either perpetual residence of the soul in Swarga, or paradise, with possession of the divine attributes of power, &c.; or elevation to *Vaikun't'ha*, the heaven of Vishn'u, where they enjoy felicity under one or all of the four conditions, under which also the Madhwâchâryas conceive such felicity to exist. Chaitanya and his two chief disciples did not leave, as it seems, written compositions; the rest of his pupils, however, wrote numerous works in Sanscrit and Bengali. The V. of this sect are distinguished by two white perpendicular streaks of sandal, or *Gopîchandana*, down the forehead, uniting at the root of the nose, and continuing to near the tip; by the names of *Râdhâ-Kr'ishn'a* stamped on the temples, breast, and arms; by a close necklace of Tulasî stalk of three strings, and a rosary of 108 or sometimes 1000 beads made of the stem of the Tulasî. The sectaries consist of every caste and order, and are governed by the descendants of their Gosâins: some live in a state of celibacy; the teachers, however, are married men.

There are several divisions of this sect, arising from the various forms under which Vishn'u is worshiped; but besides them, there are three which may be looked upon as seceders from the original sect—viz., the *Spasht'a Dâyakas*, the *Kartâ Bhâjas*, and the *Sâhujas*.

The *Spasht'a Dâyakas* deny the divine character and authority of the Guru, and allow the association of male and female cœnobites in one conventional abode, where their relation is that of brothers and sisters, and their common interest the worship of Kr'ishn'a and Chaitanya. The women also act as the spiritual teachers of the females of respectable families, and the consequence is the growing diffusion of the doctrines of this sect in Calcutta, where it is especially established.—The *Kartâ Bhâjas* are of very recent origin, and, as they acknowledge the absolute divinity of the Gurn, there would not be much difference between them and the original body of the V. of Bengal, had they not broken through the old line of hereditary teachers, and invested a new family with spiritual power—viz., that of their founder, *Râma-S'aran-Pâl*, who, at the beginning of this century, was successful in his attempt to create this schism.—Of the *Sâhujas*, very little is known, their professions and practices being kept secret. These are suspected not to be of a very moral character. The chief temples of the V. of Bengal are at Dwarakâ, Brindâvan, Jagannâth, Nadîya, Ambikâ, and Agradwîpa.

Besides these Vaishn'ava sects, there are others of less importance, which it must here suffice merely to enumerate by name—viz., the sect of the *Khâkins*, founded by *Kil*, the disciple of Krishn'adâs, and established chiefly at Hanumángád'hí, in Oude; the *Mâlûk Dâsas*, founded by *Mâlûk Dâs* about 1600, or the end of the Emperor Akbar's reign—their principal establishment is at Kara Manikpur; the *Dâdû Panthis* founded by *Dâdû*, a pupil of one of the Kabîr teachers, about the same time, and established especially in Marwar and Ajmeer; the *Rai Dâsas*, founded by *Rai Dâs*, a disciple of Râmânanda, a sect, it is said, confined to the very lowest of the mixed Hindu castes, or the workers in hides and leather; the *Senâ Panthis*, who derive their origin from *Senâ*,

the barber, the third of Râmânanda's disciples; the *Mirâ Bâis*, a subdivision of the Vallabhâchâryas, established by *Mirâ Bâi*, the daughter of a petty Râjâ of Mertâ, and the wife of the Râṇ'a of Udayapur; the *Sanakâdi Sampradâyins*, or *Nimâvats*, throughout Upper India, founded by an ascetic Nimbâditya; the *Râdhâ Vallabhis*, who consider Harivam's' as their founder, a personage who lived about 300 years ago, and established a monastery at Brindâvan; the *Sakhî Bhâvas*, probably owing their origin to the last-named sect; the *Charan' Dâsas*, whose chief seat is at Delhi, founded by *Charan' Dâs*, a merchant of the Dhûsar tribe, who resided at Delhi, in the reign of the second Alemgìr; the *Haris'-chandis;* the *Sadhnâ Panthis*, founded by *Sadhnâ*, a butcher; and the *Mâdhavis*. founded by *Mâdho*.—For a fuller detail, see H. H. Wilson's *Sketch of the Religious Sects of the Hindus*, edited by Dr. Rost in Wilson's Works, vol. i. (Lond. 1862); and on the Vallabhâchâryas, the *History of the Sect of the Mahârâjas* (by Karsandâs Mulji), mentioned above (Lond. 1865).

VALAIS (Ger. *Wallis*), a frontier canton of Switzerland, bounded on the N. by the cantons of Vaud and Bern, and on the S. by Italy. Area, 2020 sq. miles; pop. (1880) 100,216. It forms one long and deep valley, included between two of the loftiest mountain chains of Europe—the Penine and the Bernese Alps—and is drained by the Upper Rhone, which, rising at its north-eastern extremity, in the glacier of the Gallenstock, falls at the western boundary of the canton into the Lake of Geneva. No European territory is more completely isolated by mountains; and it is rendered still more inaccessible by transverse chains, between which are enclosed narrow valleys. The greater part of the surface consists of barren mountain slopes; in their higher elevations covered with the greatest of the Swiss glaciers. The forests and pasture-lands supply the inhabitants with their chief occupations. But grain-cultivation is not absent; the chief agricultural tract being the level ground, from a quarter of a mile to three miles wide, which lies along the main channel of the river. Here corn enough is grown to supply the wants of the inhabitants. The heat at the bottom of the valley is intense in summer, and Indian corn and the vine are grown with great success. The V. opens into the Lake of Geneva, and is connected by great high-roads, and now by railway, with the other parts of French Switzerland and Savoy. The Grimsel and Gemmi passes connect the eastern part of the valley with German Switzerland; and the Great St. Bernard and Simplon (q. v.) passes connect it with Italy. Formerly, the cattle, the chief export of V., were driven over the Simplon into Italy, but now the railway, which ascends the valley to beyond Sion, on the Simplon road, threatens to divert this trade to Western Switzerland and France. The inhabitants of the Upper V.—one-third of the population—speak German; those of the Lower V., the Vaudois dialect of French. The line which separates the two languages lies along the ridges running north from the Matterhorn to a point a little to the east of Leuk. All the inhabitants are Roman Catholic.

The V. is subdivided into dixaines, each of which has its council, and may be said to form a republic. Each of the dixaines sends four members to a larger council or diet meeting at Sion. The upper part of the V., throughout the middle ages, acknowledged a very slight feudal dependence on the German Empire; the lower part belonged to Savoy. At the period of the struggle of the Swiss with the Duke of Burgundy, the Upper V. took possession of the Lower V., and reduced it to the position of a vassal state; and in this condition it remained until 1798, the period of French conquest, when the distinction was set aside. As stated in the article SWITZERLAND, under the recent constitution, the suffrage was extended to the whole pop. of V., with results little expected by the Liberal party in the Swiss diet. Sion (q. v.) and Martigny (q. v.) are the chief towns.

VALCKENAER, LUDVIG KASPAR, an eminent Dutch philologist, born at Leeuwarden, in 1715, studied at Franeker, and in 1741, became Professor of Greek there. Subsequently, he was called to Leyden, where he died, March 14, 1785. V. was an admirable lecturer and commentator on the classics. To a thorough knowledge of their literature and antiquities, he added a fine critical discernment and thoughtfulness. Among his more notable performances are his recasting of Ursinus's *Virgilius cum Scriptoribus Græcis Collatus* (Leeuwarden, 1747), his editions of the Greek grammarian Ammonius (Leyd. 1739; Leip. 1822), of the *Phœnissæ* (Franek. 1755; Leip. 1824), and the *Hippolytus* (Leyd. 1768; Leip. 1823), his *Diatribe in Euripidis Perditorum Dramatum Reliquias* (Leyd. 1767; Leip. 1824); his edition of the so-called *Epistles of Phalaris* (Gröning. 1777), and of the *Idylls* of Theocritus (Leyd. 1779—1781; new ed., Leip. 1810). He also furnished a rich store of critical observations to Wesseling's Herodotus. Among his posthumous works are his *Callimachi Elegiarum Fragmenta* (Leyd. 1799), his *De Aristobulo Judæo* (Leyd. 1806), and his *Opuscula Philologica, Critica, Oratoria* (2 vols. Leip. 1808).

VA'LDAI HILLS. See NOVGOROD.

VALDEPE'NAS, a town of New Castile, in the modern province of Ciudad Real, and 30 miles east-south-east of the city of that name. It is a straggling mud-built town, situated in a district celebrated for its red wine. Pop. (1877) 13,876.

VALDIVIA, a city and capital of one of the southern provinces of Chili, is close on the parallel of 40° S. lat. It has one of the best harbors on the Pacific coast, and a pop. (1875) of 3872.

VALENCE, a town of France, capital of the dep. of Drome, on a hill on the left bank of the Rhone, 65 miles south of Lyon. The walls with which it is surrounded give it a gloomy appearance. Silk-weaving and silk-throwing are carried on, manufactures of printed and other cottons, and commerce in silk, fruits, wines, liqueurs, and spirits. Pop. (1876) 20,476.

VALE'NCIA, a small island on the south-west coast of Ireland, forms part of the county Kerry, is separated from the mainland by a narrow arm of Valencia Bay, and lies 38 miles west-south-west from Killarney. It is 5½ miles long and 2 miles broad; the soil is in many places good; half the entire area is under cultivation; and there are about 2500 inhabitants. On the west side, which is mainly high rocky moorland, there are valuable slate and flag quarries. On the north side of the island is Valencia Bay, an inlet of Dingle Bay; and Valencia Harbor, the most western in Ireland, is part of the bay of the same name. Here is the telegraphic station for three Atlantic cables, now in operation, which were laid in 1866, 1873, and 1874, besides the cable laid in 1865, but which is not now in operation. Another Atlantic cable starts from Balinskellig Bay, a little to the south of V. See TELEGRAPH, and ATLANTIC TELEGRAPH.

VALE'NCIA, a former kingdom of Spain, now subdivided into the three modern provinces of Valencia, Alicante, and Castellon de la Plana (see SPAIN), comprises a tract of country in the east of Spain, washed by the Mediterranean and bounded on the N. by Catalonia, and on the S. and S.-W. by Murcia.

In the middle districts of the kingdom are small plains, abounding in lagoons where they border on the Mediterranean, but furnished with few harbors; both in the north and south are mountain ridges, offsets from the eastern edge of the great central plateau of Spain. V. is remarkable for its fine climate, and for its fertility in the well-watered districts. The fruitful localities called the *Huertas* (gardens) yield three, and sometimes four harvests in the year. Neither wheat nor barley is largely grown, but the rice-crops are so abundant, that not only is the whole of Spain supplied with this article from V., but a considerable quantity is also exported. The country is rich in iron, lead, copper, cinnabar, cobalt, and coals. The lagoons on the coast, especially that of Albufera, are rich in sea-fowl and fish. The inhabitants, in whom is observable a strong mixture of Moorish blood, are remarkably industrious, and V. is known to be the most actively manufacturing province of Spain after Cataluña.

VALENCIA, an ancient city and seaport of Spain, formerly capital of the kingdom, and now of the province of the same name, stands on the shores of the Mediterranean, 294 miles east-south-east of Madrid by railway. The Huerta—35 English sq. m. in extent—which surrounds the city resembles an immense orchard, and is ingeniously watered by an intricate network of pipes and rivulets, laid down by the Moors eight centuries ago, and efficiently answering its purpose down to the present day. In this garden, the carob, citron, orange, palm, and mulberry grow in wild luxuriance. Nature, stimulated by constant moisture and a burning sun, exhibits a wonderful strength and fecundity. V. is surrounded by old picturesque battlemented walls, erected by Pedro IV. in 1356; the interior of the city is striking and pleasing; most of the streets are macadamized; and while, in the old quarters, the houses are closely packed and gloomy-looking, well suited to keep out the enemy, *heat*—those recently erected are high, gaily-colored in blue, rose, cream-color, &c.; decorated with elegant iron-gilt balconies, and furnished with courts freshened with flowers and cooled by fountains.

V. is the see of an archbishop, and its cathedral, La Seo—the see—which was commenced in 1262, is classical in the interior, and Gothic in the exterior, is 350 feet long, and at the transepts, 216 feet wide. From the top of a tower which surmounts one of the portals, the view is said to be one of the most striking in Spain. In the cathedral and its chapels there are a number of magnificent pictures, including some by Ribalta and Joanes. The Church of the Colegio de Corpus is quite a museum of pictures by Ribalta, who, according to Ford, has painted heads equal to any produced by the old Venetians. There are also numerous and interesting picture-galleries, in the chief of which only the productions of the great Valencian school are to be seen. The custom-house, dating from 1758, is now the Cigar Factory, which employs 3500 women, and produces 120,000 lbs. of tobacco yearly. The university, with a public library of 42,000 vols., is well attended. Silk-spinning and weaving are extensively carried on. There are also extensive

hemp and cloth weaving, and manufactures of hats, glass, linen, leather, and Valencia tiles for flooring. V. was long sunk, like the whole of the country, in a lethargic sleep, but it has, within recent years, awakened to activity. Its port has been improved; it is now connected with Madrid by railway, and being to its own metropolis what Brighton is to London, it is much visited in summer by the *Madrilenos*, who contribute greatly to its prosperity. There is considerable commerce with Britain. Pop. (1877) 143,856.

V., or *Valentia de Cid*, is a very ancient city. It was destroyed by Pompey, and rebuilt by Sertorius, after which it became a *colonia*. It was taken by the Goths in 413 A.D., and by the Moors in 712. The *Cid* took it in 1094—1095, and ruled despotically here till 1099. The union of Ferdinand and Isabella brought it under the Castilian crown. Suchet captured the city in 1810.

VALE'NCIA, a town of South America, Venezuela, in the province of Caracas, 85 miles west-south-west of Caracas, about two miles east of a lake of the same name, and about 20 miles from Puerto Cabello on the coast, with which and with Caracas it carries on an active trade. V. is finely situated in an exceedingly fertile district, in which cattle and horses are raised in great numbers. Population said to be 16,000.

VALENCIENNES, a manufacturing town and fortress of France, in the dep. of Nord, on the Escaut, 155 miles by railway north-north-east of Paris. It is well built, but it does not contain many objects of attraction of any sort. There are many pleasant promenades in the immediate vicinity. A famous kind of lace is made here, as well as fine woven fabrics and gauzes. Salt-making and sugar-refining are carried on, and there is an active trade in timber, wine, and oil. It is the birthplace of Watteau and Froissart. Pop. (1876) 22,686.

VA'LENS, emperor of the East, the brother of Valentinian I. (q. v.), was born near Cibalis in Pannonia, about 328 A.D., and was associated with his brother in imperial authority, receiving as his share of the empire, Asia, Egypt and Thrace, March 28, 364. His sovereignty was, however, disputed by Procopius, a supposed scion of the race of Constantine, who raised his standard in Thrace, was crowned at Constantinople, and for two years maintained his ground with skill and courage, till the defeat of his troops at Thyatira and Nacosia, and his subsequent capture and cruel death, 366 A.D. The first prominent act of V.'s reign was a reduction of 25 per cent. in the taxes, which gained him the general goodwill of his subjects, but was of questionable prudence in the unsettled state of the northern and eastern frontiers.

The prolonged imprisonment of 3000 Ostrogoths, who had been sent to aid Procopius, led to a rupture between V. and the aged hero Hermanric, and to a war which lasted from 367 to 369. The contest was carried on in the country of the Goths, and was throughout in favor of the Romans. Difficulties arose immediately afterwards (370) with the Persians, who were desirous of possessing themselves of Armenia, and though the two powers came frequently into collision, the one as the assailant, and the other as the ally of the Armenian monarch, war was not declared till the end of 372, when the Romans were victorious. V., who had removed to Antioch at the commencement of the war, now occupied himself with the religious quarrels between the Arians and the orthodox party, which at that time raged with much violence over the whole eastern empire. Incapable of independent judgment, he had adopted the views of his Arian councilors, and under their guidance, punished the more obstinate of the 'heretics.' At the same time, a conspiracy, prompted by professors of magical arts, who declared that V.'s successor should be one whose name began with *Theod*, was discovered, its promoters and agents punished with death, as well as a number of persons who were so unfortunate as to possess a name commencing with the unlucky prefix. Affairs on the eastern frontier again assumed a threatening aspect; but the Romans were disinclined any longer to interfere with the designs of the Persians on Armenia, and concluded a somewhat discreditable treaty in 376. In the meantime, events were taking place on the northern frontier which were destined ere long to become of sinister import to the Roman Empire. The Goths, who had for some time been peacefully settled in Dacia, were assailed by the advancing hordes of the Huns; the Ostrogoths, who first felt the shock, were partly incorporated, and the remainder forced to retreat; the Visigoths next attempted to stem the torrent, but without success, and immense crowds of fugitives belonging to this warlike race crowded to the north bank of the Danube.

V. accorded permission to a large body of Goths under Fritigern to cross into Mœsia and Thrace, and take possession of the waste lands in these provinces; the fugitive Ostrogoths soon afterwards crossed the river without permission; and the alarm which the numbers and turbulence of his new subjects speedily aroused, led V. to the adoption of such impolitic measures, that the gratitude of the Goths for shelter afforded was turned to bitter resentment. V., prompted by his servile and flattering advisers, at last resolved on war; and marching against the barbarians, he engaged them near Adrianople, August 9, 378. His army was totally routed, and two-thirds of it, including V. himself and most of his chief officers, left dead on the field.—See Gibbon's *Decline and Fall*, chaps. 25 and 26; and Tillemont's *Historie des Empereurs*, vol. v.

VALENTINE, BASIL, a celebrated German alchemist, of whom so little is known that it has been disputed whether he flourished in the 12th or the 15th century. It has been maintained that he was a monk of the order of St. Benedict, in St. Peter's convent at Erfurt, but his name does not appear on the list at Erfurt, nor on the general list kept at Rome. It seems probable that he flourished about the end of the 15th century. He was a diligent seeker for the philosopher's stone, and wrote a large number of works, chiefly on the process of transmutation, a complete list of which will be seen in Lenglet's *History of the Heremetic Philosophy*, vol. iii. Some of the titles are curious, as *Basil Valentine's Twelve Keys of Philosophy. Apocalypsis Chymica, Revelation of the Mystery of the Essential Colors of the Seven Metals, The Triumphal Car of Antimony. A Chemico-philosophical Tract concerning Things Natural and Præternatural.* &c. After his death, his works were thought to be wholly lost, when they were discovered in the stonework of the abbey, 'Heaven itself conspiring to bring to light these extraordinary works by shattering by a thunderbolt the pillar in which they were concealed,' if we are to believe his followers in the mystic art, who have handed the story down to us. His works were mostly written in the old Upper-Saxon dialect, and were not printed till 1602; after which time many of them were published in the form of French translations, though a few still remain in MS.

VALENTINE'S DAY, the 14th of February, is, or more correctly was, celebrated in England, Scotland, and in different parts of the continent, particularly Lorraine and Maine in France, by a very peculiar and amusing custom. On the eve of St. Valentine, a number of young folk—maids and bachelors—would assemble together, and inscribe upon little billets the names of an equal number of maids and bachelors of their acquaintance, throw the whole into a receptacle of some sort, and then draw them lottery-wise—care, of course, being taken that each should draw one of the opposite sex. The person thus drawn became one's valentine. Of course, besides having got a valentine for one's self, one became, by the universality of the practice, some other person's valentine; but, as Misson, a learned traveler in the early part of last century, remarks, 'the man stuck faster to the valentine that had fallen to him, than to her to whom he had fallen.' These imaginary engagements, as may readily be supposed, often led to real ones; because one necessary consequence of them was, that for a whole year, a bachelor remained bound to the service of his valentine, somewhat after the fashion of a medieval knight of romance to his lady-love. At one period, it was customary for both sexes to make each other presents, but latterly the obligation seems to have been restricted to young men. During the 15th c., this amusement was very popular among the upper classes, and at many European courts. From Pepys's *Diary*, we see that in Charles II.'s reign, married as well as single people could be chosen.

For some time back, the festival—at least in England and Scotland—has ceased to possess the graceful symbolic meaning it used to have, and has become a considerable nuisance. 'The approach of the day is now heralded by the appearance in the printsellers' shop-windows of vast numbers of missives calculated for use on this occasion, each generally consisting of a single sheet of post-paper, on the first page of which is seen some ridiculous-colored caricature of the male or female figure, with a few burlesque verses below. More rarely, the print is of a sentimental kind, such as a view of Hymen's altar, with a pair undergoing initiation into wedded happiness before it, while Cupid flutters above, and hearts transfixed with his darts decorate the corners. Maid-servants and young fellows interchange such epistles with each other on the 14th of February, no doubt conceiving that the joke is amazingly good; and, generally, the newspapers do not fail to record that the London post-men delivered so many hundred thousand more letters on that day than they do in general.—Chambers's *Book of Days*, vol. i. p. 255.

The connection of the custom with St. Valentine is purely accidental. In the legends of the different saints of that name recorded in the *Acta Sanctorum*, no trace of the practice peculiar to the 14th of February is found. It has been suggested by Mr. Douce, in his *Illustrations of Shakspeare*, that the custom may have descended to us from the ancient Romans, who, during the *Lupercalia*, celebrated in the month of February, were wont among other things 'to put the names of young women into a box, from which they were drawn by the men as chance directed;' and that the Christian clergy, finding it difficult or impossible to extirpate this pagan practice, gave it at least a religious aspect, by substituting the names of particular saints for those of the women; and it is, certainly a usage more or less widely extended in the Roman Catholic Church to select, either on St. Valentine's Day

or some other, a patron saint for the year, who is termed a valentine. But it is far more probable that the custom of choosing valentines is a relic of that nature-religion which was undoubtedly the primitive form of religion in North-western Europe—as elsewhere; and that it sprung from a recognition of the peculiarity of the season. Hence, the explanation, that 'about this time of the year the birds choose their mates, and thence probably came the custom of the young men and maidens choosing valentines or special loving friends on that day.' Valentines are now less extensively manufactured than formerly.

VALENTI'NIANS, a Gnostic sect or school (see GNOSTICS), founded by Valentinus, who went from Alexandria to Rome about 140 A.D., and died there, or in Cyprus, about 160. The distinguishing feature of his system lies, in the first place, in his recognizing heathenism as a preparatory stage of Christianity; and then in his dividing the higher spiritual world into 15 pair of æons, each consisting of a male and a female. The first pair, or syzygy, is made up of Bythos, or God in himself, and Ennoia, or God as existing in his own thoughts; from these emanated next Nous (Intelligence) and Aletheia (Truth), and so on. As the last æon, Sophia, transgressed the bounds that had been laid down by the æon Heros, and a part of her being became lost in Chaos, there was formed a crude being, called Achamoth, which, through the Demiurgos that emanated from it, created the corporeal world. Heros now imparted to the souls of men (for all the bodies composing the corporeal world are possessed of souls) a *pneumatic* or spiritual element, but this only attained to full activity when Christ, a collective emanation from all the æons, appeared as Saviour and united himself with the man Jesus. In the end, all that is pneumatic, and even the originally psychic or soul element in as far as it has assimilated itself to the psychic, will return into the Pleroma.

VALENTINIA'NUS, the name of three Roman emperors of the same family; the first and most famous of whom, VALENTINIANUS I., was the son of Gratianus (a rope-maker who had enlisted in the army, and risen to the grade of *comes militum*), and was born at Cibalis, in Pannonia, 321 A.D. V. entered the army at an early age, and, aided by the military renown of his father, rapidly rose in rank under the emperors Constantius and Julian, only, however, to fall more rapidly; for he was degraded by Constantius in 357, and, for his publicly expressed contempt for paganism, banished by Julian in 362. Restored to favor in the following year, he distinguished himself in the East, and on the death of Jovian was unanimously chosen as his successor, February 26, 364. A month after his accession, he chose as his colleague his brother, Valens (q. v.), to whom he resigned the government of the East, reserving for himself Illyricum, Italy, the Gauls, Britain, Spain, and Africa. During V.'s reign, the utmost vigilance was required to preserve the frontier districts of the empire from the ravages of the swarms of barbarians who, like vultures, had gathered round their prey, watching with greedy eagerness the rapid decay of its strength, and ready at the first opportunity to hasten its impending doom. The Alemanni repeatedly (366—368) ravaged the east, and the Saxons (370) the north-east of Gaul; Illyricum was wasted (370) by the Quadi, and Africa by the southern desert tribes; and though these invasions were mostly repelled and revenged in a manner becoming the warriors of the queen of nations, the auxiliary means often had recourse to (e. g., the assassination of two powerful and able opponents, the kings of the Alemanni and Quadi, and the treacherous attack on the Saxons while under the fancied security of a treaty), surely indicated that the sturdy virtue which formerly imbued the soldiers of the empire was rapidly disappearing.

The internal administration was excellent, for the emperor added to his ability, prudence, and firmness of character, the less common imperial qualities of vigilance and impartiality; and his cognizance of any abuse or injustice by whomsoever perpetrated, was the signal for its speedy rectification, and the severe punishment of the offender. Though himself a zealous Catholic, he repelled the solicitations of the bishops who wished him to interfere in the religious disputes of the time, permitted his subjects to adopt whatever religion they chose, and strictly forbade all persecution or annoyance on account of religious belief, even maintaining the 'pontifices' of the provinces in the privileges which they had possessed under Julian. On account of the scandalous abuse by ecclesiastics of their influence over their penitents, he excluded priests and monks from the right of succession to property; judicial proceedings were forbidden to be held in private; the extreme license of speech hitherto allowed to advocates was judiciously restrained; gratuitous medical attendance was provided for the poor of Rome; and schools were established throughout the empire. The success of V.'s administration was doubtless much owing to his fortunate choice of officers: Theodosius the Elder in Africa and Britain, Jovinus in Gaul, and Theodosius the Younger (afterwards emperor) in Illyricum, form a trio distinguished by an unswerving loyalty, administrative ability, and military talent, rarely found in any age; and contrast strongly with their predecessors in office.

V.'s private life was a model of morality and economy; and according to the summation of the accurate and trustworthy Ammianus, 'he had so many good qualities, that if everything had been equal in him, he would have been another Trajan or Marcus Aurelius.' But the one and grievous fault which marred his character was an ungovernable temper, which led him into the occasional commission of excessive cruelties, and ultimately caused his death; for while giving audience to the deputies of the Quadi, with whom he was then at war, he worked himself into such an access of passion as to rupture a blood-vessel in his chest, and fell back dead into the arms of his guards, November 17, 375. By his first wife, he had one son, Gratianus (q. v.); and by the second, Justina, another son, Valentinian, and three daughters, one of whom, Galla, became the wife of the Emperor Theodosius I.—VALENTINIANUS II., the younger son of the preceding, was born 372 A.D., and received from his elder brother, Gratianus (q. v.), the provinces of Italy, Illyricum, and Africa, as his share of the Western Empire. During his long minority, the Empress Justina administered the government; and about three years after her death, V., who had given promise of good administrative qualities, was murdered by the Frank, Arbogastes, the commander-in-chief of his army, May 15, 392.—VALENTINIAN III., the grand-nephew of the preceding, being the son of Constantius III. by Placidia, the daughter of Theodosius the Great and Galla, was born about 419 A.D., and was seated on the throne of the West by Theodosius II., emperor of the East, 425 A.D.

V. was a weak and contemptible prince, nevertheless his reign is one of the most interesting epochs of Roman history, exhibiting, as it does to the full, the internal weakness and corruption of the empire, the gradual closing with it of its irresistible barbarian foes; the sad picture being momentarily lightened from time to time with a flash of the warrior-spirit of old Rome. V. may be said never to have ruled during the 30 years that he sat disesteemed and unhonored on the imperial throne; his mother, Placidia, governed till her death in 450, and was succeeded by the eunuch, Heraclius, one of those malignant fribbles who swarmed around the throne of the falling empire. The regulations enacted for the internal administration were creditable, and especially so when ecclesiastical interests were involved, as in almost all cases, the ambitious and persecuting tendencies of the now preponderant orthodox party, were firmly restrained; while, on the other hand, the fierce vindictiveness of its more bigoted rivals was kept within bounds. But the utter corruption of manners, the complete extinction of 'public spirit,' the oppressive exactions of the tax collectors, and equally of the commissioners who were appointed to prevent these exactions; the general employment of the powers of the executive in the avenging of private quarrels, and the utter impossibility of obtaining redress for injuries, too plainly showed that the empire had fallen far beyond remedy, and that if not destroyed by assailants from without, it would speedily crumble to pieces of itself.

The early part of V.'s reign was disturbed by the contests between the 'comites' Boniface and Aëtius, the former of whom had supported, and the latter resisted V.'s claims to the throne; but notwithstanding this, the vile and groundless calumnies of Aëtius prevailed upon the empress to declare the gallant and upright governor of Africa a public enemy; and the latter, in the first flush of resentment, called to his aid the Vandals under Genseric (q. v.). Thus Africa was lost to the empire. But Aëtius, notwithstanding, proved himself the invincible bulwark of the Roman power in Europe; the Franks, Goths, Burgundians, and other German nations who had encroached on the empire, were successively defeated and repelled, and the destructive career of the formidable Huns brought nigh to a close on the field of Chalons. Yet the labor of defending an extensive empire from attack on all sides was too much for one man; and consequently, much of Spain and Gaul was ultimately seized by the Suevi and Visigoths, the north of Italy was ravaged by the Huns, Sicily and Sardinia by the Vandals, and even Rome repeatedly besieged, while Britain was abandoned to the wild Picts and Scots. Aëtius seems to have committed the same error as his more upright and noble, though not more able predecessor Stilicho (q. v.), in attempting, by the marriage of his son to V.'s daughter, to transfer the imperial dignity to his own family, and like him also, undermined in influence and reputation by the machinations of a eunuch, he was assassinated, though by the sword of his master (454). In the following year, V., who had ravished the wife of his intimate friend Maximus, was conspired against by the friends of the latter, and the faithful adherents of Aëtius, and murdered in the midst of his guards, March 16, 455.

VALE'NZA (*Valentia Valentinum Forum*), a city of Northern Italy, on an elevated plain, on the right bank of the Po, eight miles north of Alessandria. It is very regularly built, and commands a fine view of the surrounding vine-clad hills. It carries

on a trade in wine, and manufactures of silk, flax, and hemp fabrics. Pop. (1871) 8918.

V., a very ancient town, belonged to the Liguri, and was conquered by Marcus Fulvius, the proconsul, who named it *Forum Fulvii, quod Valentinum*. In 1635, it was besieged for 50 days by the armies of France, Savoy, and Parma, and taken. In 1707, it came into the possession of Victor Amadeus II., Duke of Savoy; in 1805, the French destroyed its gates and fortifications; and in 1815, after the fall of Napoleon's empire, it reverted to the king of Sardinia.

VALE'RIAN (*Valeriana*), a genus of plants of the natural order *Valerianaceæ*, an order of exogenous plants, containing nearly 200 known species, natives of temperate climates, chiefly of Europe, the mountainous parts of India, and South America; annual or perennial herbaceous plants with opposite leaves, destitute of stipules, and small flowers in cymes. They are nearly allied to *Dipsacaceæ* (see TEASEL), but differ in the mode of inflorescence, and in the seeds being destitute of albumen. The fruit also is not simply 1-celled, but exhibits two other abortive cells, and the stamens are 1—5, the stigmas 1—3. The corolla is sometimes spurred.—The genus *Valeriana* is distinguished by a pappus-like calyx, a spurless corolla, and three stamens. The species are pretty numerous. The common V. (*V. officinalis*) is abundant in ditches, moist woods, &c., in Britain and throughout Europe. It has a fleshy root, pinnatifid leaves, a stem 2—4 feet high, and pale flesh-colored flowers. The root is a well-known medicine, used both by physicians and as a domestic remedy in spasms, epilepsy, hysteria, and other nervous affections. It possesses powerful antispasmodic properties, and a very considerable influence over the nervous system. Cats are very fond of it, and it exercises a remarkable stimulating and intoxicating power over them. Although the plant grows chiefly in damp soils, the root is most powerfully medicinal in dry hilly ground.



Valeriana officinalis.

The roots should be collected in autumn; and those from wild plants growing on a dry soil are preferred. The chief ingredients of valerian are woody fibre, resinous and gum-like matters, and a little more than 1 per cent. of a volatile oil, which is crystallizable, and has been termed *valerole*, and in which a well-known acid (also obtained from several other sources), *valerianic* or *valeric acid*, is developed on exposure to the air. Valerian imparts its therapeutic properties, which are those of a stimulating antispasmodic agent, both to water and to alcohol. There are three officinal preparations—viz., the *Infusion*, the *Tincture*, and the *Ammoniated Tincture*. In large doses, valerian produces considerable disturbance of the nervous system, as headache, vertigo, and even temporary blindness. In average doses—as, for example, in from one to two ounces of infusion, and from half a drachm to two drachms of either of the tinctures—it is a very efficacious remedy in those severe cases of hysteria which closely simulate epilepsy, and in chorea. As some of the salts of valerianic acid—viz., the valerianates of soda, zinc, ammonia, iron, and quinine—act similarly to and with more certainty than the above-named preparations, we may infer that the therapeutic action of the remedy is solely due to the acid; and as the infusion and tinctures are by no means agreeable medicines, they will probably soon be replaced by the valerianates.

The SMALL MARSH V. (*V. dioica*), also a native of Britain, is much less powerful than the common species.—The greater V. (*V. Phu*), which grows in alpine districts of the continent of Europe, is now almost entirely disused, although it is said to be one of the strongest of the European Valerians, a pre-eminence which *V. Dioscoridis* disputes with it.—*V. Celtica* and *V. Saluinca* are gathered near the limits of perpetual snow on the mountains of Styria and Carinthia, and carried into Turkey and Egypt, and thence into India and Ethiopia, to be used to aromatize baths, and as a substitute for SPIKENARD (q. v.).—*V. Sitchensis*, a native of the north-west of America, is said to possess the medicinal properties of the genus in great perfection. *V. Hardwickii* is used medicinally in Nepaul.—The root of *V. edulis*, a species found in the north-west of America, is an article of food of the Indians.—Corn Salad (q. v.) or Lamb's Lettuce belongs to the order *Valerianaceæ*.

VALERIANE'LLA. See CORN SALAD.

VALERIA'NIC or VALERIC ACID is one of the volatile fatty acids represented by the general formula $HO,C_{2n}H_{2n-1}O_3$, or $C_{2n}H_{2n}O_4$. Its composition is represented by the formula $HO,C_{10}H_9O_3$; and amongst its chief properties it may be noticed that it is a limpid, colorless, oily fluid of a penetrating odor, allied to that of valerian root, and an acrid taste. It renders paper transparent, but the spots disappear on exposure to the air. Its specific gravity is 0·94, it boils at 347°, and may be distilled without change; and its vapor is inflammable. It is only slightly soluble in water, but dissolves in alcohol and ether in all proportions. It exists in and is obtained by distilling valerian root with water acidulated with sulphuric acid. It may be similarly obtained from angelica root, and some other vegetable sources. It is also formed during the oxidation of fats and fatty acids (especially oleic acid), either by nitric acid or mere exposure to the air, by the oxidation and putrefaction of the albuminates, &c.; but the best method of procuring it is by distilling a mixture of amylic alcohol (or fousel oil) with bichromate of potash and sulphuric acid.

The salts of valerianic acid—the valerianates or valerates, as it is now becoming the fashion to call them—are formed either by saturating the base or its carbonate with the free acid, or by double decomposition, their general formula being $MO,C_{10}H_9O_3$, when M is any metal. The alkaline valerianates are very soluble, and are not easily obtained in crystals; but most of the other salts occur in nacreous scales, and all of them, when moist, have the smell and taste of valerian.

The following salts are used in medicine: *Valerianate of soda*, which is included in *Pharm. Br. Valerianate of zinc*, which is also included in *Pharm. Br.*, and occurs in brilliant white pearly tabular crystals, with a feeble odor of valerianic acid and a metallic taste, is scarcely soluble in cold water or in ether, but insoluble in hot water and alcohol. Besides these officinal salts, the valerianates of ammonia, of iron, and of quinia are employed in the same cases as the preparations of valerian, the doses averaging from half a grain to three or four times that amount three times a day in pills, except in the case of the ammonia salt, which is best given in solution. *Valerianate of oxide of amyl* ($C_{10}H_{11}O,C_{10}H_9O_3$) is a volatile fluid with a penetrating odor of apples, boiling at about 360°, slightly soluble in water, but dissolving freely in spirit and in ether. In the form of a dilute spirituous solution, it so strongly resembles apples in its smell, that it is used in perfumery under the title of *oil of apples*.

VALERIA'NUS, P. LICINIUS, Roman emperor, was descended from an ancient and noble family, and after distinguishing himself in the various posts which he was selected to fill by masters who appreciated his talents and virtues, was chosen for his integrity and accomplishments to the office of censor. Faithful in his allegiance to Gallus, he went to summon the legions of Gaul and Germany to aid the feeble emperor against the usurper Æmilianus, but arrived too late to save his master. The usurper's troops, awed by the superior numbers of V.'s army, and the stern sanctity of their leader's character, murdered their own chief, and united with their late antagonists in proclaiming V. emperor, 253 A.D. V. was then about 60 years of age, and feeling his inability to sustain, unaided, the cares of empire, assumed as colleague his eldest son, Gallienus (q. v.).

V. showed abundant proof during his short reign of most ardent zeal for the prosperity of the empire; but the times required a ruler of more energy and ability; as the grave disturbances which arose throughout the empire, the irresistible irruption of the Franks into Gaul, despite the utmost efforts of Aurelian (q. v.), the devastation of Thrace, Macedonia, Greece, and the Archipelago by the Goths, the advance of the Alemanni to Milan, and the conquest of Syria and Armenia by Shapur, amply testified. The troubles in the East appearing most threatening, V. went thither in person, and for some time fortune favored his standard; but pursuing his opponents too rashly, he was suddenly attacked by superior numbers at Edessa, completely defeated, and himself, with the remnant of his army, forced to surrender, 260 A.D. The statements regarding the indignities heaped upon the unfortunate captive by his haughty conqueror, are probably false, or, at least, much exaggerated; but of one thing we are assured, that V. languished till death in hopeless captivity; and after his death, his skin was flayed off, stuffed, preserved as a proud trophy of victory, which was invariably exhibited to the ambassadors from Rome to the Sassanide court.

VALE'TTA, an important fortress and beautiful city, capital of the island of Malta, on the north-east side of which, in lat. 35° 53′, long. 14° 31′, it is situated. It occupies a tongue of land which runs out in a north-east direction, is 3200 yards long, and generally about 1200 yards across, except at the extremity, where it narrows considerably, and forms the famous Point of St. Elmo, on which are a powerful fort and a light-house. From this Point to its landward end, the neck of land, which is well named the 'Hog's Back,' rises gradually; and there is a downward slope

from the central ridge to the Great Harbor on the right, and to the Marsa-Musceit, the quarantine harbor, on the left. Eight principal streets traverse the peninsula, and are intersected by cross-streets, that pass over the central ridge, and afford communication from harbor to harbor.

These cross-streets are necessarily very steep at the extremities, where they rise from the shores by long flights of stairs. The town and harbors are defended by a series of fortifications of great strength. They are mostly hewn out of the solid rock, and, mounted with the most powerful artillery, are considered impregnable. The city is divided into five quarters—the *Citta Nuova*, or Valetta Proper, Floriana, Vittoriosa, Sanglea, and Barmola. Besides the enormous forts, balconies, and battlements, which are the principal architectural characteristics of the city, V. contains many noble edifices. The governor's palace—formerly that of the Grand Masters—is unadorned without, but magnificent within, and possesses an interesting armory; the 'con-' (i. e., joint) cathedral of St. John is a superb structure; and the church of San Pubblio, with its famed *sotteraneo* (vault) of embalmed monks and skeletons; the public library, 60,000 vols.; the university; and the aqueduct, which brings water to the city from the far side of the island, a distance of 8¾ miles, are worthy of notice. The city was founded by the Grand Master Valette—from whom it derives its name—in 1566. V. is the center of the commerce of the island, for which, as well as for the principal historical incidents with which its name is associated, see MALTA. Pop. upwards of 60,000.

VALETTE, JOHN PARISOT DE LA, a Grand Master of the Knights of St. John, celebrated for his gallant defence of Malta against a powerful fleet of the Turks, which must be regarded as mainly instrumental in checking the westward progress of the arms of Solyman the Great, long the terror of Europe and of Christendom. La V. was born of a noble family, in 1494; and at a very early age entered the order of St. John, in which he soon distinguished himself by his enthusiastic bravery and his skill in arms. His chief distinctions, even in youth, were won in the naval service in the Mediterranean, where the Turkish power was especially formidable. On the death of Claude la Sangle, Grand Master of the order, La V. was elected to that office, being the 48th in the list of the grand masters.

Still directing the energies of the order in the same course he succeeded, within the first five years of his Grand-mastership, in capturing 50 great galleys from the Turks, and an immense number of smaller vessels of war; a success which so stirred the indignation of the sultan, that he resolved on the capture of Malta, and the destruction of the Knights. Accordingly, on the 18th May 1565, an immense fleet, of 159 ships, conveying a body of 30,000 janizaries and spahis, appeared off the harbor of Malta, and after failing in several assaults, formally invested the island. Alone and unsupported by any of the Christian powers, the gallant La V. maintained the fortress under circumstances of extreme difficulty and distress of every kind; and when, all further resistance seeming to be hopeless, he was urged to capitulate, his reply was, that the life of a worn-out soldier of 71 years could not be better spent than in such a service. At last, at the end of four months, and after a loss, it is said, of 20,000 men, the Turkish fleet was forced to raise the blockade and withdraw from the island. La V. died three years later, August 21, 1568.—There is another LA VALETTE, a father of the Jesuit Society, who obtained a very different sort of notoriety in the latter half of the 18th century. Having engaged, contrary to the prohibition of Benedict XIV., as a trader in the products of the large estates held by the Jesuits in the Philippine Islands, and being unable, in consequence of the capture of his ships by an English privateer, to meet his engagements, a suit was commenced in the French courts against the French province of the Society, the proceedings in which suit were among the causes which precipitated the expulsion of the Society from France, and its eventual suppression by Clement XIV. See JESUITS.

VALGUARNE'RA, a town of Sicily, in the province of Caltanisetta, 48 miles north-east of Girgenti, in a mountainous district. Pop. about 9500.

VA'LGUS is a term employed in Surgery to designate a variety of Club-foot (q. v.). The corresponding Latin word signifies 'having legs bent outwards, bow-legged,' and is probably derived from *volvo*, 'to turn or twist.' As it is an adjective, the substantive *Talipes* (an unclassical word, indicating 'weakness of the feet,' but in surgical nomenclature signifying 'club-foot') must be regarded as understood.

VALLA, LAURENTIUS, one of the first scholars of the Renaissance, was born at Rome in 1415, taught classics in various places in the north of Italy; but in 1443, on account of his assaults on the scholastic philosophy, and his defence of Epicurus, found it advisable to seek protection at Naples from Alfonso V. Here, however, he soon fell under a suspicion of heresy, and was, it is said, dragged for punishment before the Inquisition. Aided by the king, he made his escape, and fled to Rome, where Pope Nicholas V. pardoned him, received him into favor, and appointed him papal secretary and canon in the church of St. John Lateran. He died 1465. V.'s Latin translations of Herodotus (Par. 1510) and Thucydides (Lyon, 1543) are admirable, and had a great influence in spreading a knowledge of classic history; but the work that brought him most renown was the *Elegantiæ Latini Sermonis* (6 books; Rome, 1471), which long served as a model in style to Latinists. From 1471 to 1536, no fewer than 59 editions of it appeared. It has passages of noble eloquence in praise of the glorious tongue of Rome, through which one discerns a passionate desire for the unity of Italy—that now attained aspiration of Italian scholars and writers. The *Elegantiæ* is, moreover, full of nice grammatical observations, particularly on synonyms. V. has also the credit of being the first of the Renaissance scholars that used his classical culture in the criticism of the New Testament (*Annotationes in Novum Testamentum*, published by Erasmus). In his *De Donatione Constantini Magni*, he demonstrated the historical groundlessness of the pretended 'Donation' of Constantine, and inveighed against the popes for their grasping after temporal power; but this he was forced to retract. A collected edition of V.'s works appeared at Basel in 1543.

VALLABHA AND VALLABHACHARYAS. See under VAISHN'AVAS.

VALLADOLI'D, a famous city of Spain, sometime capital of the whole country, and still capital of the province of the same name (see CASTILE), stands on a wide, wind-blown plain on the left bank of the Pisnerga, 150 miles north-west of Madrid by railway. It is 2100 feet above sea-level, and has a healthy climate, the air being pure and genial, and the sky generally cloudless. Having been the residence of the court prior to its removal to Madrid at the close of the 16th c., the city contains many large and decayed dwellings; although, with the returning prosperity of the town, new mansions are being erected, and the streets are being paved, enlarged, and multiplied. In the Plaza de Campo, the site of famous tournaments, *autos-da-fé*, decapitations, and bull-fights, Napoleon reviewed 35,000 troops. The Plaza de Toros, or bull-arena, can accommodate 10,000 persons. The Museo, which contains such of the statues, carvings, and sculptures as could be collected at the suppression of convents in the province, is an elegant building, containing a grand saloon, six rooms filled with pictures, and three with sculptures. Of these treasures, the sculptures are the most valuable, though among the pictures are several by Rubens. Near the Palacio Real (royal palace) are the remains of two of the noblest Gothic religious edifices in the world, the convent of San Pablo, and the Colegio de San Gregorio, both richly and beautifully decorated, but much damaged by the French soldiery. V. is admirably situated for trade and manufactures. There is abundant water for irrigation, and the surrounding district is remarkably fertile. It communicates with the Atlantic by the Douro, and with the middle and south of Spain by canals and railways. Manufactures are springing up in the city; the soil in the vicinity is being improved by companies instituted for that purpose; and in other respects V. gives tokens of revival. Silk, cotton, and woollen stuffs; jewelry, hats, paper, perfumery, &c., are manufactured. Pop. (1877) 52,206.

V., the *Pincia* of Ptolemy, is first mentioned under its present name in 1072. Charles V. erected many splendid edifices here. About this time V. was the most prosperous city in Spain, containing 100,000 inhabitants. Formerly capital of Castile and Leon, it was still the residence of the kings and the usual resort of foreigners. In 1560, Madrid was declared the only court; and from this time the prosperity of V. declined. Since 1851 it has been the seat of an archbishop, and has still its university.

VALLADOLI'D, a town of Mexico, in the state of Yucatan, 90 miles east-south-east of Merida, stands in the midst of a highly cultivated tract of country. It is the best constructed and the healthiest town in Yucatan, and the seat of cotton manufactures. Pop. 15,000.

VA'LLARY CROWN (Lat. *corona vallaris* or *castrensis*), a crown bestowed by the ancient Romans as an honorary reward on the soldier who first surmounted the out-works, and broke into the enemy's camp. It is in form a circle of gold with palisades attached, as in the above figure. The crown vallary occasionally occurs as a heraldic bearing.



Vallary Crown.

VALLEY, a hollow tract on the earth's surface between hills or mountains. Valleys are generally parallel to the direction of the ridges of elevated ground; but some are transverse, cutting through the mountain-chain. They have a watercourse at or near their lowest level. The main valley is that which has the river of the drainage-system to which it belongs flowing through it, while the tributary streams which feed this river flow through lateral valleys.

The terms upper and lower valley define parts of the same valley, as related to the source or to the mouth of the river which flows through it. In a narrow valley, the river always occupies the lowest part; but in wide valleys, especially in those in which waters run that are largely charged with sediment, the river often builds up a channel for itself, that is higher than the ground at the foot of the hill. The river, in its floods, bears a large amount of mud, which it continues to carry as long as the water is retained within its bed; but whenever it overflows its banks, the velocity is reduced, and the heavier particles, which form the bulk of the sediment, are deposited near the river's course; while flowing over the surface of the level ground, even the finer particles fall to the bottom, until, as it reaches the limits of the valley, the water gradually becomes clearer. The Rhine, the Nile, and indeed almost all great rivers in wide valleys, illustrate this phenomenon. The river seldom flows through the middle of the valley, but is generally nearest to that side where the slope to the high ground is steepest; the opposite side of the main valley presenting a more gradual rise to the mountain summits, supplies the chief lateral valleys and feeding-streams to the river.

The origin of valleys has been a subject of considerable controversy, and this question continues to occupy the attention of geologists. At the time when a universal deluge was used to explain whatever was inexplicable in geology, it was considered to have been the agent which furrowed the earth's surface with valleys; and this opinion was entertained so lately, as to have been advocated by the late Dean Buckland in his *Reliquiæ Diluvianæ*, until Professor Fleming showed the untenableness of these opinions.

At the present day, geologists are very much divided as to the origin of valleys. Some hold that they are the result of the operation of that internal agency which has, at different periods, so broken the crust of the earth, and changed its surface; while others maintain that various agents now operating more or less favorably in disintegrating and removing the solid materials of the exposed portion of the surface of the earth, produced the inequalities that now exist. There can be no doubt that all these have been active, and that the special advocacy of individual agents, as the sole producers of these phenomena, is the source of error, and the cause of controversy. Each and all have done their part; and in a satisfactory explanation, they must all be taken into account. That internal force has been a principal agent in producing the diversity of hill and valley, seems beyond doubt. This force acted by raising the surface perpendicularly from below upwards; by producing great faults, which presented facilities for the action of running water; or by pushing a portion of the crust forward, so as to produce immense folds, alternating with mountain ranges. The Appalachians of North America, and the associated valleys, have been produced, as has been shown by Professor Rogers, by the last-mentioned method; and the Tertiary strata of the Alps were carried up a thousand feet, while the valley-beds of the Adriatic and the Mediterranean either remained stationary or subsided to a lower level. The fact that some valleys are only the synclinal axes between the bounding mountain systems, like the basin of Switzerland between the elevated ridges of the Alps and Jura, also confirms the opinion that some valleys owe their origin to the operations of an internal force, which operated in geologic ages in a more powerful manner than it has been known to do in historical times.

In the face of such facts, it is surprising to hear practical geologists so influenced by pet theories as to assert that the action of internal force has 'no direct effect on the external features of the ground.' But this is the position of men who adhere to the strict Lyellian doctrine, that all the past changes on the earth's surface have been produced by agents now operating, and at the same rate, but through enormously protracted periods of time. But as these agents are various, so we have almost as many theories as there are agents. Lyell insists that ocean-currents, and the wear and tear of the waves, have produced the inequalities. Jukes will have it that the atmosphere has disintegrated, and the rivers carried off the materials which formerly filled up the hollowed-out valley to a level with the surrounding hills; while Ramsay declares that glaciers were the important agents in the process. That any one of these alone has produced the great changes on the surface of the earth, is a position that would be maintained only by those who are blinded by their idol of a favorite hypothesis which they have to defend. But that all of them, in addition to the operation of an internal force, have been agents, more or less, in producing the present conformation of the earth's surface, cannot be doubted. While the advocates of superficial agents so completely ignore the influence of internal force, as in the statement of Professor Jukes quoted, those who maintain the opposite view are equally open to condemnation when they declare that 'the wear and tear due to atmospheric sub-aërial erosive agency never could, even after operating for countless ages, have originated and deepened any of the valleys which occur in flat countries.'—Murchison's Address at British Association, 1865.

VALLISNE'RIA, a genus of small, stemless, aquatic plants, with grass-like leaves, belonging to the natural order *Hydrocharideæ*, and found in the warm parts of both hemispheres. They generally grow in running waters. *V. spiralis* is particularly celebrated on account of its peculiar process of fecundation. At the time when this is to take place, the flowers of the female plants rise to the surface of the water by means of their long spirally-twisted stalks. The flowers of the male plants, in order to follow



Vallisneria spiralis:
a, female plant; *b*, male plant.

them thither, become detached, having previously grown on short spikes at the bottom of the water, and expand, floating about upon the surface. After fecundation, the female flowers return under the water by the spiral contraction of their stalks, and the fruit is ripened under water. This plant is found in ditches and bogs in Italy and the south of France.

VALLOMBRO'SA, a celebrated abbey of Tuscany, situated among the Apennines, in a valley surrounded with forests of fir, beech, and chestnut-trees (hence the name, meaning 'shady valley'). Here an order of monks according to the rule of St. Benedict was founded about the middle of the 11th c., who were called Vallombrosians from the name of the site, or Grey Monks, from the color of their habit, which, however, was afterwards changed to black. They were the first to admit lay brethren. The monastery became very wealthy through donations, and the present magnificent buildings were erected in 1637. It formed a refuge for priests during French rule in Italy. After 1815, the monks resumed possession, but in very diminished numbers. In 1863 the monastery was suppressed, and the buildings were made use of for a royal academy of forestry. The monastery and its highly picturesque environs are still much visited by artists and tourists.

Vallombrosa was visited by Dante, celebrated by Ariosto in the *Orlando Furioso*, canto xxii., and is mentioned by Milton in the *Paradise Lost*.

VALLS, an old-fashioned town of Spain, in the province of Tarragona, in a plain watered by the Francoli, 55 miles west of Barcelona. V. is surrounded by ancient walls, has manufactures of cotton, woollen, silk, leather, and soap. The French, under St. Cyr, defeated the Spanish here in 1809; but were in their turn defeated in 1811. Pop. 13,655.

VALMY, a French village in the dep. of Marne, 20 miles north-east from Chalons. In 1792, the Prussians, under the Duke of Brunswick, after capturing Longwy and Verdun, were advancing towards Paris, driving the army of Dumouriez before them, when Kellermann (q. v.), who commanded the army of the Rhine, learning the critical situation of his comrade, hastened to his relief with 22,000 men, and taking up his position on the heights of Valmy, awaited the advance of the Prussians. These, possessing themselves of the heights of La Lune, immediately opened a vigorous cannonade on the French, to which the latter effectively replied. The explosion of two ammunition-wagons within the French lines having thrown them into disorder, a body of Prussians, taking advantage of the confusion, advanced to the attack; but the energetic conduct of Kellermann, and the enthusiasm infused by him into his troops, restored their steadiness, and by a sudden charge with the bayonet, the Prussians were made to retire to their former position. This battle, or rather skirmish, frequently alluded to as the *cannonade of Valmy*, did not cost either army more than 800 men, but though, in a military point of view, an insignificant affair, it produced moral effects of the greatest importance. It was the first triumph of the republican arms, and with characteristic impulsiveness, the French were transferred from the depths of despair to the very pinnacle of self-confidence. When Napoleon was creating his 'noblesse,' this great service rendered to France by Kellermann was fitly remembered by his nomination as *Duc de Valmy*.

VALOIS, HOUSE OF, a branch of the CAPETIAN dynasty (q. v.), which possessed the throne of France from 1327 to 1589, originated in the person of Charles, second son of King Philippe III. (*le Hardi*), who obtained in 1285 the county of Valois in appanage from his father. Previously, the county of Valois had been possessed by a cadet branch of the great House of Vermandois; but on the union of the heiress of Vermandois with Count Hugh the

Great, the younger son of King Henry I., and the failure of their descendants in the end of the 12th c., the Vermandois possessions, including Valois, were annexed to the French crown, till again separated in 1285, as above mentioned. But Philippe IV., the elder brother of Charles, having left three sons, who reigned in succession, and died without issue male, the succession fell, by the Salic law, to the eldest son of Charles, who accordingly ascended the throne as PHILIPPE VI. (q. v.). The elevation of the House of V. to the throne of France gave rise to long and bloody wars with Edward III. of England, who claimed the crown through his mother, Isabel, the daughter of Philippe IV., insisting that the Salic law only prohibited the 'succession' of females, and did not deny their capacity for transmitting a claim to the crown. But if Edward III.'s argument had been sound, it would have destroyed his rival's claim without benefiting himself, for the real heirs to the throne would have then been the Navarrese royal family, who were descended from the eldest daughter of Louis X. Edward, nevertheless, assumed the title of *King of France*, an example followed by all his successors till George III., and maintained his claims by force of arms till, by the mediation of the pope, a partition of the kingdom was effected.

The French crown fell, by regular succession of son to father, to JOHN THE GOOD (1350—1364), CHARLES V. (1364—1380), CHARLES VI. (1380—1422), CHARLES VII. (1422—1461), LOUIS XI. (1461—1483), and CHARLES VIII. (1483—1498), under the first four of whom the contest with England was carried on with spirit, at first to the advantage of the English, but latterly of the French, who, under Charles VII., succeeded in driving the English from all their strongholds, Calais alone excepted. Charles VIII. having died without leaving male issue, the crown fell to the representative of the nearest collateral male line—that is, to Louis, son of Charles, Duke of Orleans, and grandson of Louis, Duke of Orleans, the younger brother of Charles VI., who ascended the throne as Louis XII. (1498—1515), the first of the Valois-Orleans *régime;* but he also dying without male issue, the succession devolved upon the descendants of his uncle, Count Jean of Angoulême, whose grandson, FRANCIS I. (1515—1547), next obtained the sceptre, which he transmitted to his son, HENRY II. (1547—1559). Henry's three sons, FRANCIS II. (1559—1560) CHARLES IX. (1560—1574) and HENRY III. (1574—1589), occupied the throne in succession; but none of them leaving lawful male heirs, and all the collateral male lines proceeding from Philippe III. having become extinct, the crown passed to the House of Bourbon (q. v.), which was descended from his younger brother, Robert.

The most distinguished cadet branches of the royal line of V. were, the ducal family of Anjou, which long contested with the Aragonese royal family the possession of Naples; the last and most celebrated ducal House of Burgundy; and the illegitimate line of Dunois and Longueville, which was so productive of eminent warriors and daring politicians.

The V. monarchs of the elder line were a succession of able rulers, who, by valor and policy, wrested France from the hands of the English, and firmly established the royal authority over their powerful, proud, and turbulent nobility; those of the younger, or *Valois-Orleans* and *Valois-Orleans-Angoulême* lines were, with the single exception of Francis I., a series of weak princes, under whose feeble rule the country was distracted by contests for power between rival nobles, and religious dissensions among the people at large, though, owing to the number of able men on whom devolved the cares of government, the country suffered less from the incapacity of its monarchs than might have been expected.

VALO'NIA, an article very extensively used by tanners, in consequence of the quantity of tannic acid which it contains. It is the acorn-cup of a species of oak (*Quercus Ægilops*), indigenous to Asiatic Turkey. It is very largely imported into Great Britain from Smyrna and the Greek Isles; as much as 40,000 tons have been received in one year. In 1880, the imports were 33,773 tons; value £520,054.

VALPARAI'SO, the most important trading-town of Chili, South America, is situated in the province and on the bay of the same name, about 90 miles west-north-west of Santiago (q. v.), with which it is connected by railway. It is chiefly built on a narrow strip of land, at the head of the bay. It contains theaters, colleges, hospitals, and a number of scientific and literary institutions; its streets, though narrow, are well paved; and its houses, almost all two stories high, are gaily painted, and furnished with balconies. The picturesque Bay of Valparaiso, which is generally crowded with ships, is sheltered from all quarters except the north; and in the winter months, when northern gales prevail, the anchorage is considered dangerous. In 1822, the town was nearly destroyed by an earthquake; and on several occasions since that time, its progress has been checked by the same cause: in spite of this, however, V. has made great progress within recent years, its population having increased from under 10,000 in 1825, to 97,575 in 1875. Fifteen forts, mostly new, defend the bay.

Nearly 3000 vessels, of about 700,000 tons, enter and clear the port annually; the imports, which value about 17,000,000 dollars, being chiefly cotton, silk, and woollen goods, hardware, iron, sugar, wines, spirits, tobacco, &c.; and the exports, which value 9,000,000 dollars, being chiefly copper, and copper ore, silver, gold, wheat, flour, tallow, hides, and wool. V. was bombarded by the Spanish fleet, March 31, 1866. Few lives were lost, but buildings and other property, the value of which was estimated at from 9,000,000 to 20,000,000 dollars were destroyed.

VALUATIONS OF LAND have been found necessary in order both to regulate liability to taxation, and in feudal times to determine the amount of casualties or occasional profits due by the vassal to the superior. Domesday Book (q. v.) contains the earliest valuation of the lands of England. Valuations were made in succeeding times, when the raising of imposts by subsidies became common, these imposts being apportioned on the people of the realm in respect of their reputed estates. Land was the chief subject of taxation, and was assessed nominally at the rate of 4*s.* per pound. But while land was rapidly increasing in value, the practice grew up of adopting an old valuation, by adhering to which the nominal 4*s.* rate came in course of time to amount to less than 2*d.* per pound. In 1692, it was resolved that a new valuation, correspondent to the existing state of the land, should be made, and a tax levied on all land throughout the realm of 1*s.* per pound, which in time of war was afterwards raised to 4*s.* This impost, called the Land Tax, was made permanent by 38 Geo. III. c. 60, which act also provided the means of enabling it to be redeemed. Though once the most productive of all the resources of the state, the land tax now furnishes a very small fraction of the revenue, and so far as not redeemed, it is still collected on the basis of the valuation of 1692, which has long ceased to be an approximate estimate of the value of land. In the collection of the income tax, the actual value, as annually fixed by commissioners and assessors, is adopted as the criterion.

In Scotland, the contributions levied in the 13th c. seem to have been made with reference to the value of the lands as ascertained, either by some general valuation, or by separate valuations in individual returns. The value as at that period was afterwards known as the *old extent*, or old valuation. In the beginning of the 14th c., land diminished greatly in value in those parts of the country that had been subjected to the ravages of war; and the Scottish parliament, in granting a subsidy to Robert I., of a tenth penny of all the rents of the laity, provided that those lands which had been wasted by the war should be revalued, and that the returns should state both the present value and the former value in time of peace. But in the course of time, as prosperity returned to Scotland, the revaluation, or *new extent*, as it was called, came to be above instead of below the old value; and it became the practice to estimate the new extent by adding a certain proportion of the old valuation, to compensate for the advanced improvement in the country, and the change in the value of money. Under Cromwell, and after the Restoration, in Scotland as well as in England, the mode of taxation adopted was first to name the sum to be raised, and then to distribute it among the counties; and an act of convention of 1667 directed that in apportioning the taxation of each county on the individual landholders, it should be in the power of the commissioners to rectify the old valuations when necessary. The rent established by these valuations is known as the *valued rent*, and continued till 1854 to be adopted for the land tax, and most of the other public and parochial assessments.

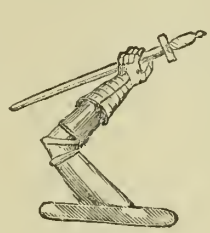
By a statute of that year (17 and 18 Vict. c. 91), the commissioners of supply of every county, and the magistrates of every burgh, are directed to cause a valuation roll to be made up annually, showing the rent or value of the whole lands and heritages within the county or burgh, by which roll all local assessments are in future to be regulated; and provision is made for the appointment of assessors to carry out the act. By 20 and 21 Vict. c. 58, commissioners of supply and burgh magistrates are further empowered to appoint the officers of inland revenue belonging to the county or burgh as assessors; and failing their doing so, the valuations made are not to be conclusive against assessments. The new system of valuation established by these acts is perhaps the most perfect in the world; it possesses the merit of giving universal satisfaction, and is noted for its simplicity.

VALUE, in Political Economy, is one of those terms which demand attention more for the clearing away of its application to vague and fallacious uses, than for an attempt to give it strict scientific definitions. It has a distinct meaning only when it is used as 'value in exchange,' and that between things co-existing in time and place. The measure of such value is the current money of the place. So two articles, each of which will bring £5 in London, are equivalent in value there. Cost has nothing to do with value. If a bale of silk has cost £100, and from disease in

the silk-worm, the price of the commodity rises, so that it will bring £150, that is its value. So also if there be a fall, so that it will only bring £75, that is its value. Vain endeavors have been made to establish a permanent standard of value for the purposes of comparing with each other the conditions of people living at long intervals. The changes which affect one thing affect all others; so that comparisons resolve themselves into the nature of fluxions. Money, so effective in estimating contemporary values, is quite useless here. Some years ago, grain, as the necessary of life, was used as a standard of value. It may be an approximate standard, while a people are so poor as to possess little more than the necessaries of life; but when a country becomes so rich that these are but a proportion of the wealth to be estimated, their capacity as a standard is gone.

VAMBÉRY, ARMINIUS, traveler and philologist, was born in Hungary in 1832. He was compelled to leave his country after the revolution of 1848, and went to Constantinople, where he devoted himself to studying oriental languages. In 1861—1864 he traveled in the disguise of a dervish, by routes unknown to Europeans, through the deserts of the Oxus to Khiva, and thence by Bokhara to Samarkand. His position precluded him from making instrumental observations for the purpose of geography, but was eminently favorable to an insight into the customs and language of the peoples visited. On this account, therefore, his *Travels and Adventures in Central Asia*, published at London in 1864, is a very valuable work. His other publications are *Wanderings and Adventures in Persia* (1867); *Sketches of Central Asia* (1868); *History of Bokhara* (1873); *Central Asia* (1874); *The Origin of the Magyars* (1882). V. is professor of Oriental languages at the university of Pesth.

VA'MBRACED, in Heraldry (Fr. *avant-bras*, forearm), a term applied to an arm clothed in armor, as in the subjoined crest; a dexter arm embowed vambraced proper, the gauntlet holding a sword below the hilt in bend sinister, point downwards, argent, hilt and pommel or.



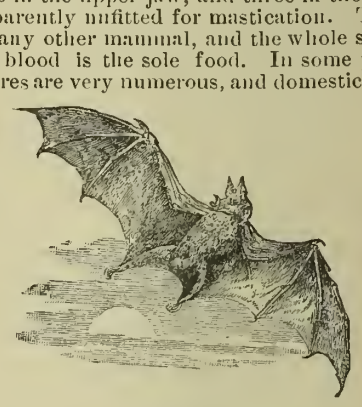
Vambraced.

VA'MPIRE (Ger. *vampyr*), called also by the Servians *Vukodlak*, and by the Wallachians *Murony*, is, according to the popular belief of the Slavonic, Romanic, and Greek population of the Lower Danube and the Thessalian peninsula, a blood-sucking ghost. In the mythology of the ancient Greeks, beings of a similar nature existed —the Lamias, beautiful phantom women, who, by all sorts of voluptuous delusions, allured youths to them in order to feast on their fresh, young, and pure blood and flesh. And among the Greek Christians there is a belief that the bodies of those who have died in excommunication are kept by the devil in a kind of life; that they go forth from their graves by night and suddenly destroy other men, and also by other means procure food, and thus keep themselves in good condition. They are called Burkolakkä, or Tympanitä; and the only way of escaping from their molestation is by digging up their unwashed corpses and burning them, after the removal of the excommunication.

The vampire proper is the illegitimate offspring of parents themselves illegitimate, or the troubled spirit of one killed by a vampire. During the day he lies as a corpse, but turned in his grave, with a florid appearance and warm blood, open staring eyes, and skin, hair, and nails still growing. But by night, especially at full moon, he wanders about in the form of a dog, frog, toad, cat, flea, louse, bug, spider, &c., and sucks the blood from living persons by biting them in the back or neck. If a dead person is under suspicion of being a vampire, his body is disinterred, and if it is found putrid it is only sprinkled with holy water by the priest; but if it is red and bloody, the devil is driven out, and on reinterring it, a stake is driven through the breast, or a nail through the forehead; or it is perhaps burned. The Vukodlaks, who are particularly greedy for the blood of young girls, pair with the Wjeschtitza, a female ghost with wings of fire, which by night sinks down on the breast of the sleeping soldier, presses him in her arms, and inspires him with her fury. As, according to popular belief, every one who is killed by a vampire becomes himself a vampire, an outward sign of the vampire bite usually remains, although not always visible and recognizable by every one; therefore, at the obsequies of every Wallachian, of whatever age or sex, there is always a skilled person, generally a midwife, called in, in order to take precautions against the corpse becoming a vampire. A long nail, for instance, is driven through the skull; it is then rubbed in various places with the lard of a pig killed on St. Ignatius's day, and a stick made of the stem of a wild rose is laid beside it.

Thessaly, Epirus, and the Wallachians of the Pindus know another kind of vampire still—living men who by night leave their shepherd dwellings, and, roving about, bite and tear everything that they meet, men as well as beasts. The Priccolitsch and the Priecolitschone of the Moldavo-Wallachians, who wanders about more frequently than the Murony proper, is likewise a real living man, who, by night, in the form of a dog, roams over heaths, pastures, and villages; and especially kills cattle and sucks their blood, from which cause he always looks healthy and blooming. Such a man is known by his backbone being prolonged in the form of a dog's tail. Thus, the Vukodlak and the Murony would be something analogous to the nightmare of German mythology; and the Priccolitsch, on the other hand, to the Werwolf (q. v.). The *ghouls* of the Arabs and Persians would seem to be identical with the vampires. In 1725 and 1732 exciting rumors about supposed vampires arose in Hungary and Servia, which resulted in the disinterment of numerous corpses, and caused the publication of a multitude of writings in Germany for and against the matter, among which the most important is Ranft's *Treatise on the True Nature of the Hungarian Vampire*, in which an account is given of all the writings which had appeared on the subject (Leip. 1734).

The name V. has been appropriated to blood-sucking bats. It was erroneously given to bats of the south-east of Asia and Malayan Archipelago, which are really frugivorous. The blood-sucking bats are all South American, and belong to the genus *Phyllostoma*, or SPECTRE BAT (q. v.), and genera nearly allied to it. The true vampires (*Desmodus*) resemble the Spectre Bats; they have a small bifid membrane on the nose, no tail, and the inter-femoral membrane little developed. They have two great projecting, approximate upper incisors, and similar lancet-shaped superior canines, all of which are very sharp-pointed, and arranged to make a triple puncture like that of a leech. There are four bilobiate inferior incisors, the innermost separated by a wide interval; the lower canines are small; there are no true molars, but two false molars in the upper-jaw, and three in the lower, of a peculiar form, apparently unfitted for mastication. The intestine is shorter than in any other mammal, and the whole structure seems to indicate that blood is the sole food. In some parts of South America, vampires are very numerous, and domestic animals suffer greatly from their nocturnal attacks. They seem to take advantage of an existing wound, but they can also make one. In some parts of Brazil, the rearing of calves is impossible, on account of these bats, and there are districts, chiefly those in which limestone rocks prevail, with numerous caves, in which cattle cannot be profitably kept. Vampires sometimes attack men, when sleeping in the open air; but the stories of their fanning their victims with their wings, whilst they suck their blood, are fabulous.



Vampire Bat.

VAN, a fortified town of Turkey in Asia, capital of a district of the same name, stands near the south-east shore of Lake Van, 145 miles south-east of Erzerum. It is overlooked by a citadel, now much dilapidated, but which, from its position on a lofty height, might be of importance, and in good repair, and well defended, would be also almost impregnable. Cotton goods are manufactured, and the bazaars are well stored with the produce raised in the vicinity. The streets are narrow, dirty, and ill-paved, but most of the houses are well-built. The principal public buildings, in addition to the citadel, are the mosques, the Armenian churches, the baths, the caravanseras, and the bazaars. V. is always called among the Armenians Schamiramakert—i. e., Town of Semiramis—contains ancient ruins, and cuneal inscriptions are found in which the name Xerxes frequently occurs. Pop. stated at 45,000.—The *district* of VAN, a territory of Turkish Armenia, has sometimes been a separate pashalik, and sometimes a subordinate division. It is bounded on the east by Persia, and on the north by the lately acquired Russian possessions in Armenia. It consists mainly of a lofty basin, surrounded by steep mountains, in the center of which is the Lake of Van. The climate is very hot in the lowlands. The productions are corn, fruit, wine, flax, tobacco, cotton, timber, manna, gall-nuts, and honey. The pasturage being exceedingly good, great numbers of live-stock are reared, and, with the other agricultural products, form the chief exports.—The LAKE OF VAN is a considerable inland sea, eighty miles long and fifty miles in extreme breadth, though the average breadth is not nearly so great. Area, 1200

sq. miles. It is fed by about eight streams, and has no visible outlet. Its waters are salt, and the only fish caught in it are a kind of sardines, which are salted and exported throughout Asia Minor.

VAN, a species of carriage for merchandise, sometimes covered, and in use for carrying household furniture; in other cases, open and of a lighter nature, used by shopkeepers for sending articles to their customers. Whether large or small, or with four or only two wheels, the van is set on springs, and it might be called a spring-cart or wagon. The term van seems to be an abbreviation of caravan, which was formerly in use.

VANA'DIUM (symb. V, equiv. 51·3), a rare metal of little practical importance. The name was first given to a substance then believed to be an elementary metal, but which has since proved to be a compound. The discovery of the substance was ascribed by some to Del Rio in 1801, and by others to Sefström in 1830. The last-named chemist found it in a Swedish iron ore, and gave it the name of V., from *Vanadis*, a cognomen of the Scandinavian goddess Freyja. Roscoe has, however, demonstrated that this substance is really a compound of oxygen with a metal, and to this new metal the symbol V is now appropriated. In the light of Roscoe's discovery, the V of the old formula becomes V_2O_2, and the oxides VO, VO_2, and VO_3, become V_2O_3, V_2O_4, and V_2O_5. In very small quantities, V. is present in nearly all clays, but its most abundant source is vanadiate of lead, which has been found in Mexico, Chili, and at Wanlockhead in Scotland.

VANBRUGH, Sir John, an eminent architect and dramatist of the 18th c., was the grandson of a Protestant refugee of Ghent, who settled in England during the reign of Queen Elizabeth. V. is supposed to have been born in Chester (in which city his father was a merchant), in the year 1666, and to have been sent to France for his education. His artistic studies were interrupted for some time by his entering the French army, which, however, he left after attaining the rank of captain. On returning to England he must soon have acquired reputation as an architect; for, in 1695, he was made one of the commissioners for finishing the palace at Greenwich for the purposes of a hospital. His first attempt at play-writing was *The Relapse*. It was brought out at Drury Lane with such success, and obtained such popularity, that V. ranked ever after as one of the leading wits and dramatists of his day. About 1697, he wrote his famous comedy, *The Provoked Wife*, for Lincoln's Inn Theater, where it was produced with even greater success than that which had attended *The Relapse*. He then, in partnership with Congreve, started a theater in the Haymarket, and there brought out his play, *The Confederacy*. But so ill suited was this building for speaking in, that not even the brilliant wit and racy humor of *The Confederacy* could command an audience, and Congreve abandoning the scheme, the theater had to be closed. In 1702, he erected, for the Earl of Carlisle, the noble palace of Castle Howard, in Yorkshire; and this led to his being employed as the architect of many mansions for the noble and the wealthy in other parts of the country. His reputation was now such that he was commissioned to erect Blenheim House, which the parliament had voted to the Duke of Marlborough; but as no particular fund had been provided for meeting the expenses, and as parliament refused, when applied to, to grant any money for that purpose, the commission was more honorable than lucrative. The queen supplied from her own private purse most of the funds; but after her death, this supply was of course stopped.

The Duke of Marlborough having also died, left a specific fund to be expended in meeting the architect's claims; but the duchess not only refused to pay V. his salary, but dismissed him from his office; and the house was completed under some other management, but from the original designs. After a great deal of trouble, V. managed to get nearly all the money that was due to him; but ever after was the sworn foe of the Duchess of Marlborough. In 1714, he was made Comptroller of Royal Works. V. died at Whitehall on March 20, 1726, leaving his well-known and popular drama, *The Provoked Husband*, unfinished. His plays can hardly be said to be popular now, their licentious tone and loose morality preventing their being read to that extent to which the brilliancy of their wit, keenness of their satire, and genuine character of their humor, would otherwise entitle them. They want the polish of Congreve's dramas, yet, at the same time, they are not infected with the artificiality, stiffness, and labored brilliancy which disfigures so many of Congreve's best scenes. The interest is well sustained throughout; the characters—such as they are—are real, natural, and racy; the situations striking, and the dialogue brilliant and unflagging. The best edition of them is contained in Leigh Hunt's *Comic Dramatists*, to which is also prefixed an excellent Life of Vanbrugh. His architectural works are still amongst the first of their kind—massive, picturesque, varied in outline, and wonderfully skillful in composition, though a frequent carelessness in the management of details spoils some of his best effects.

VANCOU'VER ISLAND, now, jointly with British Columbia, one of the colonies of Great Britain, forms a part of the Dominion of Canada, and is bounded on the W. by the Pacific, and on the E. by Queen Charlotte Sound, Johnstone Strait, Discovery Strait, and Strait of Georgia, which, taken together, form an open seaway, separating the island from British Columbia. Lat. 48° 20′—51° N., long. 123°—128° W. It is 279 miles in length, from 30 to 50 miles in average breadth, and is of importance not only for its great natural resources, but also from its geographical position, which gives it, both commercially and in a military point of view, the command of the Pacific. Area, about 16,000 sq. m. The main mass of the island is a mountain ridge, which rises in its highest peak, Mount Arrowsmith, to the height of 5900 feet, and whose buttress-like walls descend for the most part abruptly to the shore. There are, however, in many coast districts, especially on the south-eastern and eastern sides, undulating tracts, thickly wooded in general, but here and there containing patches of open grass-land. The outline of the island is boldly picturesque. The shores are marked by abrupt rocky cliffs and promontories, by pebbly beaches and sheltered coves, with fine harbors. The western shores are gloomy and frowning in aspect, deeply indented by fiord-like arms of the sea, the banks of which are formed by steep rocks, rising like walls. The surface is diversified by mountain, precipice, hill, dale, and lake, and the whole country is more or less densely wooded, except where the mountain summits afford no foot-hold for plants, or where open grass-lands occur. There are no navigable rivers, and the streams, which are torrents in winter, and are nearly dry in summer, are short, and are valuable only as supplying power for grist and saw mills. Springs are numerous, and the water excellent. The climate closely resembles that of Great Britain, subject, however, to modifications traceable to the position of the island.

The ocean that washes its shores is throughout the whole year of a remarkably low temperature, owing to the arctic currents that sweep down along the coast, even to the lat. of San Francisco; and westerly winds blowing over the chilled sea-water, modify the climate of the island considerably. Again, winds from the south-east, from the snow-covered Olympian Mountains in Washington Territory, are also cold. Owing to these causes, the climate of the island, even so far on as the middle of June, resembles a late English spring—having a clear atmosphere, bright sun, and cold winds. The winter, as a rule, is open and wet; the spring is later and colder than in England, and the summer dryer and hotter. The maximum temperature is about 84° Fahr., the minimum about 22° Fahr. Only a small proportion of the surface is suited for agriculture, four-fifths being little better than barren rock. The crops generally raised are wheat, barley, oats and peas. The green crops are turnips, mangold-wurzel, vetches, potatoes—which flourish here in unsurpassed excellence—and all sorts of vegetables. Of wheat, the average production is 25 to 30 bushels per acre; of oats, 40 bushels; barley, 40 bushels. Fruit-culture is a very profitable branch of industry. Gold has been found; coal is very abundant; and copper, silver, lead, and other ores abound. The puma, the bear, and wolf still range in the forests; two kinds of deer are found; there are two kinds of grouse; and snipe and wild-fowl in great variety. Salmon abound. Extensive banks lie about 32 miles off the south-west shore. All of them are well stocked with fish, especially the cod, herring, haddock, whiting, halibut, and sturgeon. A company has been formed to prosecute the fisheries; and there is an extensive market along the west coast of America. Among the valuable woods of the island, the white fir, or Douglas pine, one of the best woods for spars known, is at once the commonest and most important. In some instances, this tree has been known 'to square' 45 inches *for* 90 *feet*. The cedars have an average diameter of 6 to 7 feet, and one has been measured 14 feet in diameter. Ship-building has sprung up, and is an important branch of industry. The capital of the island is Victoria (q. v.). The pop. (including Victoria) is 6000; together with a large floating pop. of miners, and about 18,000 natives, who, however, are gradually disappearing.

The island was discovered in 1762 by Captain Vancouver, an officer in the British navy. Its possession was secured to Britain by treaty in 1846; previous to 1858, it was held, together with British Columbia, by the Hudson's Bay Company under lease from the crown; later, it was for two years an independent colony; but in 1865, V. I. and British Columbia were united. See Columbia, British. The Canadian Pacific Railway is to fix its ultimate terminus on V. I., which will thus stand in unbroken communication with the Atlantic coast.

VA'NDA, a genus of plants of the natural order *Orchideæ*. *V. cærulea*, one of the most beautiful of Indian orchids, is highly prized by cultivators in Britain, and plants are sold at prices of £3 and upwards. It has panicles of azure flowers. Dr. Hooker found it on the Khasia Mountains, growing in great profusion, epiphytical upon the oak, banyan, &c.

VA'NDALS (Lat. *Vandali*, also *Vindili* and *Vanduli*), a famous race of European barbarians, probably of Germanic, though some consider them of Slavonic origin. Procopius, who agrees with

Pliny in considering them one with the Goths, states that they originally occupied the country about the *Palus Mæotis* (Sea of Azov), but it would appear that afterwards they migrated to the north-west, and settled south of the Baltic, between the rivers Vistula and Viadus (Oder). They make their first appearance, however, as a historic people in the 2d c. A.D., at which time they inhabited the north-eastern slopes of the Riesengebirge (called after them, *Vandalici Montes*), and figure as the associates of the Marcomanni and Quadi in the plundering expeditions into Pannonia, and the wars with Marcus Aurelius. In the latter half of the 3d c., they are found in the Roman province of Dacia, along with Goths and Gepidæ. According to Jornandes, the Gothic king, Geberic, annihilated a large part of the nation on the banks of the Maros. The remainder were transplanted by Constantine to Pannonia, where they lived in peace for 60 years. But at the beginning of the 5th c., urged, it is said, by Stilicho, they abandoned their new homes, and in company with the Suevi, Alani, and other German tribes, led by their king, Godegisil, burst into Gaul, which they miserably wasted for the space of three years. Thence they swept through the passes of the Pyrenees into Spain, which experienced a similar fate; and finally, after much quarreling and fighting with their German associates, they settled in a part of Bætica, which received from them the name of *Vandalitia* (mod. *Andalusia*).

In 429, at the call of Bonifacius, governor of Africa, who, from being the most reliable bulwark which the Western Empire possessed, had been driven into rebellion by the false representations of Aëtius (see VALENTINIANUS III.), they crossed the Strait of Gibraltar, under their leader, Genseric (q. v.), in one resistless horde (numbering 50,000 to 80,000 in all), carrying devastation and ruin from the shores of the Atlantic to the frontiers of Cyrene. They were joined by the Donatists (q. v.), a sect of African heretics, and being themselves Arians, they inflicted great cruelties upon the orthodox Christians. Meantime Boniface had discovered the treachery of his rival Aëtius, and set himself, when too late, to remedy the dreadful consequences of his too credulous resentment. He advanced with a small and hastily-levied force, but was defeated with considerable loss, and driven into Hippo (now *Bona*), which he defended for more than 14 months. During the siege St. Augustine died, August 28, 430. Boniface, reinforced by a Byzantine army under Aspar, now sallied out upon the Vandals, and a second defeat decided the fate of Africa. In 439, Genseric broke the peace which he had concluded with Valentinian III., in 435, and conquered Carthage. A new peace was established, which recognized the authority of the V. over North Africa from the Atlantic to Cyrene, over the Baleric Isles, Sardinia, Corsica, and part of Sicily. In 455, the V. invaded Italy, and plundered Rome for 14 days. The manner in which they mutilated and destroyed the works of art collected in the city, has originated the application of the term *Vandalism* to all similar barbarism. After the death of Genseric (477), his son, Hunneric, cruelly persecuted the Catholics; warred against the Moorish races in North Africa, who were trying to recover their independence, and kept the Mediterranean in a state of alarm by his piracies. His successors, Guntamund (d. 496) and Thrasamund (d. 523), were comparatively mild and tolerant rulers; the latter was even friendly to literature. But the warm climate, and the love of luxurious pleasure, now began to enervate the spirit of the V.; and the natives, in different parts of Africa, showed unmistakably that they had ceased to fear them.

Thrasamund was compelled to solicit aid from his brother-in-law, Theodoric (q. v.), who sent him a Gothic contingent to help him against the Moors of Tripoli. After his death, Hilderic, a son of Hunneric, became ruler, but he showed such strong leanings towards Catholicism (owing to his long residence in Constantinople), that his subjects grew discontented, and he was overthrown by his uncle, Gelimer, in 530. This led to the Emperor Justinian sending an expedition, under Belisarius, against Gelimer, in 533. When the latter heard of the arrival of the great Byzantine general, he caused Hilderic and his sons to be put to death, but was himself soon after forced to seek refuge in the wilds of Numidia. In 534, he surrendered, was carried to Constantinople in triumph, and ended his life in Asia Minor. Most of the V. were drafted into the imperial army, and 'used up' in the wars with Persia. The few who remained in Africa rapidly disappeared among the natives. —See the various histories of the Roman Empire; also Papencordt, *Geschichte der Vandal. Herrschaft in Afrika* (Berl. 1837).

VANDERVELDE, WILLIAM, commonly called the Elder, in distinction from his son of the same name, was born in 1610, at Leyden. He was bred a sailor; and having a natural aptitude for art, he busied himself in drawings of marine subjects. These becoming known, were seen to be of great merit; and in 1666, he was chosen to sail with the fleet of the famous Admiral de Ruyter, with a view to the commemoration on canvas of his exploits against the English. The sketches which he produced of several engagements which he witnessed procured him a great reputation; and in 1675, he was induced to settle in England, as painter of sea-fights to Charles II., who allowed him a pension of £100 a year. On the death of Charles, his services were retained at the same rate by his successor, James II. He died in London, in 1693, and was buried in St. James's churchyard. His works were mostly colorless drawings, of great beauty and precision, many of which were afterwards painted upon in oil by his much more famous son—

VANDERVELDE, WILLIAM, the Younger, who was born at Amsterdam, in 1633. He received his education in art from his father, whom he followed to England. The designs produced by the father, the son was employed to color; and for this service, to him also a pension of £100 a year was assigned. This official and subsidiary employment was, however, the least important part of his activity, his time being mainly devoted to the series of original works which have given him assured rank as one of the greatest of marine painters. In his rendering of the ocean, in its various moods, V. has had few equals; and his works are now highly valued by the connoisseur. The best of them are to be found in England, the Gallery at Bridgewater House being particularly rich in fine specimens. V. lived for the most part with his father at Greenwich; and after his death, in London, where, in 1707, he died.

VAN DIE'MEN'S LAND. See TASMANIA.

VANDYCK. See DYCK.

VANE, SIR HENRY, a notable English politician of the 17th c., was born in 1612. His father, also a Sir Henry, was a distinguished statesman in the reigns of King James I. and Charles I., and received many proofs of the royal favor; but having taken part in the prosecution of Strafford (q. v.), he was deprived of all his offices of honor and emolument. When the parliament rose against the king, V. remained neutral; and some time before the execution of Charles, he withdrew to his seat at Raby Castle, where he died in 1654.—SIR HENRY VANE, the Younger, studied at Westminster and Magdalen Hall, Oxford, where he appears to have embraced, with all the inconsiderate enthusiasm of his character, those republican principles for which he afterwards became so famous. His travels in France and Switzerland strongly confirmed him in his aversion to the government and discipline of the Church of England, and in 1635, he sailed for New England—the refuge of disaffected spirits in those days. He was soon after chosen by the people governor of Massachusetts; but his predilections in favor of 'Antinomian' opinions soon robbed him of his popularity, and in 1636, or thereabouts, he returned home. He now married a daughter of Sir Christopher Wray of Ashby, in Lincolnshire, and entered on a political career.

Through his father's interest, he was appointed treasurer of the navy, along with Sir William Russell, and entered parliament for Kingston-upon-Hull, in 1640, but almost immediately joined Pym and the anti-court party, of which he became one of the most vehement and resolute leaders. When the Civil War broke out, no man was more conspicuous in the military and theological politics of the time than Vane. He carried to the House of Peers the articles of impeachment against Archbishop Laud; he was a member of the Westminster Assembly; a 'great contriver and promoter of the Solemn League and Covenant' (though in his heart he abhorred both it and presbytery, and only used them as a means of crushing the bishops); the chief instrument in carrying the 'self-denying ordinance' (1644); and one of the commissioners at the treaties of Uxbridge (1644—1645) and the Isle of Wight (1648). But he did not view with satisfaction the increasing power of Cromwell and the army. He was too extravagant a parliamentarian, too much of a visionary and enthusiast, to be pleased with the supremacy of the musket and sabre, and for some time he withdrew altogether from public affairs. On the establishment of a Commonwealth, however, in February 1649, V. was appointed one of the Council of State; yet his antipathy to Cromwell, and his factious, pragmatical, hair-splitting activity so much increased, that the former, who looked upon V. as a subtle promoter of divisive courses, called him a 'juggling fellow;' and was probably in deep earnest, when, at the dissolution of the Commons, in April 1653, against which V. protested with a sort of feminine sharpness, he cried out: 'The Lord deliver me from Sir Harry Vane!'

In 1656, V. wrote a book entitled *A Healing Question Propounded and Resolved*, which was so hostile to Cromwell's protectorate, that it was found necessary to imprison the author in Carisbrooke Castle, Isle of Wight. He was released after a detention of four months; and attempts were made by Cromwell to win him over, but V. was inflexible in his fanaticism; and during the rule both of Cromwell and Richard, he maintained an attitude of sullen discontent. After meddling a little in the helpless intrigues that followed the abdication of Richard, he was ordered by parliament to withdraw to his house at Raby. When the Restoration took place, V. was one of the twenty persons excluded from the *Act of General Pardon and Oblivion;* and in July 1660, he was committed to the Tower. On the 2d of June 1662, he was arraigned,

and indicted of high treason before the Middlesex grand jury, found guilty (on the 6th), and on the 14th was beheaded on Tower Hill. His son was knighted by King Charles, and raised to the peerage by King William, as Lord Barnard of Barnard Castle. V. was a subtle, restless, crotchety, unwise kind of man —a real thorn in the flesh of the great Cromwell. He was one of the Fifth Monarchy Sect, and much given to extravagant religious musings, and to praying (with his friends) in language wholly unintelligible. He also wrote several political and theological treatises, which do not require special mention.—See *The Life and Death of Sir Henry Vane, Knight* (London, 1662); Birch's *Lives;* and Ludlow's *Memoirs*.

VANGS, ropes on either side of a gaff, for steadying, or acting as braces to, a fore-and-aft sail.

VANI'LLA, a genus of parasitical *Orchideæ*, natives of tropical parts of America and of Asia; which spring at first from the ground, and climb with twining stems to the height of 20 or 30 feet on trees, sending into them fibrous roots produced from nodes, from which the leaves also grow. These roots, drawing sap from the trees, sustain the plant, even after the principal root has been destroyed. The stem is four-cornered and juicy; the leaves long and fleshy. The flowers are in spikes, and are very large, fleshy, and generally fragrant. The fruit is a pod-like,



Vanilla aromatica.

fleshy capsule, opening along the side. The *Vanilla* of commerce was formerly supposed to be the fruit of *V. aromatica*, a native of tropical America, but is now ascertained to be chiefly, if not wholly, the fruit of *V. planifolia*, a species indigenous to Mexico, Guiana, Brazil, Peru, &c., and cultivated also in some of the West India Islands, the Mauritius, and Ceylon. The fruit is cylindrical, about a span long, and less than half an inch thick. It is gathered before it is fully ripe, dried in the shade, and steeped in a fixed oil, generally that of the cashew nut. It contains within its tough pericarp a soft black pulp, in which many minute black seeds are embedded.

V. appears in commerce in packets of 50—100 pods, wrapped up in cane-leaves and sheet-lead, or in small tin boxes. It has a strong, peculiar, agreeable odor; and a warm, sweetish taste. The interior pulp is the most aromatic part. Benzoic acid is sometimes so abundant in it as to effloresce in fine needles. V. is of little use in medicine, although it is a gentle stimulant and promotes digestion, and in large doses is said to be a powerful aphrodisiac; but it is much used by perfumers, and also for flavoring chocolate, pastry, sweetmeats, ices, and liqueurs. Balsam of Peru is sometimes used as a substitute for it, as it is expensive, and the whole quantity imported into Britain does not exceed four or five cwt. annually. It is in very general use in South America. Several kinds are distinguished in commerce. The best is that called *Leg* or *Lec*, which is almost of a black color, and covered with crystals of benzoic acid. Another kind, less fragrant, drier, and of a darker color, is known as *Simarona*. A still inferior kind, with much broader, brown capsules, is called *Pompona*, or *Bova*. When the fruit of V. is fully ripe, a liquid (*Baume de Vanille*) exudes from it, which is unknown in Europe, but is valued in Peru. V. has ripened its fruit in British hot-houses, but the flowers are apt to fall off without fruit being produced, unless care is taken to secure it by artificial impregnation. This is, in some measure, the case even in the East Indies, and in some parts of America itself; and it is supposed that the presence of some insect, delighting in the flowers of the V., makes it more productive in other parts of America, especially in Mexico.

VANLOO, Jean Baptiste, a member of a family originally Flemish, in which a love of art seemed indigenous, was born at Aix in Provence in 1684. His grandfather and father were both painters of some talent, and under the instruction of the latter whilst yet a mere boy, he is said to have attained considerable proficiency as an artist. Subsequently, he settled himself as such at Nice, and afterwards at Toulon, where he married the daughter of an advocate. On quitting Toulon, on the occasion of its being besieged by the Duke of Savoy in 1707, he returned to his native place, and abode some years there. He was again at Nice in 1712, and in the year following he visited Genoa and Turin. At the latter of these cities, he won the favorable regard of the Prince of Carignano, son-in-law of the Duke of Savoy, and was sent by him to study at Rome as a pupil of Benedetto Luti. After a further residence at Turin, he proceeded in 1719 to Paris, where apartments were assigned him in the hôtel of the prince his patron. Here he speedily acquired a great reputation as a portrait-painter. He was made a member of the Academy in 1731, and Professor of Painting in 1735. The loss of a large sum of money in the Mississippi Scheme induced him to come, in 1738, to London, where his portraits soon distanced all rivalry. His health, however, having given way, he retired in 1742 to his native district, Provence, where he died in April 1746.

Though chiefly eminent in portrait, V. had also considerable talent as a painter of historical subjects, and executed many works of this kind, in some of which a distinct merit is still recognized.

VANLOO, Charles André, younger brother of the preceding, was born in 1705, at Nice. As a boy, he was with his brother at Rome, and studied under Benedetto Luti. He accompanied his brother in 1719 to Paris, where, after some little interval in which he was employed as a decorative artist at the Opera house, he betook himself to portrait-painting. He returned in 1727 to Rome, and there he executed some works which laid the basis of his future reputation, procured him, through the influence of the Cardinal de Polignac, a pension from the king of France, and in 1729, the title of Cavaliere from the pope. On leaving Rome, he visited Turin, painted there for the king of Sardinia a series of subjects from the *Jerusalem delivered* of Tasso, and returned to Paris in 1734. The year following, he was made a member of the Academy, and his subsequent career was one of full prosperity. Tempting offers were made him by Frederick the Great, who desired to have him in his service; but he declined them in favor of a nephew, preferring to remain in Paris. In 1751, he was made by Louis XV. a knight of the order of St. Michael; and in the course of the same year, he became Director of the Academy. In 1762, he was made chief painter to the king; and three years after he died. As the last really great specimens of the old French school of historical painting, his works have still their admirers

VANNES, a seaport town of France, capital of the dep. of Morbihan, stands at the mouth of the Vannes, which falls into a narrow inlet of the Gulf of Morbihan, 310 miles west-south-west of Paris by railway. The town is surrounded by high walls flanked with towers. The cathedral is the most important edifice. Manufactures of linen and woollen cloth and ship-building to some extent are carried on, as well as commerce in honey, wax, wine, and hemp. Pop. (1876) 15,716.

VAN RENSSELAER, Stephen, known as 'the Patroon,' an American statesman, and patron of learning, was born in New York, Nov. 1, 1769, the fifth in descent from Kiliaen Van Rensselaer, the original patroon or proprietor of the Dutch colony of Rensselaerwick, who in 1630, and subsequently, purchased a tract of land near Albany, 48 miles long by 24 wide, extending over three counties. He was educated at Princeton and Harvard Colleges, and married a daughter of General Philip Schuyler, a distinguished officer of the Revolution. Engaging early in politics, at a period when they were the pursuit of men of the highest social position, he was, in 1789, elected to the state legislature; and in 1795, to the state senate, and became lieutenant-governor, president of a state convention, and canal commissioner. Turning his attention to military affairs, he was, at the beginning of the war of 1812, in command of the state militia, and led the assault of Queenstown; but the refusal of a portion of his troops, from constitutional scruples, to cross the Niagara river, enabled the British to repulse the attack, and the general resigned in disgust. As president of the board of canal commissioners for 15 years, he promoted the New York system of internal improvements; as chancellor of the state university, he presided over educational reforms; and as president of the agricultural board, aided to develop the resources of the state. At his own cost, he employed Professors Eaton and Hitchcock to make agricultural surveys, not only of his own vast estates, but of a large part of New York and New England, the results of which he published in 1824; he also paid Professor Eaton to give popular lectures on geology through the state. In 1824, he established at Troy an institution for the education of teachers, with free pupils from every county. Widening the sphere of his political interests, he went to Congress in 1823, and served several terms, exerting a powerful influence, and securing the election of John Quincy Adams as President of the United States. After an active, useful and

honorable career, worthy of his high position, he died at Albany, January 26, 1839.

VAN VEEN, Otho (called also Ottovenius), an eminent painter, was a native of Leyden, of which city his father was a wealthy burgomaster. The exact year of his birth is involved in some obscurity; but there seems tolerable evidence to fix it as about 1556—1557. He received a careful education, and in aid of the natural talent he displayed for drawing, the best masters were procured him. When about 15 years old, he was sent to Liége, whence, after a residence of three years, he proceeded to Rome, where he became a pupil of the celebrated Zucchero. In Italy, he remained about eight years; and on his return home by way of Vienna, the emperor, by tempting offers, vainly endeavored to detain him in his service. It is significant of the estimation in which he had come to be held as an artist, that on his passing through Munich and Cologne, similar offers were pressed upon him. These also, however, he declined, wishing to settle in his native country. Finally, he went to reside at Brussels, as painter to the famous Alexander Farnese, Duke of Parma, and then governor of the Spanish Netherlands, of whom he executed a masterly portrait in armor, which greatly increased his reputation. The duke having died, he established himself at Antwerp, and opened an Academy, at which the great Rubens was one of his pupils. In the matured art of Rubens, traces of his master are still, it is thought, to be detected; and in particular, he is held to have in all probability derived from him that fondness for allegorical and emblematic subjects which possessed him not always to his advantage. On the occasion of the entry into Antwerp of the new governor, the Archduke Albert of Austria, Van Veen was employed to design the arches and the other decorative business of the ceremonial, and so pleased was the duke with the taste and invention displayed, that he appointed him Master of the Mint at Brussels, to which city he returned to reside. An invitation to Paris was subsequently sent him by Louis XIII., but this he saw fit to decline; and in Brussels, at the age of 78, he died.

The chief works of Van Veen are religious pictures for churches. In the cathedrals of Leyden, Antwerp, and Bruges, good specimens may be found. On their own account, they deserve attention; but it is chiefly as 'the work of a man who had the honor to be the master of Rubens' (to quote the words of Reynolds), that they now for the most part receive it.

VA'POR. As all *solids*, with the exception of carbon (an exception most probably due to our not being able to produce a sufficiently high temperature), are melted, or rendered *liquid* by the application of Heat (q. v.), so a further application of heat converts them into *vapor*. A vapor is really a gas, but it requires a little consideration to convince ourselves of the fact. Perhaps the best proof that can be given is that supplied by the beautiful experiments of Faraday (q. v.) and others on the liquefaction of gases. Hydrogen, oxygen, and nitrogen were long exceptions; but now all gases have been liquefied by a proper application of pressure or cold, or of cold and pressure combined. The difference, in common language only, between a vapor and a gas is this: A gas is a substance which at ordinary temperatures and pressures exists in a state of vapor; while a vapor is produced by the application of heat to a substance which is ordinarily found in the solid or liquid form. In other words, gases are the vapors of substances which, in the liquid form, boil at very low temperatures.

The most familiar instance of vapor is aqueous vapor, or Steam (q. v.). At all temperatures, even as low as the freezing-point, ice and water give off vapor; and the quantity produced is determined by the temperature alone: that is, Evaporation (q. v.) at any temperature continues (more or less slowly according to the quantity of air or other gas which is present) until the pressure exerted by the vapor upon the containing vessel attains a certain definite value, depending on the temperature alone. If the temperature be such that the corresponding vapor-pressure is equal to the pressure of the air, vapor comes off freely, and we have the phenomenon called boiling.

Vapor in a vessel which contains some unevaporated water is thus always *saturated*, as it is called, i. e., the full amount of vapor capable of existing at the temperature of the vessel is present. If it be compressed, some is liquefied; if allowed to expand, more vapor is formed.

If, however, there be no water present in the liquid form, and the temperature be gradually raised, the pressure of the vapor will rise, but much more slowly than when water is present, because no more vapor can be formed. In this state, that of *superheated* steam, vapor behaves almost exactly as an ordinary gas.

Chlorine, carbonic acid, sulphurous acid, &c., thus exist at ordinary temperatures as *superheated* vapors; and can therefore be reduced by cold and pressure to the condition of *saturated* vapor, when they are easily liquefied by carrying the process further.

Aqueous vapor may be liquefied by cold alone, or by pressure alone, as we have seen; and at ordinary temperatures, it is easy to liquefy sulphurous acid, ammonia, and even carbonic acid and laughing gas, by mere compression. Gases absorbed by charcoal, or by spongy platinum, i. e., condensed by intense molecular forces on the large surface presented by the interstices in these bodies, must in all probability exist in the state of liquids. Carbonic acid is liquefied when exposed to a pressure of 35 atmospheres at ordinary temperatures; and some varieties of charcoal absorb from 80 to 100 times their bulk of this gas. Remembering that, on account of the impenetrability of matter, the gas can only be in the *pores* of the charcoal, and that their whole bulk forms but a small fraction of that of the charcoal itself, we see that in all probability the absorbed gas must be condensed so enormously as to have become liquid. It is probable that in Graham's recent process, for separating by dialysis (see Osmose) the oxygen and nitrogen of the atmosphere, the film of vulcanized india-rubber which is employed as septum compels these gases to pass through its pores in a liquid form.

Some extraordinary experiments, due to Cagniard de la Tour (the inventor of the Sirene, q. v.), have given us valuable information on the subject of vapors. He showed that when water, ether, and other liquids are hermetically sealed in glass tubes, so as to fill from a quarter to a half of the tube, the application of the requisite amount of heat is sufficient to convert the whole into vapor. This vapor, therefore, has a density equal to half or quarter of that of the liquid! Ordinary steam from boiling water has only about $1\frac{1}{1000}$th of the density of water (in common language, a cubic inch of water gives a cubic foot of steam). These experiments are very dangerous.

Some important experiments of this nature are due to Andrews. Having, by mere pressure, partially liquefied carbonic acid in a glass tube, he raised the temperature gradually, and observed that the demarcation between the liquid and the gas became less and less definite; the capillary curvature of the surface of the liquid also diminishing. At about 88° F., the liquid surface became horizontal, and the liquid disappeared. The tube then appeared to be filled with a homogeneous substance, neither gaseous nor liquid; apparently a new state of matter. When the temperature was slightly diminished, or the pressure relaxed, there was a singular appearance of flickering striæ, such as one sees on mixing alcohol and water, or on looking through the column of irregularly heated air rising from a hot body. No pressure that Andrews could apply, not even 400 atmospheres, could liquefy this gas when its temperature was above 88° F. It appears that for every gas there is a point of temperature above which it is impossible by any amount of pressure to liquefy it.

The so-called permanent gases, oxygen, hydrogen, and nitrogen, have at last yielded to the patience and skill of M. Pictet of Geneva and M. Cailletet of Paris, and have been liquefied or even solidified. In the last months of 1877 oxygen was liquefied under a pressure of 500 atmospheres; hydrogen, when subjected to a pressure of 280 atmospheres; and nitrogen, under a pressure of 200 atmospheres.

VAR, a department in the extreme south-east of France, bounded on the S. and S.E. by the Mediterranean, and on the N.E. by the department of Alpes Maritimes. See Alpes Maritimes. Area 2348 sq. m.; pop. (1881) 285,547. The dep. receives its name from the river Var, which formerly served as its boundary on the east, but which, since the arrondissement of Grasse was taken from the dep. of Var, and added to that of the Alpes Maritimes, now belongs entirely to the latter. Var is well watered by a great number of streams, of which the chief are the Gapau, Argens, and Bianson. In the north and north-east, it is mountainous, being traversed by a branch of the *Alpes de Provence*, called the Monts de l'Esterel. Between the mountains and the watercourses are many very fertile valleys. The climate of Var, tempered by the altitude of the surface, is pleasant. Fruits of all kinds are here cultivated with remarkable success; tobacco is grown, and 17,600,000 gallons of wine are produced annually. The dep. abounds in minerals; an active commerce is carried on, the exports being chiefly wine, fruits, olive oil, and other agricultural and horticultural products. It is divided into the three arrondissements of Draguignan, Brignoles, and Toulon. Capital, Draguignan.

VARA'NGIANS (Ger. *Waräger*, or *Wäringer*), a Norman people of the Baltic coast, who greatly damaged by their piracies the commerce of the republic of Novgorod, and subjugated repeatedly the Slavic and Finnish peoples of Northern and Central Russia. They forced the Krivitches, Tschudes, and other tribes to pay tribute, and wrested from the Russians the districts now known as Revel, Petersburg, and Archangel; the Russians retreating into Finland and Karelia. Gradually the two nations became intermixed, and towards the 9th c., the names Russian and Varangian appear to have been considered synonymous. In 862, the rulers of this Russo-Varangian nation, Rurik (q. v.), Sineous, and Truvor, were invited by the federative state of Novgorod, in which the Slaves were dominant, to put themselves at its head, and

Rurik accepting the invitation, founded the Russian monarchy. See RUSSIA. The V. were at first distinguishable in various ways above the other peoples of the Novgorod state; but being far inferior in number, were soon forced to adopt the Slavic tongue, conform to Slavic manners, and so become merged in the predominant population. The great success which attended this experiment of the Novgorod confederacy, induced other Slavic states which were located on the Dnieper to put themselves under the protection of the warlike V.; and accordingly we find, soon after 862, a second Slavic state at Kiev, under the rule of Oskold, a Varangian chief, and the conqueror of the barbarous Chazars. After Rurik's death, his successor in power, the Regent Oleg, united Kiev to Novgorod, making Kiev the capital—a position it held till supplanted by Moscow (q. v.).

VARA'NIDÆ, a family of saurian reptiles, having a very elongated body, without a dorsal crest; strong legs, and long unequal toes; the tail long and slightly compressed; the scales tuberculous, and arranged in rings; the tongue protractile, dividing into two points as in serpents. Some of them are aquatic, and some inhabit dry and sandy places. The terrestrial species have the tail conical; the aquatic species have it compressed and often crested, so that it becomes a powerful organ of locomotion in water. The motion of the terrestrial species is aided by the tail, and is always serpentine. Some of the V. attain a large size. They feed on animal food of any kind, and have been seen to attack a young deer swimming across a river. The species are not numerous, and belong chiefly to the eastern hemisphere.

VARA'ZZÉ, a small town of Northern Italy, on the Gulf, and 18 miles south-west of the city, of Genoa. Some trade in wood and extensive construction of fishing-boats are here carried on. Pop. of town, 5000.

VA'REC, an old name for crude carbonate of soda.

VARE'SÉ, a town of Northern Italy, in the province of Como, and 13 miles west of the town of that name. It is a handsome town; contains a number of fine palaces and magnificent villas; and carries on manufactures of silk, cotton, paper, and hats. Pop. 12,600. V. is of very ancient origin. The Romans kept it strongly garrisoned as a stronghold against invasion from the north.

VARIA'TION in Music, a transformation of a melody by melodic, harmonic, contrapuntal, and rhythmic changes. The subject chosen is called the theme; it is first simply harmonized with or without an introduction, and then repeated in a variety of different transformations, and the variations collectively with the theme constitute the piece. Occasionally, the different variations are combined by an intermediate passage; but generally each has its separate close, and the whole terminates with an extended and richly-developed variation, or a coda.

VARIATION OF THE COMPASS. See TERRESTRIAL MAGNETISM.

VARICE'LLA (Lat., a little pimple), popularly known as CHICKEN-POX (q. v.).

VARICOCE'LE (known also as CIRCOCELE) is a term used in Surgery to designate a varicose state of the veins of the spermatic cord. It is caused by the same conditions which give rise to Varicose Veins (q. v.) elsewhere—viz., weakness of structure, combined with obstruction through corpulence, costipation, &c., to the return of the venous blood. For a description of its symptoms, and of the suitable treatment, we must refer to any ordinary text-book of Surgery.

VA'RICOSE VEINS. When a vein becomes dilated at a certain part of its course, for no apparent physiological object, such as relieving the venous circulation elsewhere (as, for example, in the case of the superficial abdominal veins enlarging in order to relieve a compressed vena cava), it is said to be varicose, the actual dilatation being called a *varix* (a word used in this sense by Cicero and Celsus). Some veins seem to be unaffected by varices, which, however, are of common occurrence in the sub-mucous veins of the rectum (constituting hæmorrhoids or piles), in the spermatic veins, giving rise to Varicocele (q. v.), and in the veins of the lower extremities. They are occasionally (but very rarely) found in other veins. Certain conditions of the system favor the formation of varices, amongst which may be noticed an indolent temperament, and a debilitated condition of the general system, accompanied by a relaxed state of the walls of the veins; and possibly also a congenital predisposition or hereditary tendency. Persons with such a pre-disposition are more likely to suffer from this affection if their occupation is one which involves much standing or walking; and cooks, washer-women, and foot-soldiers have been selected as specially prone to varicose veins.

Varices may occur at almost any period of life, but are chiefly developed during middle age. Their formation is aided by any condition of the system which impedes the circulation, as certain diseases of the heart, lungs, and liver; and by continued *high living*, which is especially liable to induce hæmorrhoids. From the researches of Andral, it appears that in varicose veins the coats of the dilated vessels may become thickened or may become thin; that they may be lengthened so that the veins become tortuous; and that the dilatation may be unequal, giving rise to the formation of pouches; and that, in consequence of the enlarged caliber of the vessels, the veins only act imperfectly, and gradually undergo degeneration. Varices occurring in the leg, to which our remaining observations apply, commonly give rise to deep-seated aching pain in the limb, with a sense of weight, fulness, and numbness, before there is any external appearance of the affection. In a more advanced stage, the ankles swell in the evening, and the feet are always cold. After a time, a small tumor of a bluish tint appears, which disappears on pressure, but returns on the removal of the pressure, and is caused by a dilating vein. This dilatation extends, and forms knotty, irregular tumors, soft to the touch, diminishing on pressure, or on the patient's assuming a horizontal posture, and giving a bluish tint to the adjacent skin. These tumors commonly occur in the middle of the leg, along the track of the saphena veins, but they often extend along the whole of the leg and thigh. With regard to treatment, it may be mentioned that old varices cannot be cured, except by operations dangerous to life, although much may be done for their relief. In their earlier stages, they are, however, more amenable to treatment.

As the disease is a very common one, we shall enter somewhat in detail into the palliative treatment which any one may adopt for himself. The venous circulation of the limb should be as much as possible facilitated by the disuse of garters; by keeping the limb (if the means and condition of the patient permit it) in a horizontal position for a month or six weeks; by prohibiting walking, and allowing only carriage-exercise, with the leg elevated to the horizontal position. The limb should also be carefully bandaged from the toes to above the knee, the bandage being replaced daily, and the limb then well rubbed with the hand, or with a flesh-brush, for ten minutes or more, from below upwards, so as to stimulate the circulation. When the circumstances of the patient hinder this treatment, elastic stockings may be tried during the day, or ordinary bandages, with a pad of lint placed on each varicose cluster before the bandage is applied. In cases where only one or two trunks are affected, the disease may be prevented from extending by the application of pieces of wash-leather spread with soap-plaster firmly over them. At the same time the general health must be attended to. Ill-nourished, feeble patients must be treated by tonics and nourishing diet; while over-fed, plethoric patients require mild but often repeated purgatives to relieve the portal circulation. In the numerous cases in which there is a relaxed condition of the veins, the tincture of sesquichloride of iron may usually be given with advantage in half-drachm doses thrice daily in half a tumbler of water, with a colocynth pill every second night, to obviate the constipating action of the iron.

Amongst the means of effecting a *radical cure*, by causing coagulation of the blood in the dilated veins, when they shrink and contract permanently, are (1) caustic potash applied over the course of the vessel, (2) subcutaneous incision of its walls, and (3) compression of the vessel between a steel pin and a twisted suture. We believe that the cases are rare in which the pain of the varix is so great as to disqualify a patient from his ordinary work, and these are the only ones in which any of these operations should be recommended; 'and the patient,' says Mr. Callender, 'if wise, will be contented with the palliative measures of a more simple character.'—Holmes's *System of Surgery*, vol. iii. p. 321. Amongst the troublesome consequences of varicose veins are the obstinate ulcers, known as varicose ulcers, to which they give rise; and it must be borne in mind that occasionally, when the skin gets thinned by prolonged pressure, the varices burst through it, and give rise to hæmorrhage, which, if not promptly stopped, may cause fainting, and even death. When such an accident occurs, the patient should at once be placed in a horizontal position, and the leg raised, in which case the bleeding will probably cease. If it continue, a pad of lint must be pressed upon the mouth of the bleeding vessel by means of a few turns of a bandage round the limb.

VARI'ETY, in Natural History, a term employed to designate groups subordinate to Species (q. v.). Varieties are regarded as less permanent than species; and those who regard species as perfectly distinct in their origin, look upon varieties as modifications of them due to particular causes. Of course those who adopt Darwin's view of species do not deem the distinction between species and varieties so important, but rather consider varieties as species in process of formation. However this may be, all naturalists acknowledge a difficulty of deciding what are varieties and what are species; and some reckon as varieties what others regard as distinct species. The whole subject is involved in difficulty, and must be studied both with respect to general principles, and to the

peculiarities of particular gases. Whatever theory may be adopted, many of the groups now distinguished by particular names are doubtful, and their designations must be regarded as merely provisional. It cannot be certainly said whether they are varieties or species.

The term *Variation* has been employed by some authors to designate forms less permanent than varieties, but the term has not obtained general acceptance.

VARI'NAS, a town of Venezuela, on the San Domingo, 90 miles south-east of the nearest shore of Lake Maracaybo. It stands at the entrance to a valley covered with tobacco-plantations. V. carries on a trade in tropical productions and in cattle. Pop. stated at 5000.

VARI'OLA. See SMALLPOX.

VA'RIX. See VARICOSE VEINS.

VA'RNA, an important seaport of the principality of Bulgaria, on the northern side of a semicircular bay, an inlet of the Black Sea, 180 miles north-north-west of Constantinople. The Congress of Berlin in 1878 decided that the strong fortifications by which the port was formerly defended should be destroyed. V. stands on a sandbank, and the city wall, the base of which in some places is 20 or 30 feet above sea-level, is in other places on a level with high-water. The town itself is crooked, irregular, dirty, and dilapidated, and as viewed from the sea, it presents a huge jumble of red-tiled houses, interspersed here and there with mosques and minarets. Pop. 26,000. The allied French and British troops were here encamped for some time in 1854. Though the harbor of V. is exposed, a considerable trade is carried on, the value of the year's imports amounting to about £450,000, and of the exports to about £540,000.

VA'RNISH is a solution of some resinous material in any proper solvent, alcohol and oils being the ones chiefly employed. The solution must be of such consistency as to enable it to be very thinly and smoothly spread over the surface intended to be varnished, so that when it dries, it leaves a thin resinous coating, which is either naturally glossy, or can be made so by mechanical polishing. From the extremely inflammable nature of the material employed, the preparation of varnish is extremely dangerous, and should not be attempted except in premises specially adapted for the purpose, and with skilled workmen. The resinous gums, such as copal, anime, and mastic, and the various kinds of lac, are those chiefly used; the copals and anime are employed in making the oil-varnishes, and the lacs and gum-mastic for spirit-varnishes. Heat is required with both kinds of solvents, and it is obtained by hot-water baths as a means of safety. Coloring matters are added to some varnishes, especially to those used on metal, as the lacquer varnish used to protect the polished surface of brass, which is colored with gamboge and turmeric. Saffron, aloes, dragon's-blood, and asphalt are also used to give yellow, brown, red, and black colors.

VARNISH TREE, a name given to several trees of the family *Anacardiaceæ*, the resinous juice of which is used for varnishing or for lacquering. The BLACK V. T. (*Melanorrhœa usitata*) is described in the article MELANORRHŒA; the JAPAN V. T. (*Rhus vernicifera*) in the article SUMACH. Another tree valuable for the varnish which it yields, is *Stagmaria verniciflua*, a native of Java, Sumatra, Borneo, Celebes, and other East India islands. The juice is extremely acrid, and soon hardens into a black resin. To obtain it, pieces of bamboo are inserted into the bark and allowed to remain all night, as the juice flows more freely by night than by day. It sells at a high price. It is prepared for use by boiling it with equal parts of oil, obtained from the fruit of the *Mimusops elengi*. The exhalations of the tree are said to be very noxious.

VA'RRO, 'the most learned of the Romans,' so called from his vast erudition in almost every department of literature, was born 116 B.C., and educated first under L. Ælius Stilo Præconinus, and then under Antiochus, a philosopher of the Academy. V. served with distinction in the wars against the Mediterranean pirates and Mithridates; but afterwards as legatus of Pompey in Spain, he was compelled to surrender his forces to Cæsar. He continued to share the fortunes of the Pompeian party till its defeat at Pharsalia, after which he solicited and obtained his pardon from Cæsar, by whom he was employed to collect and arrange the great library designed for the public. The next period in V.'s life was spent in literary retirement, chiefly at his villas near Cumæ and Tusculum. When the 2d triumvirate was formed, his name was enrolled in the list of the proscribed; but he succeeded in escaping, and, after some time spent in concealment, he was received under the protection of Octavian. The residue of his long life was spent in the tranquil prosecution of his favorite studies, rendered all the more arduous by the destruction of his magnificent library. He died in his 89th year, 28 B.C. V. was not only the most learned, but also the most prolific of Roman authors. He himself confesses to having composed no fewer than 490 books; but only two of these have survived, and one of them in a fragmentary state. The most considerable of his writings, whether lost or extant, are as follows: 1. *De Re Rusticâ, Libri III.*, still extant, and though written in the author's 81st year, constituting the most important treatise on ancient agriculture known to us. 2. *De Linguâ Latinâ*, a grammatical work, which originally extended to 24 books, only six of which, however, have come down to us, and even these in an imperfect form. But for this treatise, mutilated as it is, we should be ignorant of many terms and forms, as well as of much recondite information regarding the civil and religious usages of the ancient Romans.

3. *Sententiæ*, consisting of 165 pregnant sayings strung together, not by V. himself, but probably by different hands at different times. 4. *Antiquitatum Libri*, comprising two sections, the *Antiquitates Rerum Humanarum*, in 25 books, and the *Antiquitates Rerum Divinarum*, in 16 books. This, the greatest work of V., and on which his reputation for learning was mainly founded, has unfortunately perished, all but a few fragments. From the 2d section, St. Augustine drew much of his well-known work, the *City of God*. 5. *Saturæ*, composed in various metres, and occasionally in prose. These pieces, copied to some extent from the productions of Menippus the Gadarene, were apparently a series of comments on a great variety of subjects, generally conveyed in the form of dialogue, and aiming at the enforcement of some moral lesson or serious truth in a familiar and even jocular style. Of these we have only fragments; and of the other works little more than the titles. The best edition of the *De Re Rusticâ* is that of Schneider (Leip. 1794—1797); of the *De Linguâ Latinâ*, that of Müller (Leip. 1833).

VARUN'A (from the Sanscrit *vr'i*, surround; hence, literally, 'the surrounder,' and kindred with the Greek *Ouranôs*) is, in the Vedic Mythology of the ancient Hindus, one of the *Adityas*, or offsprings of *Aditi*, the deity of space, and amongst these, one of the most prominent. He is often invoked together with *Mitra*, sometimes together with *Agni*, the god of fire, or with *Indra* (q. v.), or other elementary deities; but frequently he is also separately praised by the poets of the Vedic hymns. The character of V., as is the case with other Vedic dieties, does not appear to have been or remained the same throughout the whole period represented by the Vedic poetry, but, on the contrary, to have varied according as new imaginations were connected with the idea out of which he arose. Originally, *Varun'a* seems to have been conceived as the sun from the time after its setting to that of its rise; while *Mitra* probably represented the sun at its rise. The night is therefore said to be V.'s, and the day Mitra's; and the 'ever-going Varun'a grants a cool place of rest to all moving creatures, on the closing of the eye (of *Savitr'i*, the sun).' As a consequence, the sun, as manifest during its daily course, is spoken of as his infant, and he 'prepares a path for the sun;' and the dawn, which is called the golden light of Mitra and V., 'goes before Varun'a.'

Out of the mysteriousness with which night is easily endowed, and the qualities which imagination may ascribe to the luminous origin of V., then probably grew the moral attributes given to this deity; for he is extolled as the guardian of immortality; as the cherisher of truth; as armed with many nooses, with which he seizes evil-doers; as the forgiver of sins, and as having unlimited control over mankind. 'No one rules for the twinkling of an eye apart from him, and he witnesses man's truth and falsehood.' The functions of sovereign authority which are then also attributed to him are probably a consequence of his character as protector of the good, and punisher of the wicked; but his kingly might is, in some hymns, also associated with the power, predicated of him, of 'setting free the water of the clouds,' or of 'ruling over the waters that are in heaven and earth.' Whether the connection of V. with the element of water arose from the association of moisture with night, or, which is more likely, from the notion, that water (*vâri*, from the same radical, *vr'i*, as V.) envelops or surrounds the earth, as darkness does, may be doubtful; but it is worthy of notice that the passages of the R'igveda in which V. is spoken of as the cause of rain, or as the lord of rivers or the sea, are few, and perhaps do not belong to the earlier portion of R'igveda poetry. See, for more detail, J. Muir's 'Contributions to a Knowledge of the Vedic Theogony and Mythology,' in the *Journal of the Royal Asiatic Society* for 1864. Compare also the article VASISHT'HA.—It is in this latter character alone, however, that V. appears in the classical and Purânic mythology; for there he has ceased to impersonate the sun, when invisible, and though, at that period too, he is still mentioned as an Aditya, his real quality is that of the regent of the waters, and more especially of the ocean, personified. As such, he retains, it is true, the Vedic qualities as 'lord of punishment,' and carries the 'noose' to bind the wicked with; these attributes, however, are, then, not the reflex of his solar omniscience and power, but that of his might as the god of water.—Later fiction makes him also the regent of the west, probably in recollection of his Vedic character as the setting sun; and

endows him with a wife, *Varun'âni*, a son, *Pushkara*, and sometimes also with a daughter, *Punjikasthalî*. It further gives him for a residence the fabulous mountain, *Pushpagiri*, 'the mountain of flowers,' and a marine monster, *Makara*, for his vehicle.

VARUS, PUBLIUS QUINTILIUS, a Roman of noble birth, was appointed governor of Syria, and on his return from that post was sent by Augustus to command the armies of Germany. His instructions, also, were to introduce into that country the regular administration of a Roman province. The Germans were indignant at his proceedings, and under the leadership of a chief of the Cherusci, named Arminius (Latinized from Herman), attacked V., who, with three legions, the usual number of auxiliaries, and a strong body of cavalry, had proceeded as far as the Weser. By false intelligence, the proconsul was induced to quit his intrenched camp. The Romans marched in a long straggling line, encumbered with baggage, with their wives and children. Suddenly they were assailed by the Germans in a forest, and it was with difficulty they forced their way to a clear space to encamp for the night. For the next two days, the Romans struggled on, marching and fighting, with decreasing forces, and exhausted strength, intending to reach, if possible, the fortress of Aliso on the Lippe. Near Kreutzberg, they were met by the main force of the Germans, and completely broken. V. killed himself in despair. Augustus, who was now old and weak, is said to have yielded to transports of grief, calling upon V. to give him back his legions. This victory of the Germans was gained 9 A.D., and rolled back the tide of Roman conquest. The Rhine, instead of the Weser, again became the boundary of the empire. The battle has ever since been a proud recollection for the Germans, and is known by the name of Herman-schlacht, that is, Herman's fight.

VA'RUS is a term employed in Surgery to designate a variety of Club-foot (q. v.). The corresponding Latin word signifies 'having the legs turned inwards, knock-kneed.' It may be regarded as the opposite to Valgus (q. v.), and as in the case of that word, *Talipes* must be understood. In the form of club-foot termed varus, (1) the heel is raised; (2) the inner edge of the foot is drawn upwards; and (3) the anterior part of the foot is twisted inwards, so that the patient walks on its outer edge.

VASARHELY, or HOLDMEZÖ-VASARHELY, a town of Hungary, stands on a marshy plain, 5 miles from the left bank of the Theiss, and 16 miles N.E. of Szegedin. It is the largest *market*-town of Hungary. Pop. (1880) 74,094, mostly Protestants, actively engaged in cattle-breeding, and in the cultivation of wine and tobacco.

VASARHELY, or MAROS-VASARHELY, a handsome town of Transylvania, the largest of what are called the Szekler towns, and the center of Szekler political life, stands on the Maros, on a fruitful plain 60 miles north-north-east of Hermanstadt. It has broad streets and well built-houses; excellent public schools, Protestant and Catholic—the latter richly endowed; a strong castle; and a choice public library, founded by Count Tekeli, and embracing 60,000 vols., among which are a MS. Tacitus, from the library of King Matthew Corvinus. Tobacco, wine, and fruit are largely cultivated. Pop. (1880) 12,883.

VASARI, GIORGIO, an Italian architect and painter, famous as a biographer and critic of artists, was born at Arezzo in 1511 or 1512. He was a pupil of Michael Angelo, and obtained the patronage of many distinguished persons, as Cardinal Ippolito de' Medici, Clement VII., and the Dukes Alessandro and Cosmo de' Medici; but his pictures possess no peculiar or distinctive merit, and his reputation rests exclusively on his *Vite de' più excellenti Pittori, Scultori, e Architetti* (Lives of the most excellent Painters, Sculptors, and Architects; Flor 2 vols. 1550; 2d ed. by V. himself, 3 vols. 1568). This work is written, on the whole, in a simple and honest style; at times, it is even marked by a noble eloquence. The criticism is often admirable; and in spite of frequent inaccuracies (which, indeed, have been corrected by Della Valle, Rumohr, Förster, and others), it remains a model of art criticism and biography. V. died at Florence in 1574.—Bohn has published an English translation of V., in 5 vols., forming part of the 'Standard Library' series.

VASCO DA GAMA. See GAMA.

VASCULARES, in De Candolle's botanical system, the first of the two great divisions of plants, consisting of those in which Vascular Tissue (q. v.) appears, and thus including all the phanerogamous plants, both endogenous and exogenous. See CELLULARES.

VA'SCULAR TISSUE, in Botany, that kind of vegetable tissue which is composed of closed tubes or vessels, elongated cells. The tubes have membranous walls of Cellulose (q. v.), and within them are juices of the plant, which often deposit secretions. They are generally almost cylindrical—although sometimes prismatical from compression—except that they taper to a point at each extremity, preserving their character as cells by being closed at the extremities. They lie close together in bundles, and often overlie one another at the ends. The principal kinds of vascular tissue are Woody Fibre (q. v.) and Laticiferous Tissue, composed of the vessels which convey the Latex (q. v.). Laticiferous tissue is generally composed of branched and anastomosing tubes, the walls of which are thin and delicate, extremely so in young plants. Many varieties of vascular tissue have, however, been distinguished by botanists, of which the most important are those classed under the name of *Fibro-vascular Tissue*, having spiral fibres in the tubes, winding up the inside of their walls as if to strengthen them. These fibres are elastic, and the coil can often be easily unrolled, at least whilst the tubes are young. Many fibres are often found in a single tube.

VASE (Lat. *vas*, Ger. *Fass*), a term applied, in its widest signification, to all vessels adapted either for ornament or for use. It is generally used in this sense with reference to ancient art; in connection with modern art, it is restricted to vessels of an ornamental kind. Few remains of antiquity have excited more interest than vases, particularly those of Greece, and of the Greek colonies and conquests. The names given by classical writers to vessels adapted for different purposes, have not always been easily identified with the ancient vases which have been preserved to us; but according to the nomenclature of M. Gerhard, which has generally been adopted, the following are the principal varieties, classified according to their uses: 1. Vases for holding wine, oil, or water, known under the names of *amphora* and *diota stamnos*. 2. Vases for carrying water, *hydria, calpis*. 3. Vases for mixing wine and water, *crater, kelebe, oxybaphon*. 4. Vases for pouring, *oinochoë, olpe, prochoïs*. 5. Drinking cups or goblets, *cantharus, kyathus, karchesion, holchion, kyphos, kylix, lepaste, phiale, keras, rhyton*. 6. Vases for ointments or perfumes, *lekythos, alabastron, askos, bomylios, aryballos, kotyliscos*.

The materials of which vases are formed include metal, stone, glass, and earthenware.

Vases of the precious metals were in use among the ancient Egyptians. Among the Greeks and Greek colonists of Asia Minor, they were very early employed for sacrificial purposes, and those of silver were frequently chased, an art in which considerable progress had been attained at a remote period. The general improvement in design in the epoch of Phidias, told in the chaser's art, the complete development of which was, however, according to Pliny, due to Polycletus. In the later period of the Roman Republic, chased silver vases were more than ever in request; but under the Empire, chasing fell into disuse. Bronze, iron, and lead were all used as materials for vases. Bronze vases abounded among the presents made to the Greek temples; they were generally thin and hammered out, often decorated with inlaid ornaments or reliefs, among which mythological subjects and animal heads appear, and the handle sometimes assumed the shape of the human figure. Leaden vases were chiefly used for unguents or perfumes. The gold and silver vases of the first few centuries of the Christian era were, for the most part, imitations of pagan art. In the 12th c., a style was introduced, called *damascene* work, with patterns of gold or silver wire embedded in iron or bronze. Many vases of this kind were made by Benvenuto Cellini.

Among the mineral materials which, plain and enriched, have been used both in ancient and modern times for vases, are marble, lapis lazuli, jasper; semi-transparent stones, such as opal, girasol, agate, chalcedony, sardonyx, cornelian; as also transparent gems and rock crystal. Multitudes of vases of precious stones were brought to Rome from the conquered provinces, particularly from Asia. Those in highest esteem were the *myrrhine* vases, whose material has been the subject of dispute among antiquaries; they are described by Pliny as brilliant, gem-like, and of various colors, generally purple and white, mingled with the iridescent hues of the rainbow. Precious stones have not ceased to be a material for vases; large and costly vases of malachite and jasper are manufactured in Russia; and elaborately carved vases are still made of the white alabaster of Volterra, in Tuscany.

Glass has at all times been a favorite material for vases. Small toilet-phials of opaque glass were in use in Egypt as far back as 1450 B.C. The cameo vases of Rome, of which the Portland vase is the most celebrated example, were composed of two layers of glass, the outer of which, being opaque, was cut down into groups of figures, delicately executed in relief. About the 3d c., we have, for the first time, the *diatreta*, or bored vases, with an external veil of network, almost detached from the rest of the glass. In the 5th c., occur vases composed of two layers of glass, with gilded subjects—often figures of Christ and legends of saints—between them. Vases of green glass, of a later period, with undercut projections, bearing a rude resemblance to the diatreta, have been found in tombs in England and France. Venice afterwards acquired great celebrity for its glass vases. In the beginning of the 16th c., the Venetian glass-makers introduced a class of vases enriched with white or colored filigree work, having the appearance of being incrusted in the glass. They were much sought

after all over Europe; and great care was taken to prevent the secret of their manufacture from being discovered. Beautifully enameled vases were also issued from the Venetian manufactories, as well as others of grotesque forms, representing imaginary animals, and pierced with holes or constructed in the form of a siphon, which are said to have been employed by alchemists, and in pharmacy and distillation. The German manufacturers, in the 16th c., produced vases with heraldic designs and inscriptions in enamel, generally cylindrical, and sometimes of considerable size, which are much prized by connoisseurs; in the following century, the designs became more artistic; and both in Germany and Italy, it was quite usual for distinguished artists to be employed to decorate these glass vases, in imitation of rock crystal, with ornaments, arabesques, and engraved subjects.

The most prevalent material for vases of all kinds, including those intended to hold the ashes of the dead, has generally been baked clay. Multitudes of Greek sepulchral vases, have, after a relapse of more than fifteen centuries, been brought to light, at a time when learned men can appreciate them, and gather from them valuable information in history and archæology. An account of the terra-cotta vases of Greece, Italy, and other countries, is given under POTTERY.

VASELINE is a substance obtained from petroleum or paraffin, which is now of commercial importance. Yellowish, translucent, and crystalline in appearance, it is nearly of the consistency of soft soap, and is almost perfectly tasteless and inodorous. It is soluble in ether, and resists the action of most chemicals. Largely used as a salve or liniment, it is also made the base of various ointments and pomades; and it may be employed inwardly as a remedy in colds, coughs, and hoarseness. It is an excellent lubricant; is serviceable for protecting polished steel or iron from rust; and has the advantage over animal and vegetable fats, that it does not become rancid. The invention and the name are American; and it is since the Philadelphia Exhibition of 1876 that V. has become widely known.

VASISHT'HA (the superlative of the Sanscrit *vasumat*, wealthy) is the name of one of the most celebrated Vedic R'ishis (q. v.), the author of several hymns of the R'igveda, and a personage who seems to have played an important part in the early history of the Brâhmanic or priestly caste of the Hindus. In the account given of him, historical events and mythological fictions are so much blended together, that it is scarcely possible to gather more from it, for certain, than that he was a sage of high reputation, and a priest jealous of the privileges and the position of his caste, and ever ready to assert its superiority over the second or military and royal caste. In one of his R'igveda hymns, he claims to have been enlightened by the god Varun'a; and in another he is called the son of *Mitra* and *Varun'a* (q. v.). In the Mahâbhârata (q. v.), he is mentioned as imparting divine knowledge to King Janaka, and as the family priest of the race of Ikshwâku; and in the Purân'as he is said to have been one of the arrangers of the Vedas in the Dwâpara age.

In Manu and the Purân'as (q. v.), he becomes a patriarch, one of the nine mind-born sons of the god Brâhman. But the most interesting episode of his life is that relating to his conflict with *Vis'wâmitra* (q. v.). A Vasisht'ha is also mentioned as the author of a law-book; but whether he is, or is intended to be, the same personage as the ancient sage, may be doubtful. The name is often written *Vas'isht'ha*, when it would be the superlative of *Vas'a*, meaning 'the most humble'—which the epic and Purânic V. certainly was not—or of *Vas'in*, meaning 'the sage who has thoroughly subdued his passions'—which, too, would seem to be a rather strange epithet of the irascible saint. But though the name of the owner of the cow of plenty, who could obtain anything he desired, is doubtless correctly spelled Vasisht'ha, the less correct spelling must nevertheless have been current for a considerable time, since so early a poet as Kâlidâsa (q. v.), in his Raghuvans'a, puns on the words *vas'î vas'isht'ha*, 'Vas'ishth'a, the sage with subdued passions.'—See, for the legends concerning V., J. Muir's *Original Sanscrit Texts*, vol. i. (1858).

VA'SSAL (Celtic, *gwâs*, a youth or page), in the Feudal System, is the correllative of Suzerain (q. v.). See also SUPERIOR, FEU.

VASSILKO'V, a town of Little Russia, in the government of Kiev, and 18 miles south-west of the city of that name. This town, which was founded in the 10th c., contains 10 factories, 5 of which are employed in the manufacture of tobacco. Pop. (1880) 16,597.

VA'STO, or IL VASTO, a town on the east coast of Southern Italy, in the province of Chieti, 26 miles south-east of Ortona. It stands on a rising ground facing the Adriatic, from which it is distant 1½ mile, is enclosed by walls, contains a spacious square with a handsome fountain, a handsome palace, a castle, and several churches. It carries on an active trade in corn, oil, and vinegar. Pop. 12,000.

VASUDEVA AND VÂSUDEVA. See under VISHN'U.

VATE'RIA. See TALLOW TREE.

VA'TICAN, PALACE OF, in Rome, the principal residence of the pope, and the seat of the great library and the museums, and collections of art, ancient and modern, which, for visitors, constitute one of the chief attractions of the city of Rome. The popes, very soon after the establishment of the peace of the church under the Emperor Constantine, had a residence at the V., which they occupied, although at uncertain intervals, conjointly with that of the Lateran. For a long time, however, through the medieval, and especially the late medieval period, the V. appears to have been neglected. It was Nicholas V. who began that systematic scheme for the improvement and embellishment of the V. which has resulted in what, taken altogether, may be regarded as perhaps the noblest of princely residences. Alexander VI., Julius II., and above all, Leo X., pursued the same plan; and there are very few of the succeeding popes who have not had a share in the enlargement or embellishment of the Vatican. Amid all the difficulties, financial and political, of his pontificate, Pius IX. carried out many tasteful works of completion or restoration, the most striking and effective of which is the great stair by which it is approached from the colonnade of St. Peter's. The building, with its gardens and other appurtenances, is said to cover a space equal to the whole area of the city of Turin, such as it was 30 years ago, with a pop. of 130,000. It is popularly believed to contain 16,000 apartments of various sizes, but this is probably an exaggeration. Some of them, however, are of unrivaled beauty, among which may be particularized the chapel of San Lorenzo, the Pauline Chapel, and the still more celebrated Sixtine Chapel, which is decorated in frescoes from the pencil of Michael Angelo; the Sala Regia, the galleries and halls decorated by Raphael, Giulio Romano, and their scholars; the magnificent library, which, although surpassed in the number of volumes, is unrivaled among the cities of Europe in extent, in beauty of proportions, and in decorations; the galleries of antiquities, Christian and pagan, and of paintings, statuary, bronzes, medals, vases, and other objects of art. Many descriptions of the V., with costly illustrations, have been published, and are to be found in all great libraries. An extremely interesting account, historical and descriptive, is to be found in Donovan's *Rome, Ancient and Modern*; see also Hare's *Walks in Rome*, and for recent additions and changes, Murray's *Handbook of Rome*.

VATTEL, EMERICH, a well-known writer on the law of nations, was born at Couret, in Neufchâtel, 25th August 1714. His father, a Protestant clergyman, had been ennobled by the king of Prussia, whose subject he was. V. studied for the church at Bâle and Geneva, but he devoted greater attention to the writings of Leibnitz and Wolf than to those of the Calvinistic divines; and instead of becoming a country clergyman, he resolved to push his fortune at the court of Berlin, as a man of letters and diplomatist. In 1741, he offered his services to Frederick II., who had just ascended the throne, but there was then no vacancy in the public service. Three years afterwards he received an appointment at Dresden from the Elector of Saxony, then also king of Poland; and in 1746, he was sent by him as minister to Bern. In this post, he had ample leisure, and devoted himself to literary pursuits. He published, in French, under different titles, collections of essays on miscellaneous subjects, which are lively, and well written. But his chief attention for ten years was bestowed on his great work, the *Droit des Gens; ou Principes de la Loi Naturelle appliqués à la Conduite et aux Affaires des Nations et des Souverains*. This title sufficiently explains the scope of the work. It contained little that was new but it abridged and systematized the doctrines of Grotius, Puffendorf, and Wolf. V. had, however, that skill in arranging his materials, and that power of lucid expression, which so often characterize French men of letters; and his book became rapidly popular as a text-book of international law. Like all his predecessors in the same field, V. based his whole system on an imaginary law of nature, and it would be easy to enumerate a large number of false conclusions to which he came in the absence of the light thrown on the law of nations by practice, and by the principle of utility in our time, so generally adopted as the test of international morality. After the completion of his great work, V. was recalled to Dresden, where he married, in 1764, Marianne de Chêne, and was promoted to the rank of privy-councilor. The duties of his new post proved too arduous, and he died of over-work on 28th December 1767. Mr. Chitty republished, in 1833, an English translation of Vattel, with notes.

VAUBAN, SEBASTIEN LE PRESTRE, Marshal of France, the celebrated military engineer, was born at Saint Leger de Fougeret, in the dep. of Nievre, 15th May 1633; and being left an almost destitute orphan at the age of ten, his education was carried on under the auspices of the *curé* of his village. Leaving Saint Leger in 1651, he set out on foot to join Condé's army, then on the Belgian frontier; and during two years of active field-service, obtained large insight into the engineering methods then in practice. Taken prisoner in 1653, he joined the royalists, and during

the succeeding contest was mostly attached to the army of Turenne, who intrusted him with the sole control of the besieging operations; and the powerful assistance which the extraordinarily rapid reduction of the enemy's strongholds gave to the king's little army, gained for V. the repute of being the most promising young engineer of the time. On the conclusion of peace in 1660, he was despatched to the west to demolish the rebel strongholds in Lorraine, and to take charge of Breisach; but in 1667, he appeared again in the north, capturing one after another the powerful defences of the Belgian frontier. About this period, the all-powerful Louvois, charmed by V.'s probity, punctuality, and habits of cool calculation, no less than by his genius, took him firmly by the hand; and it was as much owing to the great minister's favor as to the superiority of his designs that V. was preferred to the highly honorable and important office of fortifying the Flemish fortresses which had fallen into the possession of France. This labor accomplished in 1672, and the war with Holland resumed, V. took his old place as director of the siege operations, and for the first time introduced into practice in Western Europe the method of approach by parallels (recently borrowed from the Turks), at the siege of Maestricht (1673), and with such effect, that that strong fortress capitulated in thirteen days.

After tracing the plan of siege for Treves, and with remarkable sagacity foretelling the date when it *must* fall, he set himself with energy to strengthen the newly-acquired fortresses in the Low Countries, and closed a long and brilliant array of services for 1674 by throwing himself into Oudenarde, where William of Orange besieged him in vain. In 1675, he inaugurated a new era in military tactics by obtaining the creation of a corps of engineers, though the completion of the innovation by the establishment of companies of sappers was denied him. In 1676, he conducted the remarkable sieges of Valenciennes and Cambrai, stormed the latter in open day, against the unanimous opinion of the generals of the army; and two years later was rewarded for his long and glorious services by the appointment of director-general of fortifications. This post gave him the supreme control of the department of military engineering, and the ten years of peace which followed 1678 supplied opportunity for V.'s rendering to France perhaps the greatest of his services, in surrounding the kingdom with a complete cordon of fortresses, fitted either for defence or for commanding weak points of the neighboring countries. At intervals during this period, he captured the almost impregnable fortress of Luxembourg, and planned and partly executed the magnificent aqueduct of Maintenon, by which the waters of the Eure are conveyed to Versailles.

War breaking out again in 1688, V. conducted the sieges of Philipsburg, Mannheim, and Frankenthal (introducing, at the last, his invention of ricochet-firing), Mons (1691), and Namur (1692), with his usual success, though opposed at the last-named place by his great rival, Cohorn, who had fortified, and who defended it. After this period, V. almost disappears from the field of warfare, on which he had stood invincible for so many years, for the sieges of Charleroi (1693), Ath (1697), Breisach (1704), and the construction of the intrenched camp near Dunkirk (1706), are the only professional works of importance during the last 14 years of his life.

After the peace of Ryswick in 1697, he had applied his active practical mind to the consideration of various deficiencies and anomalies in the internal government of France; and his zeal and research brought together a large mass of information and suggestion on numerous subjects, which was published under the curious title of *Oisivetés de M. de Vauban*, and contained recommendations for the collection of statistics of population, commerce, and agriculture, for supplying the army by recruitment, and valuable suggestions for improving the soil by drainage, &c., &c. Another of his works which excited an immense sensation at the time was the *Dîme Royale* (1707), in which he discussed the question of taxation, and anticipated in the most striking manner the doctrines which, a century later, overthrew the French monarchy: such principles promulgated by a man of V.'s sterling integrity and profound practical wisdom, could not be expected to be very palatable to the king and court, of whose conduct they furnished indirectly the severest censure; and we are not therefore surprised to learn from Saint-Simon 'that the Marshal de Vauban was very ill received when he presented himself,' and that, by an edict of February 14, 1707, his book was seized and confiscated. V. did not long survive his disgrace, dying at Paris, March 30, 1707. Fontenelle calculates that he had constructed 33 new fortresses, repaired 300 old ones, conducted 53 sieges, and had been present at 140 'actions of vigor'; and in his practice, the capture of a fortress was certainly a mere question of time and powder. His various professional works on the attack and defence of places, and on mines, have been collected under the title of *Œuvres Militaires* (Paris, 1796); and besides these, we have various other Memoirs on professional subjects from his pen. Historical notices and eulogies of V. are abundant in French literature. See *Nouvelle Biographie Générale.*

VAUCLUSE, a dep. in the south-east of France, bounded on the W. by the Rhone, and on the S. by the Durance, which separates it from the dep. of Bouches du Rhone. Area, 1365 sq. m.; pop. (1880) 244,149. The Rhone is the great river, and its affluents, with the exception of the Durance, are all small. The dep. is traversed in the east by spurs of the Alps. The plains are all in the west—the chief being those of Orange, Carpentras, and Cavaillon. In the east, the mountains are separated by narrow, torrent-ploughed valleys; and the summits, the chief of which is Mont Ventoux, 6778 feet high, are arid and bare. The climate is healthy and temperate, although subject to great variations—the winds from the north and north-east being sometimes very violent. The dep., though more agricultural than manufacturing, does not produce cereals in great quantity; but the peach, pear, prune, almond, and fig trees bear excellent fruits. Olive, mulberry, and orange trees are quite common. Wines and honey, both held in high esteem, are produced. There are four arrondissements—Avignon, Apt, Carpentras, and Orange. Avignon is capital.

VAUD (Ger. *Waadt*), a canton which forms the western corner of Switzerland between the Jura and the Bernese Alps. Area, 1240 sq. m.; pop. (1880) 238,730. It is a comparatively level district, traversed, however, by an elevated tract, known as Mount Jorat, from which plains slope on either side to the Lake of Geneva on the south, and the Lake of Neufchâtel on the north. On both sides, near the mountains, there are extensive pasturelands, but the greater part of the country is highly cultivated. The orchards and vineyards are very extensive, the latter yielding white wines of excellent quality. There are no manufactures of any importance. It is now traversed by railways, which connect it in two directions with France, and in three with the rest of Switzerland. It forms part of French Switzerland, the dialect spoken being the Vaudois. The religion is Protestant.

V. has formed, since 1830, a democratic republic, the council of the canton being elected and controlled by the people. In 1845 and 1861, the rights of the people were still further extended. V., after the fall of the Roman Empire, formed part of the Burgundian kingdom. In the 13th c., it became a dependency of Savoy, to which it was annexed in 1359. In 1476, the House of Savoy took part with the Duke of Burgundy in his struggle with the Swiss; and on his defeat, a part of V. was annexed to the adjoining cantons. In 1536, the Bernese took possession of the whole of V., which they divided into fifteen parts, administered by *baillis*, appointed at Bern. The nobility became patricians of Bern, and in this way acquired great influence. Still, the local councils had the power of appointing magistrates and administrative officers, which, to some extent, tempered the aristocratic character of the government. The French invasion put an end to the rule of Bern, and V. became a separate canton. The government remained in the hands of the higher classes until June 1830, when a new constitution, granting a vote to every adult *bourgeois* of good character, was obtained from the council. The existing democratic-representative constitution dates from 1845. The Vaudois are industrious and well educated; and from this part of Switzerland come a large number of the Swiss teachers and governesses who are met with in all parts of the world. Capitol, Lausanne (q. v.).

VAUDEVILLE, originally a popular song with words relating to some story of the day; whence it has come to signify a play in which dialogue is interspersed with songs of this description, incidentally introduced but forming an important part of the drama. The German *Liedertafel* is a somewhat similar composition.—The name Vaudeville is a corruption of Vaux de Vire, the name of two picturesque valleys in the Bocage of Normandy. One Olivier Basselin, a fuller in Vire (q. v.), composed, about the middle of the 15th c., a number of humorous and more or less satirical drinking-songs, which were very popular, and spread over France, bearing the name of their native place (Les Vaux de Vire). As the origin of the term was soon lost sight of, it at last took its present form. In the 16th c., Vauquelin still names such pieces Les Vaux de Vire.

VAUDOIS. See WALDENSES.

VAULT, an arched roof, usually constructed of stone or brick-work. The simplest kind of vault is the plain wagon or tunnel vault, being a simple segmental or semicircular arch, thrown across a longitudinal apartment, and extending from one end to the other. Ordinary bridges show an example of this style of vaulting. Such vaults were commonly used by the Romans, who also built vaults with *groins*—i. e., vaults intersecting one another. See GROINED VAULTING. The tunnel arch, of a pointed form, was of very ancient introduction, having been used by the Assyrians for vaulting their large drains.

The Egyptians are also said to have been acquainted with vaulting; but the earliest remains of ancient vaults of any magnitude are Roman works.

The Roman vaults, where groined, are usually constructed with

carefully cut stone, so as to prevent the angle from chipping. The medieval architects had not the costly materials or skill of the Romans at command, so they formed the groins only of dressed stone, and the filling in of the vault with commoner materials. This led to the groin becoming a prominent feature in medieval architecture, being generally ornamented with mouldings and carved work. We have already traced the progress of Gothic vaulting under the heads GOTHIC ARCHITECTURE, FAN-TRACERY VAULTING, RIB, &c. Domical or hemispherical vaulting was also much used by the Romans. The Pantheon, in Rome, is the finest example remaining, being a circular building with a dome 142 feet in diameter. Roman domes and vaults are frequently ornamented with sunk panels. During the Renaissance period, vaulting in great measure gave place to wooden roofs; but when employed, the domical or plain groined vaults of Roman architecture are chiefly used. In modern works, vaults and arches are gradually becoming superseded by the use of iron construction, both for roofs and for supporting floors, bridges, &c.

VAU'LTING-SHAFT, a small column, or pillar, supporting the ribs of a Gothic vault. These shafts generally occur in clusters, and may either spring from the ground, or be supported on small corbels in the wall.

VAUMURE, in old fortresses, a low work under the wall, in the nature of a *fausse-braye*.

VAUQUELIN, JEAN, a French poet, was born in 1535, of a noble family, at the château of La Fresnaye, near Falaise. He made a pretence of studying law at Poitiers, Paris, and at Bourges, but really spent his time in gaiety and verse-making. He finally became president of the *Présideal* bench at Caen, where he died in 1607. His *Œuvres Poétiques* contain many sportive songs and other light pieces, which are yet read with pleasure. He was the first writer of idyls in French verse, and is considered as the real founder of French satire, which he redeemed from the grossness that had hitherto characterized the productions that went under that name.

VAUXHA'LL, a famous public garden in London, constituted as such immediately after the Restoration (May 1660), and supporting that character for nearly two centuries. It was situated in Lambeth, opposite Millbank, and near the manor called Fulke's Hall (the residence of Fulke de Breauté, a follower of King John), from which is derived the name Vauxhall. Pepys, writing May 28, 1667, describes the garden, and concludes that the entertainments there to be had are 'mighty devertising.' But the pastimes of V. were not always of a merely 'devertising' description. The eating, drinking, dancing, and flirtation that continually went on there, led to much quarreling and dissipation. On the whole, V. does not appear to have been particularly strict in its morals. The loose character of the amusements it afforded is freely sketched by the dramatists and novelists of the last century, and is again revived in Thackeray's *Vanity Fair*.

VAUXHALL NECTAR, a mixture of rum and syrup, with an addition of benzoic acid, or flowers of Benjamin, in the proportion of half a dram to the quart. It was formerly in much repute as a drink, and was taken mixed with water. It was also called British arrack.

VA'VASOUR, or VALVASSOR (derived, like *vassal*, from Celtic *gwâs*, a youth or page), a term of feudal times, more in use in the continent of Europe than in England, employed somewhat loosely, and defined by Camden as the rank next below a baron. Its usual meaning was one who held his lands, not directly of the crown, but of one of the higher nobility. In this class were comprehended the *châtelains*, who owned castles, or fortified houses, and possessed rights of territorial justice.

VAYGA'CH (also written *Vaigatch*, *Vaigatz*, and *Waigatz*), an island of the Arctic Ocean, belonging to Russia, stands between the mainland and the island of Nova Zembla, from the former of which it is separated by a strait about 5 miles broad. There is no resident population; but, being productive in furs and in fish, it annually attracts a number of Russian and Samoied hunters.

VAYU (from the sanscrit *vâ*, blow), the wind, is, in the Vedic Mythology of the Hindus, a deity, which originally seems to have held an equal rank with Indra (q. v.), but much more rarely occupies the imagination of the poets than this god, or Agni, or the sun; for though, according to Yâska (q. v.), ancient commentators of the Vedas hold that there are only three great deities—viz., *Agni*, fire, whose place is on earth; *Sûrya*, the sun, whose place is in heaven; and *Vâyu*, or *Indra* (q. v.), whose place is in the intermediate sphere—only a few hymns, comparatively speaking, are dedicated to Vâyu, whereas the other deities named are the subject of manifold praise. The description given by the R'igveda of the greatness of Vâyu nevertheless answers the position which those ancient commentators assign to him.—See J. Muir's 'Contributions to a Knowledge of the Vedic Theogony and Mythology,' in the *Journal of the Royal Asiatic Society* for 1864. In the epic and Purânic mythology, V. occupies but an inferior position, and the legends there related of him have no cosmical character. They give him a wife, *Anjanâ*, by whom he has a son, the monkey *Hanumat* (q. v.). When represented, V. either rides on an antelope with a sabre in his hand, or he is seated holding his son Hanumat in his arms.

VAYU-PURAN'A. See PURAN'A.

VEDA (from the Sanscrit *vid*, know; kindred with the Latin *vid-*, Greek *id-*, Gothic *vait-*, Lithuanian *weizd-*; hence, literally, knowledge) is the technical name of those ancient Sanscrit works on which the first period of the religious belief of the Hindus is based. See INDIA, sec. *Religion*. The oldest of these works—and in all probability the oldest literary document still existing—is the *R'igveda;* next to it stand the *Yagurveda* and *Sâmaveda;* and the latest is the *Atharvaveda*. The first three also bear the collective title of *trayî*, or 'the threefold' (scil. science); and all four are considered to be of divinely inspired origin. Each of these Vedas consists of two distinct divisions—a *Sanhitâ*, or collection of *mantras*, or hymns; and a portion called *Brâhman'a*. A *mantra* (from *man*, think; hence, literally, the means by which thinking or meditation is effected) is, as Colebrooke, in conformity with the Mîmânsâ writers, defines the word, a prayer, or else a thanksgiving, praise, or adoration addressed to a deity: it declares the purpose of a pious act, or lauds or invokes the object; it asks a question or returns an answer; either directs, inquires, or deliberates, blesses or impreeates, exults or laments, counts or narrates, &c. Sometimes it is addressed to the deity with a verb in the first person; sometimes it ends with the verb 'thou art,' or with the word 'thee.' See Colebrooke, *Miscellaneous Essays*, i. p. 308; Müller, *Ancient Sanscrit Literature*, p. 343; Jaiminiyanyâyamâlâvistara, as quoted in Goldstücker's *Pân'ini*, p. 69. If such a *mantra* is metrical, and intended for loud recitation, it is called *R'ich* (from *r'ich*, praise)—whence the name *R'igveda*, i. e., the Veda containing such praises—if it is in prose, and then it must be muttered inaudibly, it is called *Yajus* (from *yaj*, sacrifice; hence, literally, the means by which sacrificing is effected); therefore, *Yajurveda* signifies the Veda containing such *yajus*. And if it is metrical, and intended for chanting, it is termed *Sâman;* whence *Sâmaveda* means the Veda containing such sâmans. (The original meaning of the latter word is obscure. Native grammarians derive it, but without much probability, from *so*, to give pain, because, they say, 'it is difficult to utter such mantras.' A mystical, but grammatically impossible account of *sâman*, is given in the *S'atapatha-brâhman'a* and *Br'ihadâran'yaka*, where the word is analyzed into *sâ* and *ama*, the former being interpreted as implying 'speech,' and the latter 'breathing forth,' since the chanting of the sâman, as the commentator says, is essentially the result of both.)—No special name is given to the mantras of the fourth Veda. The author of the mantra, or, as the Hindus would say, the inspired 'seer,' who received it from the deity, is termed its *R'ishi* (q. v.); and the object in which the mantra is concerned is its *devatâ*—a word which generally signifies 'deity,' but the meaning of which, in its reference to the mantras, must not always be taken literally, as there are hymns, in which not gods or deified beings, but, for instance, a sacrificial post, a remedy against bad dreams, the generosity of princes from whom gifts were received by the authors, or a chariot, a drum, weapons, the charioteer and horses employed in war, and other worldly objects, invoked, are considered as the *devatâ*.—See Colebrooke's *Misc. Essays*, i. p. 22; Wilson's *Rigveda*, vol. i., in the edition of F. E. Hall, p. 347.—*Brâhman'a*—derived from *brahman*, neuter, probably in the sense of prayer or hymn (see concerning this word, J. Muir, 'On the Relation of the Priests to the other Classes of Indian Society in the Vedic Age,' in the *Journal of the Royal Asiatic Society* for 1864; and the introduction of M. Haug's edition of the Aitareya Brâhman'a, vol. i. p. 4)—designates, according to *Mâdhava-Sâyan'a*, the great commentator on the Vedas, that portion in prose of the Vedas which contains either commandments or explanations; or, in other words, which gives injunctions for the performance of sacrificial acts, explains their origin, and the occasions on which the mantras had to be used, by adding sometimes illustrations and legends, and sometimes also mystical and philosophical speculations. The *Brâhman'a* portion of the Vedas is therefore the basis on which the Vedic ritual rests (see KALPA and VEDANGA), and whence the *Upanishads* (q. v., and the philosophical doctrines (see SANSCRIT LITERATURE) took their development.

Though *Mantras* and *Brâhman'as*—both of which are also termed *S'ruti* (q. v.)—were held at a later period of Hinduism to have existed simultaneously, that is, from eternity, it is certain that the Brâhman'a portion of each Veda is posterior to at least some part of its Sanhitâ, for it refers to it; and it scarcely requires a remark that so great a bulk of works as that represented by both portions must have been the gradual result of a considerable period of time. There is, indeed, sufficient evidence to prove that various conditions of society, various phases of religious belief, and even different periods of language, are re-

flected by them. The difficulty, however, critically to discern these periods is enhanced by the losses, probably considerable, which these writings suffered before they were preserved in the shape in which we now possess them. For in tradition, which records that *Vyâsa* (q. v.). after having compiled and arranged the Vedas, handed each of them to four disciples, and that these disciples taught them to their disciples, and so forth, down to distant ages, there is so much indubitable, that Mantras and Brâhman'as had to pass through a large number of S'âkhâs, or schools, and that the discrepancies which gradually arose between these schools, both as regards the Vedic texts and the interpretation of these texts, cannot have been slight; for, apart from the conclusion yielded by a comparison of the remaining texts of some of these schools, later writers afford us an insight into the animosity which existed between these schools, and must have arisen from very material grounds. Thus, in a commentary on *Pâraskara's Gr'ihya Sûtras*, it is said: 'Vasisht'ha declares that it is wrong to follow the rules of another S'âkhâ. He says: "A wise person will certainly not perform the duties prescribed by another S'âkhâ; he that does is called a traitor to his S'âkhâ. Whosoever leaves the law of his S'âkhâ, and adopts that of another, he sinks into blind darkness, having degraded a sacred R'ishi." And in another law-book it is said: "If a man gives up his own customs, and performs others, whether out of ignorance or covetousness, he will fall, and be destroyed." And again in the *Paris'isht'a* of the *Chhandogas:* "A fool who ceases to follow his own S'âkhâ, wishing to adopt another one, his work will be in vain." '—See Müller's *Ancient Sanscrit Literature*, p. 51. That each *S'âkhâ* claimed the possession of the only true and genuine Veda, may be already inferred from passages like these.

The differences between these S'âkhâs, however, did not consist—as has been believed—in their various readings of the S'ruti alone; it also consisted in considerable variations of their arrangement of the scriptures; in their additions or omissions of texts—as may be seen from still existing S'âkhâs of the Yajurveda—and, as is stated by *Madhusûdana*, and results from a commentator on Pân'ini, in their *different interpretation of the Vedic texts*. How great the number of these S'âkhâs was, may be inferred from the statement of the *Charan'avyûha*, a treatise ascribed to an ancient writer, S'aunaka; for it enumerates five S'âkhâs of the R'igveda; says that there were 86, and names 42 (or in one recension 44) of the Yajurveda; mentions twelve of the Sâmaveda, out of a thousand, which, it says, were at one time in existence, and nine of the Atharvaveda. The *Atharvan'arahasya*, a modern treatise on the Atharvaveda, while ascribing the same number of S'âkhâs to the Sâmaveda and Atharvaveda, speaks of twenty-one of the R'igveda, and a hunderd of the Yajurveda. Of all these schools, however, the *R'igveda* is now extant only in one; the *Yajurveda* (both divisions, to be named hereafter, taken collectively) in three, and partially, in four; the *Sâmaveda* in perhaps two; and the *Atharvaveda* in one.

The character of the Sanhitâ or Mantra portion of the four Vedas—on which their Brâhman'a portion is based—as well as the relation in which these Sanhitâs stand to each other, is intelligible only if it is borne in mind that the ancient Hindu believed to secure the favors of his gods chiefly by the performance of sacrificial rites; that gradually these rites became complicated and manifold, and that special care, therefore, had to be taken to provide for a correct celebration of the sacrifices which had sprung up, and also to guard against the evil consequences which might result from inadvertence, or other causes beyond the sacrificer's control.

The original worship seems to have been simple enough (see INDIA, sec. *Religion*)—it probably neither occupied much time, nor required the assistance of a priest. But when sacrifices were instituted which lasted from one day to eleven, nay, to a hundred days—and some works speak of sacrifices which went on for the space of one and even several years—and when the Brahmanic caste found the performance of such sacrifices to be an excellent means of establishing its sway over the other castes, and a convenient source of an easy livelihood, it was laid down as a rule that no sacrifice could be performed without one *R'itwij*, or priest; and that a great sacrifice, such as the Jyotisht'oma, Râjasûya, or other sacrifices which could only be celebrated by wealthy people or kings, required the assistance of not less than sixteen priests, besides a number of menials, who had to slay the sacrificial animals, to chant, or to perform other inferior work. These sixteen priests were then divided into four sections, each headed by one R'itwij, and containing besides him, his three purushas, or assistants. The first section consisted of the *Adhwaryu*, with his three purushas, the Pratiprasthâtr'i, Neshtr'i, and Unnetr'i; the second, of the *Brahman*, with the three purushas, Brâhmanâchchhansin, Agnîdh (or Agnîdhra), and Potr'i; the third, of the *Udgâtr'i*, with the Prastotr'i, Pratihartr'i, and Subrahman'ya; and the fourth of the *Hotr'i*, whose assistants were the Maitrâvanrun'a, Achchhâvâka, and Grâvastut. (In other accounts, the order of these sections varies, and in the section headed by the Brahman, the Potr'i precedes the Agnîdh; see also Müller, *Ancient Sanscrit Lit.*, pp. 468, 469; where, however, by mistake, some of the assistant priests occur in the wrong sections). The principal duties of these priests were further regulated in the following manner. The *Hotr'i* had to perform the rites relating to the R'igveda, the *Adhwaryu* those based on the Yajurveda; the *Udgâtr'i* was concerned in the rites of the Sâmaveda; and the Brahman had to possess a knowledge of all these three Vedas, and to set right any mistake that might have occurred in the performance of the ritual acts, or remedy any defect which might vitiate the efficiency of the sacrifice. He was therefore the most learned of all the priests; and the R'igveda itself, though perhaps in one of its latest portions, recognizes this superiority of the priest Brahman.

In the ritual works relating to the first three Vedas, no functions based on the use of the latest or the Atharvaveda are assigned to him, but in the *S'aunaka-Brâhman'a* of the *Atharvaveda*, where Prajâpati is introduced as intending to perform a Soma sacrifice, and asking the Vedas whom he should choose for his Hortr'i, Adhwaryu, Udgâtr'i, and Brahman, the Vedas answer him: 'Choose for a Hotr'i (the priest) who knows the R'igveda, for an Adwaryu, (the priest) who knows the Yajurveda; for an Udgâtr'i, (the priest) who knows the Sâmaveda; and for a Brahman (the priest) who knows the Atharvaveda;' and to explain the reason for such advice, they add that the R'igveda hymns having the earth for their abode, one who chooses a *Hotr'i* will obtain dominion over the earth; the Yajurveda mantras resting on the intermediate space, one who engages an *Adhwaryu* will obtain the world of that space; the Sâmaveda hymns dwelling on heaven, one who employs an *Udgâtr'i* will obtain that world; but one who chooses a *Brahman* will encompass the world of (the neuter) Brahman, or the supreme spirit, since the hymns of the Atharvaveda have for their abode Brahman.

The most interesting feature of this and similar passages is the tendency of their authors to maintain the greater efficiency of one of the later Vedas in comparison to that of the R'igveda, and consequently the greater practical superiority of these Vedas over the avowedly oldest Veda. And this is intelligible enough, if we compare the contents of these Vedas.

The worship alluded to in many hymns of the R'igveda must have consisted more of isolated sacrificial offerings than of a series of acts strung together so as to form an elaborate sacrifice. There are other hymns, it is true, which betray the existence, at their time, of a ritual, already become complicated, as when three or four, or even seven priests are mentioned by the poet; but though these hymns, as well as the former, bear testimony to the existence, at that early period, of ritual acts, it does not follow that the R'igveda, as such, was composed for the purpose of being recited when they were performed. From the nature of its hymns, it results, on the contrary, that, having been composed, they were at some subsequent period connected with those pious acts which became more and more complicated, and gradually were systematized. But then even there remain verses which would not easily bend to such artificial purposes; and whole hymns, too, which would resist an attempt to force the into a liturgic code for which they were not intended by the poet's mind.

A collection of songs, in short, which was the natural growth of time, and, to some extent, at least, the ingenuous outburst of the poets' feelings, became inadequate for a regular liturgy of a highly developed and throughout artificial ritual. Out of this necessity there arose the *Sâma-* and the *Yajurveda*. The former was entirely made up of extracts from the R'igveda, put together so as to suit the ritual of the so-called Soma sacrifices. For, as all native authorities agree in stating that the Sâmaveda contains none but R'igveda verses, the absence of 71 verses in the recension of this Veda, edited by Professor Benfey from the recension in which the R'igveda now exists, does not disprove their unanimous statement: it must be accounted for by the circumstance, that these verses belonged to one or the other of the recensions of the R'igveda, which, as mentioned before, are no longer preserved. The origin of the Yajurveda is similar to that of the Sâmaveda; it, too, is chiefly composed of verses taken from the R'igveda; but as the sphere of the ritual for which the compilation of this Veda became necessary is wider than that of the Sâmaveda, and as the poetry of the R'igveda no longer sufficed for certain sacrifices with which this ritual had been enlarged, new mantras were added to it—the so-called Yajus, in prose, which thus became a distinctive feature of this Veda; and it is on the Yajurveda, therefore, that the orthodox Hindu looked with especial predilection, for it could better satisfy his sacrificial wants than the Sâma-, and still more, of course, than the R'igveda. 'The Yajurveda,' says *Sâyan'a*, in his introduction to the Taittirîya Sanhitâ, 'is like a wall, the two other Vedas like paintings (on it).' The sacredness of the Sâma- and Yajurveda, and the belief in their inspired character, rest on the assumption

that they are of the same origin as the R'igveda, which dates from eternity, and which was 'seen' by the R'ishis who uttered it. That, in the case of the Yajurveda, this theory is only partially correct, results already from the description just given of it; for whatever losses the present text of the R'igveda may have suffered, it is admitted by all authorities that its mantras were always metrical, and that it can never, therefore, have possessed passages in prose. But how frail this theory is, and in what sense it is possible to speak of the sameness of origin even in the case of those hymns of the Sâma- and Yajurveda which are composed of R'igveda verses, a comparison of the place occupied by the verses of a few hymns taken from one and the other of these Vedas with the place which the same verses occupy in the R'igveda, will sufficiently show.

The first hymn of the Sâmaveda consists of ten verses, nine of which are contained in the present recension of the R'igveda. If by the side of each of these verses the place is marked which it holds in the R'igveda, the result is this :

	Book.	Hymn.	Verse.
Sâmaveda 1, verse 1, is R'igveda.	6	16	10
" " 2, "	6	16	1
" " 3, "	1	12	1
" " 4, "	6	16	34
" " 5, "	8	73	1
" " 6, "	8	60	1
" " 7, "	6	16	16
" " 8, "	8	11	7
" " 9, "	6	16	13

The verses of which the hymn of the Sâmaveda 1, verses 370—380, is composed, correspond with the following verses of the R'igveda :

	Book.	Hymn.	Verse.
Sâmaveda 1, v. 370, with R'igveda,	8	86	10
" " 371, "	10	147	1
" " 372, "		absent	
" " 373, "	1	57	4
" " 374, "	3	51	1
" " 375, "	10	43	1
" " 376, "	1	51	1
" " 377, "	1	52	1
" " 378, "	6	70	1
" " 379, "	10	134	1
" " 380, "	1	101	1

If from the White Yajurveda the mantras, for instance, of the 22d to the 25th chapter were submitted to a similar test, it would be seen that in chapter 22, which has 34 divisions, only four verses occur in the R'igveda, viz.:

	Book.	Hymn.	Verse.
White Yajurveda 22, v. 10, in R'igv.	1	22	5
" " 15, "	5	14	1
" " 16, "	3	11	2
" " 18, "	9	110	3

that in chapter 23, with 65 divisions, there correspond :

	Book.	Hymn.	Verse.
White Yajurv. 23, v. 3, with R'igv.	10	121	3
" " 5, "	1	6	1
" " 6, "	1	6	2
" " 16, "	1	162	21
" " 32, "	4	39	6

that chapter 24 being in prose, cannot occur in the R'igveda; and that of chapter 25, with 47 divisions :

	Book.	Hymn.	Verse.
White Yajurv. 25, v. 12, is R'igv.	10	121	4
" " 13, "	10	121	2
" " 14–23, are "	1	89	1–10
" " 24–45 "	1	162	1–22
" " 46, is "	10	157	1, 3, 2

(See the article 'The Inspired Writings of Hinduism,' in the *Westminster Review* for January 1864.)

All, therefore, that is left of the oldest Veda in the Sâmaveda and Yajurveda, is a R'igveda piece-meal; its hymns scattered about; verses of the same hymn transposed; verses from different hymns combined, and even the compositions of different poets brought into one and the same hymn, as if they belonged to the same authorship. That, under such treatment, the Yajurveda should have lost all poetical worth, is but what may be expected; it must be, however, matter of surprise that the Sâmaveda should have saved so much, as it even now possesses, of that genuine beauty which distinguishes the R'igveda poetry. The *Atharvaveda*, too, is made up in a similar manner as the Yajurveda, with this difference only, that the additions in it to the garbled extracts from the R'igveda are more considerable than those in the Yajurveda. It is avowedly the latest Veda, and even its name 'Atharvaveda,' as it was current already during the classical period of Sanscrit literature, does not yet occur in the oldest Upanishads (q. v.), where only the songs or revelations of the *Atharva-Angiras*, or of the *Bhr'igu-Angiras*, apparently denoting this Veda, are spoken of. The Atharvaveda was not used, as Madhusûdana, in his treatise on Sanscrit Literature says, 'for the sacrifice, but merely for appeasing evil influences, for insuring the success of sacrificial acts, for incantations, &c.;' but on this very ground, and perhaps on account of the mysteriousness which pervades its songs, it obtained, amongst certain schools, a degree of sanctity which even surpassed that of the older Vedas.

This being the general character of these four Vedas, a few remarks must here suffice to convey some idea of their special contents.

On the religious ideas expressed in the *R'igveda*, a general account is given in the article INDIA, sec. *Religion;* see also, besides the deities mentioned there, and the articles referring to them, VARUN'A, VAYU, and YAMA, and J. Muir's 'Contributions to a Knowledge of Vedic Theogony and Mythology,' in the *Journal of the Royal Asiatic Society* for 1864. The social condition of the Hindus, as reflected from the hymns of this Veda, is not that of a pastoral or nomadic people, as is sometimes supposed, but, on the contrary, betrays an advanced stage of civilization. Frequent allusion is made in them to towns and cities, to mighty kings, and their prodigious wealth. Besides agriculture, they mention various useful arts which were practised by the people, as the art of weaving, of melting precious metals, of fabricating cars, golden and iron mail, and golden ornaments. The employment of the needle and the use of musical instruments, are known to them. They also prove that the Hindus of that period were not only familiar with the ocean, but sometimes must have engaged in naval expeditions. They had some knowledge of medicine, and must have made some advance in astronomical computation, as mention is made of the adoption of an intercalary month, for the purpose of adjusting the solar and lunar years. Nor were they unacquainted with the vices of civilization, for we read in these hymns of common women, of secret births, of gamblers and thieves. There is also a curious hymn, from which it would follow that even the complicated law of inheritance, which is one of the peculiarities of the existing Hindu law, was to some extent already in use at one of the periods of the R'igveda hymns. The institution of caste, however, seems at that time to have been unknown, for there is no evidence to prove that the names which at a later period were current for the distinction of caste, were employed in the same sense by the poets of these hymns.—See Wilson's *R'igveda*, vol. i., re-edited by F. E. Hall, vols. ii., iii.; and vol. iv., edited by E. B. Cowell (Lond. 1850—1866).

The only recension in which the Sanhitâ of the R'igveda has been preserved to us, is that of the *S'âkala* school; and the hymns themselves are arranged according to two methods, the one chiefly considering the material bulk, the other the authorship of the hymns. Both divisions, however, run parallel. According to the former, the whole Sanhitâ consists of eight *Asht'akas*, or eights; these, again, are divided into 64 *Adhyâyas*, or lessons; these into 2006 *Vargas*, or sections; and the Vargas into *R'ichs*, or verses, the actual number of which is 10,417, but, according to the statement of native authorities, seems at some other time to have amounted to 10,616 or 10622.—According to the other method, the Sanhitâ is divided into ten *Man'd'alas*, or 'circles;' the Man'd'alas into 85 *Anuvâkas*, or 'sections;' these into 1017, and 11 additional, i. e., into 1028 *Sûhtas*, or 'hymns,' and the hymns into *R'ichs*, or verses, the number of which coincides, of course, with that of the former arrangement. The number of *padas*, or words, in this Sanhitâ is stated as being 153,826.

In eight out of the ten Man'd'alas, the first hymn or hymns are addressed to *Agni;* the next hymn or hymns generally to *Indra;* and after these come hymns to the *Vis'we Devâs*—the deities collectively—or hymns to other special deities. The eighth Man'd'ala begins with hymns to Indra, and the ninth is chiefly devoted to Soma.

As for the authorship of the hymns, the second Man'd'ala belongs chiefly to that of *Gr'itsamada*, the third chiefly to that of *Vis'wâmitra*, and the fourth chiefly to that of *Vâmadeva*. The fifth was composed chiefly by *Atri* and members of his family; the sixth by *Bharadvâja* and members of his family; the seventh by *Vasisht'ha* and his kin; the first, eighth, ninth, and tenth by various R'ishis.—The text of the Sanhitâ has been edited in Roman characters by Professor Th. Aufrecht (Berlin, 1861); and the text, with the commentary of Sâyan'a, is published by Professor Max Müller, there having already appeared vols. i.—vi. of this edition (Lond. 1849—1874). Of translations, the first volume of one by Max Müller appeared in 1869; that by the late Professor H. H. Wilson, which was left by him completed in manuscript, follows the commentary of Sâyan'a, based on Hindu tradition; that begun

by Professor Benfey in the Journal *Orient und Accident*, vols. i. and ii. (Gött. 1862—1864), is essentially speculative.

The Brâhman'a portion of the R'igveda is preserved in two works only—the *Aitareya Brâhman'a*, which consists of eight *Panchikâs*, or 'pentades,' each of these comprising five *Adhyâyas*, or 'lessons,' and all the Adhyâyas together, 285 *Khan'd'as*, or 'portions;' and the *S'ânkhâyana*, or *Kanshîtaki-Brâhman'a*, containing thirty *Adhyâyas*, also subdivided into a number of *Khan'd'as*. The following specimens, selected from the former, may illustrate the manner in which works of this category enjoin sacrificial rites and explain their secret meaning. The first relates to the ceremony of carrying the Soma (q. v.). 'The king Soma lived among the Gandharvas. The gods and R'ishis deliberated as to how the king might be induced to return to them. *Vâch*, the goddess of speech, said: "The Gandharvas lust after women. I (therefore) shall transform myself into a woman, and then you sell me to them (in exchange for Soma)." The gods answered: "No! how may we live without thee?" She said: "Sell me unto them; if you should want me, I shall return to you." Thus they did. In the disguise of a big naked woman, she was sold (by the gods to the Gandharvas) in exchange for Soma. In imitation (of this precedent), men drive away an immaculate cow of one year's age, this being the price at which they purchase the king Soma. This cow may, however, be rebought; for *Vâch* returned to the gods. Hence the Mantras, after Soma has been bought, are to be repeated with a low voice. After Soma has been bought, the goddess of speech is with the Gandharvas; but she returns as soon as the ceremony of carrying the sacred fire is performed.'

The following are the speculations of this Brâhman'a on the *Yûpa*, or sacrificial post, and the meaning of the sacrificial animal. '(The theologians) argue the question: Is the *Yûpa* to remain standing (before the fire); or is it to be thrown (into the fire)? (They answer:) For him who desires cattle, it may remain standing. (About this, the following legend is reported.) Once upon a time, cattle did not stand still to be taken by the gods for food. After having run away, the cattle stood still, and, turning towards the gods, said repeatedly: "Yon shall not obtain us. No, no!" Thereupon the gods saw that *Yûpa*-weapon which they erected. Thus they frightened the animals, which then returned to them. That is the reason that, up to this day, the sacrificial animals are turned towards the *Yûpa* (their head being bent towards the sacrificial post to which they are tied). Then they stood still to be taken by the gods for their food. . . . The man who is initiated (into the sacrificial mysteries) offers himself to all deities. Agni represents all deities, and Soma represents all deities. When the sacrificer offers the animal to Agni and Soma, he releases himself from being offered to all deities. Some say: "The animal to be offered to Agni and Soma must be of two colors, because it belongs to two deities." But this precept should not be attended to. A fat animal is to be sacrificed, because animals (compared to the sacrificer) are fat, and he (compared to them) is lean. When the animal is fat, the sacrificer thrives through its marrow. Some say: "Do not eat of the animal offered to Agni and Soma. Who eats of this animal, eats human flesh, because the sacrificer releases himself (from being sacrificed) by means of the animal." But this precept, too, should not be attended to. The animal offered to Agni and Soma was an offering to Indra, for Indra slew Vr'itra through Agni and Soma. Both then said to him: "Thou hast slain Vr'itra through us; let us choose a boon from thee." "Choose yourselves," answered he. But they chose this boon from him; and thus they receive (now as their food) the animal which is sacrificed the day previous to the Soma feast. This is their everlasting portion chosen by them; hence one ought to take pieces of it, and eat them.'—See M. Haug's edition and translation of the *Aitareya Brâhman'a* (vol. ii. pp. 59, 78), vols. i., ii. (Bombay, 1863).

The principal object for which the *Sâmaveda* was compiled is the performance of those sacrifices of which the juice of the Soma plant is the chief ingredient; and of such sacrifices the most important is the *Jyotisht'oma*, which consists of seven stages: the Agnisht'oma, Atyagnisht'oma, Ukthya, Shod'as'in, Atirâtra, Aptoryâma, and Vâjapeya; but the performance of the Agnisht'oma alone was considered obligatory for those who wished to derive the chief advantage accruing from the celebration of this grand ceremony; while its other six stages, though adding to the merits of the sacrificer, were deemed voluntary. At the performance of such Soma sacrifices, the verses of the Sâmaveda were intoned; and there are special song-books which teach the proper manner how to chant them. The Sanhitâ of the Sâmaveda is preserved in two recensions: in that of the *Rân'âyaniya*, and probably also the *Kauthuma* school. It consists of two parts: the first, the *Chhandograntha*, also called *Archika*, or *Pûrvârchika*, contains, in the present recension, 585 verses, which are arranged into 59 *Das'ati* or decades, these being divided into *Prapât'hakas*, or chapters, and the latter, again, into *Ardhaprapât'hakas*, or half-chapters. The second portion, called *Staubhika*, or *Uttarâgrantha*, or *Uttarârchika*, consists of 1225 verses, distributed over nine *Prapât'hakas*, which, too, are subdivided into *Ardhaprapât'hakas*. And there is this peculiarity in the Uttarâgrantha, that being for the most part arranged according to triplets of verses, the first verse of these triplets is frequently one which also occurs in the Archika portion. It is then called the *Yoni*, or parent verse, because the subsequent two, the *Uttarâ*, are symbolically its children, since they participate of all the modulations, stoppages and other modifications which may occur in the chanting of the 'parent' verse. These modulations, &c. are taught in the *Gânas*, or song-books mentioned before, two of which, the *Veyagâna* and *Aran'yagâna*, relate to the Archika; and two others, the *Ûhagâna* and *Ûhyagâna*, to the Staubhika part. The text of the Sâmaveda-Sanhitâ, in the Rân'âyanîya recension, has been edited and translated by Dr. J. Stevenson (Lond. 1842—1843), and by Professor Th. Benfey (Leip. 1848).

The number of *Brâhman'as* relating to this Veda is, by the native authorities, given as eight; and their names are: the *Praud'ha*, or *Panchavins'a-*, the *Shad'vins'a-*, the *Sâmavidhi-*, or *Sâmavidhâna-*, the *Arsheya-*, the *Devatâdhyâya-*, the *Vans'a-*, the *Sanhitopanishad-Brâhman'a;* and the *Upanishad*, which probably is the *Chhândogya-Upanishad*, and thus is ranked amongst the Brâhman'as. A later Brâhman'a, probably of modern date, and which is not mentioned by Sâyan'a, is the *Adbhuta-Brâhman'a*. The latter and the *Van'sa Brâhmana* have been edited by Professor A. Weber; the former in the *Indische Studien*, vol. iv. (Berlin, 1858); the latter in the *Abhandlungen der königlichen Akademie der Wissenschaften zu Berlin* (1858).

The history of the Yajurveda differs in so far from that of the other Vedas, as it is marked by a dissension between its own schools far more important than the differences which separated the schools of each other Veda. It is known by the distinction between a Yajurveda, called the *Black-*, and another, called the *White-Yajurveda*. Tradition, especially that of the Purân'as, records a legend to account for it. *Vais'ampâyana*, it says, the disciple of Vyâsa, who had received from him the Yajurveda, once having committed an offence, desired his disciples to assist him in the performing of some expiatory act. One of these, however, *Yâjnavalkya*, proposed that he should alone perform the whole rite; upon which, Vais'ampâyana, enraged at what he considered to be the arrogance of Yâjnavalkya, uttered a curse on him, the effect of which was, that Yâjnavalkya, disgorged all the Yajus texts he had learned from Vais'ampâyana. The other disciples, having meanwhile been transformed into partridges (*tittiri*), picked up these tainted texts, and retained them. Hence these texts are called *Taittirîyas*. But Yâjnavalkya, desirous of obtaining other Yajus texts, devoutly prayed to the Sun, and had granted to him his wish—'to possess such texts as were not known to his teacher.' And because the Sun on that occasion appeared to Yâjnavalkya in the shape of a horse (*vâja*), those who studied these texts were called *Vâjins*.

That part of this legend was invented merely to account for the name of the *Taittirîyas*, after whom a Sanhitâ and Brâhman'a of the Black Yajurveda, and for that of the *Vâjasaneyins*, after whom the Sanhitâ of the White Yajurveda is named, is clear enough. Nor is greater faith to be placed on it when it implies that the origin of this dissension ascended to the very oldest period of the Yajurveda; for there is strong reason to assume that the division took place even after the time of the grammarian Pân'ini (q. v.). See Goldstücker's *Pân'ini*, p. 130, ff. But so much in it is consistent with truth—that the Black Yajurveda is the older of the two; that the White Yajurveda contains texts which are not in the Black; and that, compared to the motley character of the former, it looks 'white,' or orderly. This motley character of the Black Yajurveda, however, arises from the circumstance, that the distinction between a Mantra and Brâhman'a portion is not so clearly established in it as in the other Vedas; hymns and matter properly belonging to the Brâhman'as there being intermixed. This defect is remedied in the White Yajurveda; and it points, therefore, to a period when the material of the old Yajus was brought into a system consonant with prevalent theories, literary and ritual.

The contents of both divisions of the Yajurveda are similar in many respects. Two of the principal sacrifices of which they treat are the *Dars'apûrn'amâsa*, or the sacrifice to be performed at new and full moon, and the *As'wamedha*, or the horse-sacrifice, at the performance of which 609 animals of various descriptions, domestic and wild, were tied to 21 sacrificial posts. A *Purushamedha*, or man-sacrifice, unknown to the other Vedas, is also mentioned in it; its character, however, is symbolical.

The text of the Black Yajurveda is extant in the recension of two schools—that of *Apastamba*, to which the *Taittirîya Sanhitâ* belongs, and that of *Charaka*. The former, which is in course of publication—the first volume and part of the second having been already published, with the commentary of Mâdhavâchârya (Sâyan'a), by Dr. E. Roer and E. B. Cowell in the *Biliotheca Indica* (Calcutta, 1860—1864)—consists of seven *Kân'd'a*, or books, which

comprise 44 *Prapât'haka*, or chapters, subdivided into 651 *Anuvâka*, or sections, and containing 2198 *Kan'd'ikâs*, or portions.

The *Vâjasaneyi-Sanhitâ*, or the Sanhitâ of the White Yajurveda, exists in the recension of the *Mâdhyandina* and *Kân'va* school. In the former—the text of which, apparently also with the commentary of *Mahîdhara*, has been edited by Professor A. Weber (Berlin, 1852)—this Sanhitâ has 40 *Adhyâyas*, or books, subdivided into 303 *Anuvâkas*, with 1975 *Kan'd'ikâs*.

The principal Brâhman'a of the Black Yajurveda is the *Taittirîya Brâhman'a*, which, with the commentary of (Mâdhava) Sâyan'a, is in the course of publication by Baboo Rajendralàla Mitra—the first volume and part of the second having already appeared in print (Calcutta, 1860—1865) in the *Bibliotheca Indica*. That of the White Yajurveda is the *S'atapathat-Brâhman'a*, the most complete and systematic of all Brâhman'as. Its text, with a semblance of the commentary of *Sâyan'a*, has been edited by Professor A. Weber (Berlin, 1855).

The Atharvaveda has no circle of sacrifices assigned to it. Its object is, as observed before, to teach how to appease, to bless, to curse, &c. 'The most prominent characteristic feature of this Veda,' Professor Whitney, one of its editors, remarks, 'is the multitude of incantations which it contains; these are pronounced either by the person who is himself to be benefited, or, more often, by the sorcerer for him, and are directed to the procuring of the greatest variety of desirable ends. Most frequently, perhaps, long life, or recovery from grievous sickness, is the object sought; then a talisman, such as a necklace, is sometimes given, or, in very numerous cases, some plant endowed with marvelous virtues is to be the immediate external means of the cure; further, the attainment of wealth or power is aimed at, the downfall of enemies, increase in love or in play, the removal of petty pests, and so on, even down to the growth of hair on a bald pate.'—*Journal of the American Oriental Society*, vol. iii. p. 308.

It has been surmised (Müller's *Ancient Sanscrit Literature*, p. 447, ff.) that the hymns of the Atharvaveda 'formed an additional part of the sacrifice from a very early time, and that they were chiefly intended to counteract the influence of any untoward event that might happen during the sacrifice.' This is possible; but the great importance which the adherents of this Veda themselves attach to it is founded on other considerations than these. They argue, as appears from the treatise *Atharvan'arahasya*, mentioned above, that the three other Vedas enable a man to fulfil the *dharma*, or religious law, but that the Atharva helps him to attain *moksha*, or eternal bliss. This doctrine is laid down, for instance, in the *Châlika Upanishad* of this Veda, when its says: 'Those Brâhmans and others who know the science of the (neuter) Brâhman contained in the *Brahmaveda*, become merged in Brâhman;' and it is likewise inferred from other passages in the *S'aunaka Brâhman'a*. The name of *Brahmaveda* itself, by which this Veda is also frequently called, is therefore explained by them, not as implying the Veda which belongs to the province of the priest Brahman, but the Veda which contains the mysterious doctrine of Brahman, the supreme spirit, into which the human soul becomes finally absorbed. It is probable, therefore, that the very uselessness of the Atharvaveda for sacrificial purposes, and the reluctance which was felt to base its sanctity merely on its incantations and spells, invested it, in the mind of its followers, with a spiritual character, which was then fully developed in the numerous Upanishads (q. v.) now connected with it.

The text of the Atharvaveda is preserved only in the *S'aunaka* school. Its Sanhitâ consists, in the present edition of it, of 20 *Kân'd'as*, or books. Of these, the first 18 are subdivided into 34 *Prapât'hakas*, or chapters, with, altogether, 94 *Anuvâkas*, or sections, each containing a number of *mantras* (the 17th Kân'd'a consisting of a single Prapât'haka). The 19th Kân'd'a is not divided into Prapât'hakas, but into *Anuvâkas*, of which it contains seven; and the 20th, likewise divided into *Anuvâkas*, has nine, of which the third is subdivided into three *Paryâyas*.—The text of this Sanhitâ has been edited by Professors R. Roth and W. D. Whitney (Berlin, 1856).

The only existing Brâhman'a of this Veda is the *S'aunaka-* or *Gopatha-Brâhman'a*. 'That this Brâhman'a,' Professor Müller observes, 'was composed after the schism of the Charakas and Vâjasaneyins, and after the completion of the Vâjasaneyi-Sanhitâ, may be gathered from the fact, that where the first lines of the other Vedas are quoted in the Gopatha, the first line of the Yajurveda is taken from the Vâjasaneyins, and not from the Taittirîyas.'—*Ancient Sanscrit Lit.*, p. 452. Each of these Vedas received in time *Anukraman'is*, or indices, which give the first word of each hymn, the number of verses, the names of the deities, the name and family of the poets, and the metre of every verse. The principal treatise of this kind is the *Sarvânukraman'i*, or 'The General Index,' ascribed to the authorship of *S'aunaka*. For the theosophical works which grew out of these Vedas, see the article UPANISHAD; and for the works which were composed in order to secure a correct reading and understanding of the Vedic texts, and a correct performing of sacrificial acts, see the article VEDANGA.—At a later period the name of Veda was also bestowed on *Itihâsas*—legends or legendary works—and *Purân'as* (q. v.), collectively; but in this sense it never obtained real currency. *Upavedas*, or minor Vedas, are also mentioned in the *Charan'avyûha* and other works, and explained by them in the following manner.

The Upaveda of the R'igveda, they say, is the *Ayurveda*, or the Veda on medicine—probably the well-known works of Charaka and Sus'ruta; the Upaveda of the Yajurveda is the *Dhanurveda*, or the Veda on archery; the Upaveda of the Sâmaveda is the *Gândharvaveda*, on music; and the Upaveda of the Atharvaveda is the *S'ilpas'âstra*, a work on mechanical arts, or, according to others, the *Arthas'âstras*, works on practical subjects, comprising polity, mechanical science, the training of elephants and horses, and fencing.

In the preceding brief outline of the four Vedas, the question as to the date at which they were composed has not been raised, because, in the present condition of Vedic philology, an answer to it could only be hypothetical. From astronomical facts, based on a statement in a Vaidik calendar, Colebrooke concluded that this calendar was written in the 14th c. before the Christian era (*Miscell. Essays*, vol. i. pp. 109, 110); and though subsequent writers have questioned the full correctness of this conclusion, those most reliable nevertheless admit that the error, if any, could not lessen the antiquity of this calendar by more than 100 or 200 years. As this calendar must have been composed after the R'igveda had been arranged, and as such an arrangement itself must be posterior to the date of its last hymn, a full scope is left for imagination to fill up these intervals. But let it be understood that imagination alone would have to perform this task, since scientific research has as yet not yielded any means to check it, or prompt it on, as the case may be; nor is there any real prospect that future discoveries in Sanscrit literature will supply this want. A safer basis, however, may be looked for, if future research restricted itself to the question as to the *relative* age of these Vedic writings.

Much valuable evidence has been already brought forward in this respect to prove that there are R'ishis ancient, and less ancient (see, for instance, J. Muir's *Original Sanscrit Texts*, vol. ii. p. 205, ff.); that there are R'igveda hymns older than others (for instance, in Müller's *Ancient Sanscrit Literature*); but, on the other hand, much confusion has also been produced by starting a theory, that all the Brâhman'as belong to one period, and all the hymns to another period preceding it, of which, again, two stages were thought to be discernible, and by assigning dates to the Brâhman'a period, as well as to each of the two stages of the Mantra period. For, apart from the purely imaginary value of such dates, and apart from the circumstance, that no evidence whatever has as yet been brought forward to justify an assumption of only two stages of hymns, each of which would comprise only 200 years, it is clear that the similarity of subject-matter alone—such as it marks the literary character of the Brâhman'as—cannot be a criterion for determining that *all* the Brâhman'as must be more recent than *all* the Sanhitâs. That a Brâhman'a of the R'igveda must be posterior to those hymns of the R'igveda Sanhitâ which it mentions, but to those alone—again, that a Brâhman'a of the Sâmaveda must be younger than the hymns of the Sâmaveda on which it relies, and so on—cannot be matter of doubt; but as the Sanhitâ of the Sâmaveda, for instance, must be more recent than that of the R'igveda, and as no fact whatever has been adduced to show why the Aitareya Brâhman'a, or other Brâhman'as of the R'igveda, could not have appeared before a Sâmaveda-Sanhitâ was made, and so forth in the case of the other Vedas, it follows that it would be entirely unsafe to infer that all the Brâhman'as must be more recent than all the Sanhitâs; nay, even that all the Brâhman'as must be later than *all* the hymns of the R'igveda, since not all of them need have existed before the oldest Brâhman'a of this Veda was composed. A result like this is, unhappily, purely negative. See the *Hymns of the Rigveda in the Sanhitâ and Pându Texts*, by F. Max Müller, 2 vols.

VEDANGA—from Veda (q. v.) and *anga*, limb; hence, literally, 'the limb of (the body of) the Veda'—is the name of six Sanscrit works, the object of which is to teach how to read and understand correctly the Vedic texts, and how to apply them correctly to sacrificial purposes. Whether the number of these works was originally the same as it now is, and already was at the time of the Upanishads, may be doubtful. Tradition mentions the following Vedângas: 1. *S'ikshâ*, or the science of proper pronunciation. It is represented by a short treatise of 35, or, in another recension, of 59 verses, which explains the nature of letters, accent, and pronunciation, and is ascribed to *Pân'ini* (q. v.). 2. *Chhandas*, or (a work on) metre, which is ascribed to *Pingala*. 3. *Vyâkaran'a*, or grammar, by which native authorities understand the celebrated work of *Pân'ini* (q. v.); but never those short books especially concerned in Vedic peculiarities, called *Prâtis'âkhyas*, the existing

representatives of which, in all probability, are posterior to Pân'ini (see Goldstücker's *Pân'ini*, &c., p. 183, ff.). 4. *Nirukta* (q. v.). 5. *Jyotisha*, or astronomy. 'Its chief object is to convey such knowledge of the heavenly bodies as is necessary for fixing the days and hours of the Vedic sacrifices.' 6. *Kalpa*, or works on the Vedic ceremonial, which systematize the ritual taught by the Brâhman'a portion of the Veda, omitting, however, all legendary or mystical detail. They are composed in the Sûtra style. See SUTRA. The Kalpa, or 'Sranta, Sûtras belonging to the R'igveda are the *As'walâyana-*, *Sânkhâyana*. and *S'aunaka Sûtras;* those relating to the Sâmaveda, the *Mas'aka-*, *Lâtyâyana-*, and *Drâhyâyan'a* Sûtras; those of the Black Yajurveda, the *Apastamba-*, *Bâudhâyana-*, *Satyâshâd'ha-*, *Hiran'yakes'in-*, *Mânava-*. *Bhâradvâja-Vâlhûna-*, *Vaikhânasa-*, *Laugâkshi-*, *Maitra-*, *Kat'ha-*, and *Vûrâha* Sûtras.

The White Yajurveda has only one Kalpa, or 'Sranta, Sûtra connected with it, the *Kâtyâyana* Sûtra, and the Atharvaveda likewise only one, the *Kus'ika Sûtra.*—At a later period, these works were supplemented by a similar class of works, which, however, merely describe the domestic ceremonies, viz., 'the marriage rite, the rites to be performed at the conception of a child, at various periods before his birth, at the time of his birth, the ceremony of naming the child, of carrying him out to see the sun, of feeding him, of cutting his hair, and lastly, of investing him as a student, and handing him to a guru, under whose care he is to study the sacred writings.' Works of this kind are called *Gr'ihya-Sûtras* (from *gr'iha*, house), and to these, again, were added the *Sâmayâchârika-Sûtras* (from *samayâchâra*, conventional practice), which treat of customs sanctioned by the practice of pious men, but not enjoined or expressly stated in the Gr'ihya-Sûtras. The two last classes of Sûtras, which are not comprised amongst the Kalpa works, then grew into the *Dharma-s'âstras*, or law-books, of which that of *Manu* is the chief representative. See Müller's *Ancient Sânscrit Literature*, p. 108, ff.

VEDANTA (from the Sanscrit *veda*, and *anta*, end; hence, literally, 'the end or ultimate aim of the Vedas') is the second great division of the *Mîmânsâ* (q. v.) school of Hindu philosophy. It is chiefly concerned in the investigation of *Brahman* (neuter), or the Supreme Spirit, and the relation in which the universe, and especially the human soul, stands to it; and in contradistinction from the *Pûrvamîmânsa*, or the investigation (*mîmânsâ*) of the former (*pûrva*) part of the Vedas—viz., the Sanhitâ, and especially the *Brâhman'as* (see VEDA)—which contain the *dharma*, or religious law (see MIMANSA), it is also called *Uttara-mîmânsâ*, or the investigation (*mîmânsâ*) of the latter (*uttara*) part of the Vedas—viz., *Aran'yakas* and *Upanishads* (q. v.), which treat of (the neuter) *Brahman*, or the Supreme Spirit [not to be confounded with (the masculine) *Brahman*, or the god of the mythological *Trimûrti* (q. v.)]. Sometimes the name given to it is *S'ârîraka-mîmânsâ*, or the investigation of the soul (s'âriraka).

In its method, the Vedânta differs from the Nyâya (see NYAYA and VAIS'ESHIKA) by endeavoring to explain the universe as a successive development from one ultimate source or principle—whereas the Nyâya, in both its divisions, treats of the objects of human knowledge of which the universe is composed, under different topics, unconcerned about their mutual relation of effect and cause; and from the *Sânkhya* (see SANKHYA and YOGA), it is distinct, inasmuch as that system is based on the assumption of a duality of principles whence the universe derives its origin.

The object-matter of the Vedânta is the proof that the universe emanates in a successive development from a Supreme Spirit or soul, which is called *Brahman* or *paramâtman;* that the human soul is therefore identical in origin with Brahman; that the worldly existence of the human soul is merely the result of its ignorance of this sameness between itself and the Supreme Spirit; and that its final liberation or freedom from Transmigration (q. v.) is attained by a removal of this ignorance, that is, by a proper understanding of the truth of the Vedânta doctrine.

According to this doctrine, *Brahman* (neuter) is both the efficient and material cause of the world, creator and creation, doer and deed. It is one, self-existent, supreme, as truth, wisdom, intelligence, and happiness; devoid of the three qualities, in the sense in which created beings possess them; and at the consummation of all things, the whole universe is resolved or absorbed into it. From Brahman individual souls emanate, as innumerable sparks issue from a blazing fire. The soul, therefore, is neither born, nor does it die; it is of divine substance, and as such, infinite, immortal, intelligent, sentient, true. Its separate existence, as distinct from Brahman, is the cause of its ignorance; and this ignorance, which consists in regarding the world as a reality capable of subsisting without Brahman, has a double power—that of enveloping and projecting. By means of the former, it makes the soul liable to mundane vicissitudes, as to the sensations of pleasure, pain, &c.

The projective power of ignorance, when encompassing the soul in its fourth condition, or that of pure intellect (its other conditions are: waking, dreaming, and dreamless sleep), produces out of the darkness which then prevails the five subtile elements—viz., *ether*, which is the substratum of the quality sound; *air*, which arises from ether, the substratum of touch; from air, *fire or light*, the substratum of color; from light, *water*, the substratum of savor; and from water, *earth*, the substratum of smell. From these subtile elements are then produced seventeen subtile bodies and the five gross elements. The former, also called *lingas'arîra*, because they are bodies (*s'arîra*) which impart to existing beings their individual character (*linga*). are *the five organs of perception*—viz., the organs of hearing, touch, sight, taste, and smell, which arise severally from the *pure* or inactive particles of each of the subtile elements; further, *two intellectual organs*, which are produced from the *mingled pure*, or inactive particles of the subtile elements—viz., *buddhi*, understanding, the function of which is to arrive at a certainty or conclusion, and *manas* (an organ of volition and imagination), the function of which consists in willing and doubting—thinking and referring the external objects to one's own self, being two functions common to both of them; lastly, *the five organs of action*—viz., the voice, the hands, the feet, the organ of excretion and that of generation, which are severally produced from the *foul* or *active* particles of each of the subtile elements; and *the five vital airs*, which are produced from the *mingled foul* or *active* particles of the subtile elements—viz., the air breathed forth, which has its place in the fore-part of the nose; the air breathed downwards, which has its place in the lower intestines; the air which circulates through the whole body; the ascending air, which has its place in the throat, and the descending air in the middle of the body, which causes assimilation and digestion of food, produces semen, excrements, &c. (Later Vedântists assume ten such vital airs—viz., besides the foregoing, the airs which severally cause retching, winking, hunger, yawning, and fattening.)

The five *gross elements* are the five subtile elements, when, according to a theory derived from a scriptural text, they have become so divided and combined that each of them retains a preponderating portion of itself, and consequently of the quality of which it is the substratum—as ether of sound, &c.—and besides smaller portions of the other subtile elements, and the qualities of which they are the substrata. From these gross elements then arise the various (mythological) worlds, and this world too, with bodies which are distinguished as viviparous, or those produced from a womb, as men, beasts, &c.; oviparous, or those produced from an egg, as birds, snakes, &c.; those generated by 'sweat' or hot moisture, as lice, gnats, &c.; and those germinating, as creepers, trees, &c. The soul, when existing in the body, is encased in a succession of 'sheaths.' The first or interior 'sheath' consists of *buddhi*, associated with the organs of perception; the second, of *manas*, associated with the organs of action; and the third, of the vital airs together with the organs of action. These three 'sheaths' constitute the subtile body of the soul, which attends the soul in its transmigrations; and the collective totality of such subtile bodies is the Supreme soul, as regarded in its relation to the world; when it is also called 'the soul which is the thread,' or passes like the thread through the universe, or Hiran'yagarbha, or life. The fourth and exterior 'sheath' of the soul is composed of the gross elements; and the collective aggregate of such gross bodies is the gross body of the deity. This whole development being the result of ignorance, the soul frees itself from its error by understanding that the different stages in which this development appears, do not represent real or absolute truth; and when its error has completely vanished, it ceases to be reborn, and becomes re-united with Brahman, whence it emanated. But since the means of arriving at a final deliverance can only be the complete mastery of the truths of the Vedânta, other means, such as the performance of sacrifices or other religious acts enjoined by the Vedas (q. v.), or the practice of Yoga (q. v.), cannot lead to the same result. They may be meritorious, and are even recommended as such, but can effect only an apparent liberation. Of this, there are two kinds: one liberation which is effected in lifetime, and enables a man to perform supernatural actions or wonders, as the evocation of the shades of progenitors, going anywhere at will, and similar feats; and another which takes place after death, and enables the soul, not divested of its subtile body, to reside in heaven; but after a time its effect ceases, and the soul has to renew its mundane existence.

In order to fit the mind for meditating on these truths, various moral duties are enjoined, and various practices are recommended, especially by later Vedânta writers. Thus, the student of the Vedânta is told not to hurt a sentient being, to speak the truth, not to steal, to practice continence, and not to accept gifts; to remain pure and content, to do penance, and to study the Vedas; also to remain in certain postures, to practice various modes of suppressing his breath, and the like. These injunctions, however, are extraneous to the doctrine itself, and appear to be a compromise with the old orthodox faith, which requires the performance of religious acts, and a later stage of it, which favors

such austere practices as are especially known by the name of Yoga (q. v.). The doctrine of *bhakti*, or faith, does not belong to the older Vedânta; it is, however, an interesting feature of the later periods of this philosophy; and the same observation applies to the doctrine of *Mâyâ*, or illusion, according to which the world has no reality whatever, but is merely the product of imagination; for the older Vedânta, as will have been seen, merely teaches that the world is not *the truth*, but does not deny its material reality.

The oldest work on this philosophy is attributed to *Bâdarâyan'a*, or *Vyâsa* (q. v.), and is written in the Sûtra (q. v.) style; it is called the *Brahma-Sûtra;* it consists of four *adhyâyas*, or lectures, each subdivided into four *pâdas*, or chapters; each pâda containing a number of Sûtras. The number of the latter is 558, and that of the *adhikaran'as* or topics treated in them 191. The most important commentary on this work is the *S'ârîrakamîmânsâbhâshya*, by *S'ankarâchârya* (q. v.); and this commentary, again, has been commented on by a great variety of writers. The text of the Sûtras and this commentary have been edited at Calc. 1818; and the text with this commentary, and a gloss on the latter, by Govindânanda, in the *Bibliotheca Indica*, by Pandita Râma Nârâyan'a Vidyâratna, Calc. 1863.

Of the great number of other commentaries on the Brahma-Sûtras, mention may be made only of that by *Râmânuja* (q. v. under VAISHN'AVAS), and of a short but very lucid one, by *Anûpanârâyan'as'iroman'ibhat't'a* (edited at Calc., without date). Amongst elementary treatises on the Vedânta, the most popular is the *Vedântasâra*, by *Sadânanda*, which, with the commentary of *Râmakr'ishn'a Tîrtha*, has been edited at Calc. 1829, and with this and another commentary by *Nr'isinhasaraswatî*, at Calc. 1849. It has been edited and translated also by the late Dr. J. R. Ballantyne (*A Lecture on the Vedânta, embracing the Text of the Vedânta Sâra*, Allahabad, 1850), who also translated the beginning of the Brahma-Sûtras.—A very useful compendium of the *Adhikaran'as*, or topics, is the *Adhikaran'amâlâ*, by *Bhâratîtîrtha*, which, with the commentary of *S'rî Anandachandra-Vedântavâgis'a*, has been edited, Calc. 1862, and as an appendix to the Brahma-Sûtras, with extracts from this commentary, in the *Bibliotheca Indica*, 1863.

VEDETTES are mounted sentinels, placed about 100 yards in advance of the outposts of an army, to keep a strict watch upon the enemy's movements, and to signal immediately the approach of danger. They should be placed two together.

VEER, in Sailing, is to pass from one board to the other, by bringing the stern to windward. It is therefore the same action as *Gybing* (q. v.).

VEGA, GARCILASO DE LA. See GARCILASO.

VEGA-CARPIO, LOPE FELIX DE, a celebrated Spanish poet, was born at Madrid on the 25th November 1562. From his very infancy, he is said to have given promise of extraordinary talent. Like Pope, he 'lisped in numbers.' On the death of his father, the family, originally a good one, fell into great difficulties, and was broken up. The young Lope fell to the charge of his uncle, the Inquisitor, Miguel del Carpio, who spared no pains to give him a good education. He was sent to the Imperial College at Madrid, and seemed to be progressing quietly towards the holy state, to which, by his uncle, he was destined, when an odd whim struck the lad, and, being then fourteen, he went off on a roving expedition with a comrade. But he and his companion were speedily arrested as thieves on their trying to effect the sale of a chain of gold (probably stolen from Lope's uncle), and sent back to Madrid. The returning prodigal was but coolly received by his reverend relative, who declined to further concern himself with a nephew of such distinctly *lay* propensities. He, in consequence, became a soldier; and in 1577 served at Terceira against the Portuguese. After this, we find him taken in hand by Geronimo Manrique, Bishop of Avila, who sent him to finish his studies at the university of Alcala. Here he was again ripening for holy orders, and was nearly in fact ripe, when again the passion of the vagabond drove him out upon the world a pervert. For some time, at this period of his life, Lope disappears from public view; and probably his adventures were of the kind which a discreet biographer will always permit his hero to prosecute as far as possible in private. It is understood that in his dramatic romance *Dorothea*, he afterwards favored the world with a sketch of himself and of these his early experiences; and if this is in detail to be taken as history, Lope, on his own showing, must have been no more a model of propriety than certain other great poets who might be named.

Towards 1585, we find him again at Madrid, attached to the person of the young Duke of Alva, for whom he composed the piece entitled *Arcadia*, a tedious pastoral, with verses interspersed, which only in detached passages displays his brilliant ability. About this time, he married a lady of condition, by name Isabella de Urbino; but his domestic felicity was speedily cut short by a misadventure. Having had some difference with a gentleman of court, he satirized him in a filthy ballad; and on finding that he took it amiss, gave him satisfaction by running him through the body. For this he was thrown into prison, and afterwards exiled to Valencia. He returned to Madrid as soon as he could with safety, and soon after lost his wife, whom he is said to have tenderly loved. Grief for her death, complicated with want of success in another of his little love-affairs, drove him to join the famous *Armada*, then being fitted out for the conquest of England. Through the perils of this disastrous expedition Lope came with a whole skin, and in 1590 was again safe in Madrid. A brother, to whom he was much attached, and who sailed as an officer in the same vessel, had not the same luck, but died during the voyage. It is a characteristic trait, that Lope—who, whatever else he may be doing, must always be conceived as flooding out continuous torrents of verse—composed, amid the distractions of tempest and battle, a long poem, the *Hermosura de Angelica*, which, as a continuation of the *Orlando Furioso* of Ariosto, has found favor even with express admirers of that poet. Shortly after his return, he became secretary to the Marquis of Malpica, and subsequently to the Count of Lemos, whose service he quitted soon after his marriage, in 1597, to Donna Juana de Guardio, resolving thenceforward to trust solely to literature for his livelihood. This he could well do with every confidence, as already one of the most admired authors of the day, and by far the most popular dramatist. The years immediately succeeding, he himself frequently afterwards refers to as the happiest period of his life; but it was not of very long duration.

At the age of seven, his son Carlos died; and soon after, in giving birth to a daughter, his wife also died. The double blow was severe. A mistress, indeed, remained to console him, Donna Maria de Luxan, by whom he had a boy and girl, the latter of whom, Marcela, was the most beloved of all his children. But he had no doubt got a little tired of Donna Maria; and about this time he began to turn his thoughts seriously to religion. Having had as much vice as he cared for, he considered he had reached the point in his career at which piety might begin to be prosecuted with advantage. Accordingly, after an interval of devout preparation, he became, in 1609, a priest of the order of St. Francis. Of his zeal in his new functions, there is evidence in the fact, that in January 1623, he took prominent part in the ceremony of burning a heretical brother of his order. As to his performance of priestly duty otherwise, strictly thus much is known, that, with his old unremitting assiduity, he continued to pour forth poems and dramas, not always of a clerical or decent kind. During his last years, he fell into a profound religious melancholy. Despite the decay of his strength, he was rigorous in keeping himself up to the severest mark of discipline; in particular, he scourged himself terribly. Finally, in the beginning of August 1635, he gave himself a scourging so terrible, that the walls of the chamber were found bespattered with his blood; and some days after he died of it, at the ripe age of 73. If the poet in his later days thus exercised a little severity with himself, we may allow him to have been the best judge as to how far the peccadillos of his earlier ones might deserve it.

Lope was the idol of his contemporaries; and on the fruits of his labor, he lived in Madrid in what might be called splendor, when the really far greater Cervantes was starving in the same street. To such an extent was the popular admiration of him carried, that his very name became a synonym of excellence; and people spoke of a Lope jewel, a Lope poem, or the like, as one of unsurpassable perfection. For a long time, nobody else than Lope de V. was willingly heard on the Spanish stage; and his fame abroad (especially, of course, in Italy and in France) was almost as remarkable. In one quality, at least, Lope must be held to have surpassed all other poets—his productiveness was something portentous, and without parallel. Setting aside his other multitudinous performances, the dramas on which his popularity mainly rested, and which have since perpetuated his fame, have been calculated to number not less than 1800. He himself, in one of his latest works, more modestly puts them at something over 1500, and assures us that to write a whole drama in a day was no unusual feat with him. Even if we suppose in this something of the fabulous, there remain in print between five and six hundred of these pieces, to testify to his enormous fecundity; and it is certain that many more of his plays were acted, which have not in this form survived. The quantity of his work considered, its quality is not much less surprising. His fertility of invention is marvelous; the ease and grace of his versification are unsurpassed in the language in which he writes; and his pieces, even when slight in substance, are instinct with life and dramatic movement. In deep and serious qualities he is deficient, on which ground he is now ranked below his immediate successor, and some time contemporary, Calderon. With this single exception, he remains, however, the chief ornament of the Spanish stage, and a not inconsiderable figure in the dramatic literature of the world. An intelligent and full survey of his works, so far as the infinity of

them permits it to be full, will be found in Ticknor's *History of Spanish Literature*, to which readers are referred.

VE'GETABLE, in a scientific sense, is a term synonymous with plant. Organic nature is divided into the *Animal Kingdom* (q. v.) and the *Vegetable Kingdom*. See PLANT. The word vegetable is derived from the Latin *vegetus*, lively, or healthy. *Vegetation* is the term employed to denote the growth of plants.

VEGETABLE CHEMISTRY, or the Chemistry of Plants, is so extensive a subject that it is impossible here to give much more than an enunciation of the most important propositions, without entering into full proofs or details. On submitting to incineration, a plant which has been dried at a moderate heat till it ceases to lose weight, we find that the residue, which consists of mineral salts and a little carbon, is much lighter than the original plant, the portion which is burned off, or apparently lost, corresponding to the organic constituents of the plant. Hence every plant, like every animal, is composed of *organic* and *mineral* or *inorganic constituents*. While the mineral constituents of the plant are also found in the crust of the earth, the organic constituents are primarily formed in the plant itself from inorganic matters, viz., from *water*, *atmospheric air*, and the *soil*, which collectively may be termed the food of plants.

The following general principles may be laid down regarding the organic constituents which mainly contribute to form the bulk of the body of the plant. (1.) All organic constituents of plants contain *carbon*. (2.) All such organic constituents contain *hydrogen*. Some of them, as, for example, many ethereal or volatile oils, consist solely of these two elements. (3.) The greater proportion of these compounds contain *oxygen* in addition to the two preceding elements. To this class belong those constituents of plants which are at the same time of the most general diffusion and of the greatest physiological and economic importance; namely, the so-called *carbo-hydrates*, which consist of carbon combined with hydrogen and oxygen in the exact proportion in which the last two elements form water. Under this title are included cellulose, starch, gum, &c. Other organic constituents contain not only carbon with hydrogen and oxygen in the above ratio, but an excess of oxygen. In this category may be placed almost all the *organic acids*, many *ethereal oils*, *wax*, the *resins*, many of the so-called *glycosides*, and the *fats*. (4.) With the above elements, *nitrogen* is associated, to form two very important groups of constituents, viz., the *organic bases* or *alkaloids*, and the *albuminates* or *proteine bodies*. Although the nitrogenous groups never form more than a small part of the mass of a plant, nitrogen is never altogether absent from a plant. (5.) In association with all the above-named elements, *sulphur* in small quantity is present in the albuminates of all plants; in association only with carbon and hydrogen, it occurs in oil of garlic and oil of assafœtida; and when combined with carbon, hydrogen, and nitrogen, it has been as yet only found in oil of mustard. Whether *phosphorus* in very minute quantity occurs in any of the vegetable albuminates, is still uncertain.

The inorganic constituents which are found in the ashes of all plants are: *potash*, *soda*, *magnesia*, and *lime*, in combination with *phosphoric*, *sulphuric*, *hydrochloric*, and *carbonic acids*, and additionally, *iron*, *manganese*, and *silica*, with traces of *fluorine;* while the marine plants or sea-weeds contain also appreciable quantities of *bromine* and *iodine*. *Alumina* and *baryta* are also occasionally found, as also are *nitrates* in certain plants. The carbonates almost always found in the ash are, as is well known, for the most part formed by the action of the incineration upon the salts of the vegetable acids, such as the acetates, citrates, &c., and probably in some other respects, the arrangements of the constituents of the ash are not precisely identical with those of the mineral ingredients while existing in the actual plant. Amongst the most essential of the inorganic constituents is *water*, which acts as a solvent for the matters dissolved in the vegetable juices, and forms a very preponderating part of the mass, sometimes amounting to from 86 to 96 per cent. of the whole plant. From the preceding remarks, it is obvious that the nutrition and development of plants is dependent on their absorbing *carbon-compounds*, *hydrogen-compounds*, *nitrogen-compounds*, *sulphur-compounds*, *water*, and such *inorganic compounds* as yield the necessary inorganic constituents in a form capable of assimilation; together with the presence of *oxygen*, which is required for the formation of organic oxygenous compounds.

The assimilation of *carbon* first claims our attention. The composition of the atmospheric air, from whatever part of the earth's surface it is taken, is, as is well known, constant, in so far as the relative volumes of oxygen and nitrogen are concerned; while the variations in the carbonic acid, except when there are obvious causes for an excess (as, for example, an over-crowded room), are very slight, and, as a general rule, deviate scarcely at all from 4 volumes in 10,000 of air. Yet causes disturbing this uniformity are perpetually at work. Professor Mulder, adopting Lavoisier's and Davy's experiments, according to which a man consumes about 26 cubic feet of oxygen in 24 hours (and later observers place the daily quantity at 45 cubic feet), calculated his yearly consumption at more than 9500 feet.

Considering the enormous numbers of men and animals on the surface of the globe, and the lamps, fires, furnaces, &c., ever burning, the atmosphere would apparently soon cease to be fit for the support of life (1) in consequence of the great diminution of oxygen, a gas essential to life, and (2) in consequence of the great excess of carbonic acid, a gas deleterious to life. The cause of this marvelous uniformity of atmospheric air under these circumstances is that function of plants by which they absorb their carbon. It is to the experiments and observations of Priestley in 1771, Ingenhousz in 1776, Senebier in 1807, and many later observers, that we are indebted for the knowledge of the great general fact, that plants take up the carbonic acid from the air, reduce it in their organism, and retain the carbon for the composition of their own organisms, while they restore the oxygen gas to the atmosphere. It is chiefly by the leaves, which may be regarded as the respiratory organs, that this process is carried on. It is needless here to notice the questions as to whether it is only during light, or constantly, that these changes go on; whether different rays of the spectrum act with more or less power in liberating the oxygen, &c. Independently of the proof afforded, for example, by placing green plants in a mixture of 70 parts of common air and 30 parts of carbonic acid, and finding that, in the course of four hours, the carbonic acid has been almost entirely replaced by oxygen, we have obvious evidence in the case of lichens growing on a naked rock, that the carbon which they contain must be obtained from the atmosphere. In the case of aquatic plants, the process is identical, the atmospheric air being dissolved in the water. Carbon, in some form of combination or other, probably forms about two-thirds of the weight of a dried plant.

The assimilation of *hydrogen* from the decomposition of water in and by the plant, is not capable of the same direct proof as that of carbon; but there are strong grounds for believing in its occurrence. This view is supported by the composition of wax, the resins, volatile oils, &c., and indeed it is difficult to see from what other source the hydrogen could be derived. In that case, the water, like the carbonic acid, contributes its oxygen to the air. The *nitrogen*, which enters into certain constituents of plants, is derived from ammonia, and not, as might have been supposed, directly from the air, of the volume of which it forms about four-fifths. It has been shown by the direct observations of Boussingault that plants cannot assimilate nitrogen, that those which have been made to absorb it by placing their roots in nitrogenous water, throw it off unchanged, and that vegetation cannot exist in a soil which contains no substances readily convertible into ammonia. The indifference of nitrogen to other elements, and the extreme readiness with which ammonia becomes decomposed, and enters into different combinations (the amides, imides, amido-acids, compound ammonias, and probably also the albuminates being derivatives of it), together with the conclusion we draw from the action of liquids containing ammonia, or matter convertible into it, as gas-liquid, fluid sewage, &c., confirm this view. The ammonia taken up by plants is obtained partly from the air, and partly from the soil. In the air it is formed after thunderstorms, and it is further supplied to the atmosphere by putrefactive processes, animal excretions, and volcanic action. It is indeed found in snow and in all rain-water, and is thus conveyed to the soil. Although direct experiments show that the air contained in the pores of the soil is richer in ammonia than ordinary atmospheric air, it is easy to show that a plant can derive its ammonia from the latter alone, by a reference to the vegetation on naked rocks, or by growing plants in powdered charcoal duly moistened with rain-water. Hence both air and soil contribute the ammonia from which the nitrogen is fixed in the plant.

The *oxygen* which occurs in the various constituents of the plant is derived from the decomposed carbonic acid and water, and corresponds to the difference between the amount contained in those absorbed compounds and the amount liberated to the atmosphere. The *sulphur* that occurs in the albuminates and certain ethereal oils, must be derived from the soil, since it does not occur either free or in combination in the air; and as the only form in which it is found in common soil is as sulphates, plants must have the property of decomposing these salts, and appropriating their sulphur after reduction. Extensive experience has proved that certain *inorganic constituents* are as indispensable to the life and development of the plant, as the organic elements we have been considering; and further, that special plants require special inorganic constituents, as is shown in works on agricultural chemistry. The two following facts seem well established: (1) that the roots of plants exert a special selective power, and absorb some salts, and reject others that are also in solution in the water of the soil; and (2) that the top or vegetable soil has the power of absorbing and retaining the most necessary mineral ingredients, and does not allow them to be carried deep into the ground by the rain; but for the discussion of this

subject, we can only refer to the experimental researches of Liebig, Mulder, Huxtable, Way, &c. It would be altogether out of place to enter into the consideration of the prodigious synthetic and analytic power of the vegetable cells; we shall merely indicate how some of the most important vegetable compounds are probably formed; beginning with the *vegetable acids*. 'Even,' says Professor Gregory, 'when carbonic acid and water are brought together in the cell, this is not enough. There must be present, first, albuminous matter, without which no active cell can exist; secondly, mineral matter, especially alkalies, phosphates, and salts. All these conditions being fulfilled, and light being admitted, we may suppose the first organic acid formed to be oxalic acid, the least complex of all.'—*Organic Chemistry*, 4th ed. p. 541. Putting it in the briefest terms, the cell separates 2 equivalents of oxygen from 2 equivalents of carbonic acid, and yields 1 equivalent of *anhydrous oxalic acid*, or $C_4O_8 - O_2 = C_4O_6$. Two equivalents of dry oxalic acid, $C_8H_4O_{18}$, by taking up 2 equivalents of water, and losing 8 equivalents of oxygen, yield *hydrated malic acid*, $C_8H_8O_{10}$. *Tartaric* and *citric acids* are capable of a similar production. Thus, 2 equivalents of dry oxalic acid, combining with 2 of water, and losing 6 of oxygen, yield hydrated tartaric acid ($C_8H_8O_{12}$, or $C_8H_4O_{10},2HO$); and similarly, 3 equivalents of dry oxalic acid, combining with 2 of water, and losing 12 of oxygen, yield hydrated citric acid ($C_{12}H_8O_{14}$, or $C_{12}H_5O_{11},3HO$). In like manner, every vegetable acid, and every one of the neutral compounds of carbon, hydrogen, and oxygen, may be derived from some less complex compound, containing more hydrogen than itself; or it may be supposed to be derived directly from carbonic acid and water, oxygen being, on every supposition, given off. 'As the proportion of oxygen to carbon diminishes, the acids become weaker, till the oxygen exactly suffices to form water with the hydrogen, when we have either very feeble acids, or neutral bodies, such as sugar, gum, and starch. As the oxygen is still further diminished, we have neutral, bitter, and acrid compounds, or colored bodies, or such as yield coloring matters, with ammonia and oxygen; further on still, we have aromatic oils, and volatile, quasi-resinous, crystallizable acids; then resins; and lastly, when all the oxygen is expelled, certain oils, which are carbo-hydrogens.'—Gregory, *op. cit.*, p. 543.

Although each individual substance is doubtless in reality derived from some substance only a little less complicated than itself, the final result, in so far as showing their mode of construction is concerned, is the same as if they were all obtained directly from carbonic acid and water. The following tabular view (compiled by Gregory) will serve to show how all the leading groups of vegetable compounds are produced from carbonic acid and water by deoxidation:

SUBSTANCES FORMED.

Name.	Formula.	=	Carbonic Acid.	+	Water.	—	Oxygen.
1. *Vegetable Acids*—							
Tartaric acid	$C_8H_8O_{12}$	=	$8CO_2$	+	6HO	—	100
Malic acid	$C_8H_6O_{10}$	=	$8CO_2$	+	6HO	—	120
Citric acid	$C_{12}H_8O_{14}$	=	$12CO_2$	+	8HO	—	180
2. *Carbo-hydrates*—							
Cellulose	$C_{12}H_{10}O_{10}$	=	$12CO_2$	+	10HO	—	240
Starch	$C_{12}H_{10}O_{10}$	=	$12CO_2$	+	10HO	—	240
Cane-sugar	$C_{12}H_{11}O_{11}$	=	$12CO_2$	+	11HO	—	240
3. *Other Neutral Bodies**—							
Mannite	$C_{12}H_{14}O_{12}$	=	$12CO_2$	+	14HO	—	260
Salicine	$C_{26}H_{18}O_{14}$	=	$26CO_2$	+	18HO	—	560
Pectine	$C_{28}H_{21}O_{24}$	=	$28CO_2$	+	21HO	—	530
Hæmatoxyline	$C_{32}H_{14}O_{12}$	=	$32CO_2$	+	14HO	—	660
Elaterine	$C_{80}H_{25}O_{18}$	=	$60CO_2$	+	25HO	—	1270
4. *Oxygenated Volatile Oils, and Allied Acids*—							
Oil of Bitter Almonds	$C_{14}H_6O_2$	=	$14CO_2$	+	6HO	—	320
Benzoic acid	$C_{14}H_6O_4$	=	$14CO_2$	+	6HO	—	300
Oil of Cinnamon	$C_{18}H_8O_2$	=	$18CO_2$	+	8HO	—	420
Cinnamic acid	$C_{18}H_8O_4$	=	$18CO_2$	+	8HO	—	400
5. *Oily and Fatty Acids*—							
Acetic acid	$C_4H_4O_2$	=	$4CO_2$	+	4HO	—	800
Butyric acid	$C_8H_8O_2$	=	$8CO_2$	+	8HO	—	200
Valerianic acid	$C_{10}H_{10}O_4$	=	$10CO_2$	+	10HO	—	260
Stearic acid	$C_{36}H_{36}O_4$	=	$36CO_2$	+	36HO	—	1040
6. *Resins and Camphors*—							
Many Resins	$C_{10}H_7O$	=	$10CO_2$	+	7HO	—	260
Camphor	$C_{10}H_8O$	=	$10CO_2$	+	8HO	—	270
Borneo Camphor	$C_{20}H_{18}O_2$	=	$20CO_2$	+	18HO	—	560
7. *Carbo-hydrogens*—							
Oil of Lemons	C_5H_4	=	$5CO_2$	+	4HO	—	140
Oil of Turpentine	$C_{10}H_8$	=	$10CO_2$	+	8HO	—	280
Oil of Juniper	$C_{15}H_{12}$	=	$15CO_2$	+	12HO	—	420
Cumole	$C_{18}H_{12}$	=	$18CO_2$	+	12HO	—	480
Cymole	$C_{20}H_{14}$	=	$20CO_2$	+	14HO	—	540

A glance at the composition of these seven groups shows that they present a series of deoxidations, till in the sixth, very little oxygen, and in the last, no oxygen whatever is left. Thus, leaving out of view, for want of space, the compounds in which nitrogen and sulphur enter, 'oxalic acid is first formed, and then malic, tartaric, citric, &c. acids from it, or from each other; then sugar, starch, &c. from the acids; bitter, acrid, and colored compounds from the sugar, starch, &c.; then oxygenated volatile oils; and then acids perhaps also from sugar, &c.; then the oily and fatty acids, either from the preceding oils and acids, or from sugar; then the resins from the fats, or from sugar; and lastly, the carbo-hydrogens. Thus, we have a picture of the whole process of vegetation as far as concerns compounds devoid of nitrogen and sulphur; and we find it uniformly to be one of deoxidation.'—Gregory, *op. cit.*, p. 548. To produce nitrogenous compounds, such as asparagine, amygdaline, nicotine, morphine, caffeine, &c., it is only additionally necessary that ammonia should be present, and the plant by a similar process gives rise to nitrogenous products, the process being shown as below:

Asparagine,	$C_8N_2H_{10}O_8$	=	$8CO_2$ +	$4HO$ +	$2NH_3$	— 120
Amygdaline,	$C_{40}NH_6O_2$	=	$40CO_2$ +	$24HO$ +	NH_3	— 820
Nicotine,	$C_{20}N_2H_{14}$	=	$20CO_2$ +	$8HO$ +	$2NH_3$	— 480
Morphine,	$C_{34}NH_{19}O_6$	=	$34CO_2$ +	$16HO$ +	NH_3	— 800
Caffeine,	$C_{16}N_4H_{10}O_4$	=	$16CO_2$	+	$4NH_3$	— 280

* In this group, which is very numerous, compounds of a most discordant character appear. Of the specimens we have selected, the first closely resembles a sugar; the second is a pure bitter; the third, a gelatinizing substance; the fourth, a pigment; and the fifth, an acrid poison.

It is easy to show how the sulphur contained in certain oils (oil of garlic, C_6H_6S, for example) is probably obtained by the reduction of the sulphuric acid existing in the sulphates of the soil; but the composition of the albuminates containing both sulphur and nitrogen is so complex that we cannot venture to attempt a popular explanation of the mode of formation of these matters from the simple food of plants.—On this subject, the reader may consult Liebig's *Agricultural Chemistry*, *Letters on Chemistry*, and *Laws of Husbandry;* Mulder's various works (a new edition of his great work is now being translated, in parts, into German); Rochleder's *Phytochemie*, and the portion of Gregory's *Organic Chemistry*, and of the third volume of Gorup-Besanez's *Handbuch der Chemie*, devoted to this question.

VEGETABLE IVORY. See IVORY, VEGETABLE.

VEGETABLE MARROW. See GOURD.

VEGETABLE PARCHMENT. See PARCHMENT, VEGETABLE.

VEGETABLE PHYSIOLOGY. All the most important departments of this subject have been already noticed in this work under the various headings of CIRCULATION OF SAP, FLOWER, FRUIT, LEAVES, METAMORPHOSIS OF ORGANS, PLANT, ROOT, SEED, SPORE, STEM, &c. We shall therefore here only discuss

one subject, which has not been separately considered—namely, the organs and functions of reproduction in plants. Although, as we learn from Herodotus, the Babylonians knew that there were male and female date-trees, and that the female required the concurrence of the male to become fertile, and Theophrastus, in his work *On the History of Plants*, and other ancient authors, frequently mention the sexes of plants, Cæsalpinus, who died at Rome in 1603, seems to have been the first writer who directed his attention to the reproductive organs of plants; and he speaks vaguely of an emanation from the male causing fertility in the female; and Grew, in 1676, seems to have been the first who distinctly recognized the functions of the stamens and pistils.

Ray, in his *Historia Plantarum*, 1694, adopted and enforced Grew's view; and Geoffroy, in 1711, read a Memoir before the Royal Academy supporting the same view. Linnæus, in his *Systema Naturæ* (1748), made these organs the foundation of his system of classification into sexual and non-sexual plants, the former being phanerogamous, or flowering, and the latter cryptogamous, or flowerless; in the latter division of plants, he could not detect stamens or pistils; and it was not till 1782, when Hedwig's work on Mosses was published, that anything was known with certainty regarding the sexual organs of any of the cryptogamia. From this brief notice of the early history of this subject, we proceed to the consideration of reproduction in the phanerogamous plants. A complete flower consists, as is well known, of four whorls (*verticils*), placed alternately within one another, the two internal being the *Stamens* (q. v.) and *Pistils* (q. v.), which are the essential organs of reproduction; while the two external are the *calyx* and *corolla*, which constitute the floral envelopes or protective coverings. Both the stamens and the pistils originate, like the floral envelopes (see FLOWER), from the thalamus, or upper part of the axis or peduncle, in the form of minute cellular proeesses; and in their development they resemble leaves, although, in their appearance, they are less like leaves than are the floral envelopes. These parts are well seen in the following diagram (fig. 1) of the flower of the vine, after it has cast its petals. There are here five stamens (the filament of one being concealed by the pistil), with introrse* two-lobed anthers. As separate articles are devoted to STAMENS and PISTILS, it is unnecessary to enter into any details regarding their anatomical structure. A few additional remarks on the pollen are, however, called for. This (the male fertilizing agent) consists of cells contained in the anther case, and is discharged by various kinds of longitudinal, transverse, valvular, or porous dehiscence.

When examined by the naked eye, it usually appears as a yellow powder; but when magnified, it is found to consist of cellules of different singular forms, varying in size from $\frac{1}{300}$th to $\frac{1}{700}$th of an inch in diameter. Oval, spherical, and triangular forms of pollen are shown in figs. 2 to 6; and they may be square, cylindrical, hour-glass shaped, &c. These pollen-grains are developed in the large cells in the early stage of the anther. The contents of each cell divide first into two, and afterwards into four parts, each of which becomes covered with cellulose, so as to constitute independent cells or grains. These grains either burst through the parent cell, and become liberated, or they remain united in fours or some multiple of four, as in many species of acacia; or in large masses, such as those seen in Orchids and in Asclepias, when they constitute *pollinia*. Each pollen-grain has usually two coverings: the outer one, called *extine*, being a firm membrane, often marked with bands or rough points; and the inner one called *intine*, which is thin, and capable of extension.

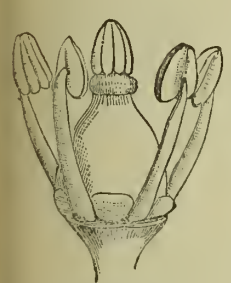
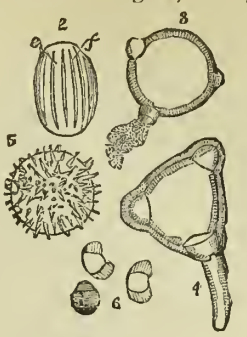


Fig. 1.

Androecium and Gynnœcium (or, in other words, the stamens and pistil) of the Vine, with the disc surrounding the base of the ovary.

In the interior of the pollen-grains, a minute granular matter exists, called *fovilla*—the granules, which are mixed with starch and oil, varying from $\frac{1}{4000}$ to $\frac{1}{30000}$ of an inch in diameter. On moistening pollen-grains in water, they swell till the *intine* bursts at one or more points, and expels the fovilla. In the act of impregnation, the pollen is scattered on the pistil, and is moistened on one side by the fluid of the stigma (a part of the pistil composed of loose cells, which secrete a viscid fluid, and are uncovered by epidermis). It is then observed that the intine, instead of bursting, protrudes in the form of a tube called the *pollen-tube*. The number of these tubes varies greatly in different plants. According to Amici (as quoted by Balfour, to whose useful *Class-book* we are indebted for most of our facts and illustrations), the two pollinia (fig. 7) of *Orchis morio* contain each about 200 secondary small masses, composed of grains united in fours, and each of these small masses presents 300 openings capable of emitting tubes. In order that an embryo plant may be formed, the mature pollen must be discharged from the anther-cells of the stamen, and brought into contact with the stigma, through which, and then



Figs. 2 to 6.

Fig. 2.—Elliptical Pollen of Milkwort (*Polygala*), viewed lengthwise. Its surface, or extine, *e*, is marked with grooves or slits, *f*, where the intine protrudes. Fig. 3.—Ripe round Pollen of Cherry (*Cerasus*) discharging its fovilla through a tubular opening formed by the intine. There are two other points at which the intine is seen protruding. Fig. 4.—Triangular Pollen of Evening Primrose (*Œnothera*), with one pollen tube protruding. This tube is formed by the intine, which is also seen projecting at the other angles. Fig. 5.—Round ripe Pollen of Hollyhock (*Alcea*), with its extine covered with prominent points. Fig. 6.—Pollen of Fir (*Pinus*), in which, by the increase of the intine, the extine is separated into two hemispherical portions marked by the dark spaces at each end of the grains.

through the conducting tissue of the style, it must pass until it reaches the foramen, or micropyle, of the ovule. The means by which this contact is accomplished are various, such as elasticity and irritability of the stamens, the action of currents of air, and the intervention of insects passing from the male to the female plant. In the case of the orchids, fertilization is solely effected by the agency of insects. The fertilizing power of pollen is retained for a different length of time in different plants: thus, while in most species of Datura, and in *Lychnis dioica*, it loses its power in two days, in the wall-flower it remains efficacious for 14 days; while in the date, cannabis, tea, and camellia, it will keep fresh for a year; indeed, Micheaux mentions that the pollen of the date has been successfully used after 18 years!

The quantity of pollen that is produced is much greater than is actually required for the impregnation of the ovules. Thus, in the Firs and Pines, the quantity is enormous, probably because of the obstacles here presented to fertilization. The *sulphur showers* occurring in some districts are composed of the yellow pollen carried by the winds from pine-forests; and the showers of colored rain which are occasionally noticed are due to a similar cause.

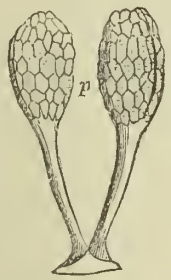


Fig. 7

Pollinia, or Pollen-masses, of Orchis, separated from the point above the stigma, with their viscid matter adhering to them at the base. The pollen-masses, *p*, are supported on stalks.

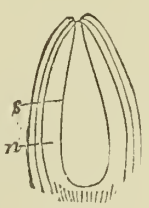


Fig. 8.

Ovule of Polygonum, showing the embryo sac, *s*, developed in the midst of the nucleus, *n*.

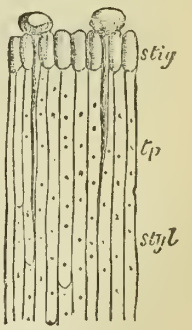


Fig. 9.

Vertical section of the upper part of the pistil of Frogsmouth (*Antirrhinum majus*). Two pollen grains are seen lying on the stigma, *stig*. These send out tubes, *tp*, which pierce the stigma, and penetrate the tissue of the style, *styl*, until they reach the ovules or young seeds.

The number of pollen-grains in certain flowers has been calculated. In a plant of *Cereus grandiflorus*, Morren observed that there were 40 flowers, each containing 500 stamens, and that each anther contained 500 pollen-grains; hence the entire number of pollen-grains in each flower was 250,000, and in the whole plant is 10,000,000. Similarly, in an entire Rhododendron plant, the pollen-grains amount to 72,620,000. The quantity required for fertilization is very small—one, two, or at most three grains, being sufficient to impregnate one ovule. In most cases, the pollen of a single anther is sufficient for complete impregnation; the additional

* This term is applied to anthers which open on the side next the pistil.

anthers being, as it were, added for the purpose of insuring the result. During the evolution of the stamens, and the maturation of the pollen, the pistil undergoes certain changes, of which the most important is that the stigma becomes enlarged, lax, and covered with a viscid secretion, which, besides detaining the pollen-grains, causes them to protrude their tubes, as already described; moreover, in some flowers, the style, which is sometimes covered with hairs, elongates during the discharge of the pollen, brushes the latter on to the pistil, and thus acts directly in fecundation. One of the central cells of the ovule now becomes much enlarged and developed, so as to form the embryo sac. At the end of this sac, next to the micropyle, several free nucleated cells are formed, to which the name of embryo vesicles, or germinal vesicles, has been given. In this way, the ovule is prepared for the action of the pollen, and for the production of the embryo plant. The tubes developed by the pollen-grains, when acted on by the secretion of the stigma, pierce the stigmatic tissue, and carry the fovilla through the canal of the style to the ovule, as shown in the figures (8. 9, and 10).

In some plants, the emission of tubes begins in half a minute after the pollen has been caught by the stigmatic secretion; in other cases, it does not begin for 24 hours or more; and it is said that in the larch, the tubes do not emerge for 35 days. The length to which the tubes extend is often very great, but the diameter is extremely small. In *Colchicum autumnale*, in which the style is 13 inches long, the length of the tube is 9000 times the diameter

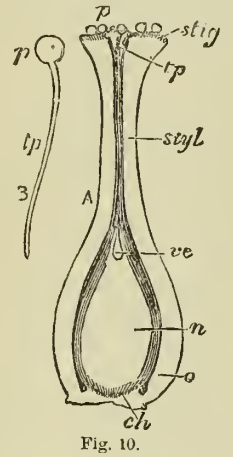


Fig. 10.

Pistil and Pollen of Polygonum. A, stigma, *stig*, with pollen-grains, *p*, adherent to it, sending tubes, *tp*, down the conducting tissue of the style, *styl;* the ovary, *o*, containing the ovule with its covering and central cellular mass or nucleus, *n*, containing a rudimentary embryo-sac, *ve*, in which ultimately the embryo is developed. The base of the ovule attached to the placenta, is marked by the chalaza, *ch*. B, pollen grain, *p*, separated with pollen tube, *tp*.



Fig. 11

Section of part of the Ovule of a species of Speedwell (*Veronica triphyllos*), showing the pollen tube, *a*, passing through the cellular tissue of the nucleus, and reaching the embryo-sac, which contains the rudimentary embryo, *d*, attached to the sac by its suspensor, *b*, and endospermal cells, *e*, at the lower part of the sac.

of the grain from which it proceeds. The time taken by the tube to traverse the length of the style, varies, but does not always correspond with the latter. In some short-styled plants, the time is very long, while in the long-styled *Colchicum autumnale*, the pollen-tube reaches the ovule in about 12 hours. In some coniferous plants, a year is required for the process.

We now proceed to consider the embryogeny of (1) Gymnospermous and (2) Angiospermous Phanerogams. In the gymnospermous or naked-seeded flowering-plants, such as the coniferæ and cycadaceæ, impregnation is effected by direct contact between the pollen and the ovule, there being no true ovary bearing a stigma. The process is thus summarized by Balfour: 'In gymnospermous plants, there are stamens containing pollen, and ovules supported on cones or altered branches, and in them the pollen enters the large micropyle of the ovule without the intervention of stigma or style. When the pollen reaches the nucleus of the naked ovule, it remains long dormant, and after many weeks and months, sends out a tube which reaches the embryo sac, and impregnates a corpuscle. One of the cells of the corpuscle then takes an active function, and develops the embryo with the suspensor in the midst of endospermal cells.'—*Op. cit.*, p. 600.

In the angiospermous phanerogams, when the pollen-tube has traversed the tissue of the style, and reached the ovule, it proceeds through the foramen or micropyle, so as to come in contact with the embryo sac; and consequent on this is the development of the cellular embryo. There is, however, much dispute as to what now occurs. 'Schleiden thinks that the end of the pollen-tube introverts the embryo sac, and in some cases perforates it, and that it becomes the first cell in the embryo. Most physiologists, however, agree in thinking that Schleiden was mistaken in regard to the extremity of the pollen-tube, and they believe that the embryo is formed from a distinct cell previously existing in the embryo sac. In some instances, the pollen-tube indents the embryo sac, at other times it perforates it, and comes into actual contact with a cell contained in the sac. In the embryo sac there are produced, before impregnation, certain cells, often three, which are called germinal vesicles, only one of which in general is impregnated by the pollinic fluid, which transudes through the membrane of the pollen tube and the walls of the embryo sac and vesicles. After impregnation, the vesicle divides by a transverse septum into two parts, the upper portion forming a confervoid partitioned filament or suspensor, and the lower becomes filled with cells, constituting the rudimentary embryo. The suspensor is attached to the part which forms the radicle of the embryo, and at the opposite end, one or two cotyledons are produced, enclosing the fresh bud or plumule. An embryo is usually produced in each ovule (monembryonomy); but when more than one germinal vesicle is impregnated, there is a plurality of embryos (polyembryonomy). When the pollen of one species is applied to the pistil of another species, we occasionally find seeds produced which give rise to individuals intermediate between the two parents: these individuals are called hybrids or mules, and are rarely fertile. A plant has, however, a preference for the pollen of its own species, and hence hybrids are rare in nature.'—Balfour, *op. cit.*, p. 600.

A reference to the preceding figure of a section of part of the ovule of a species of *Speedwell*, will elucidate the above summary: it shows the pollen tube *a*, just as it reaches the embryo sac which contains the rudimentary embryo *d*, attached to the sac by its suspensor *b*, and endospermal cells *c*, at the lower part of the sac. The suspensor is sometimes of considerable length, and as much as three, or even five times the length of the whole seed. Its attachment to the radicular end of the embryo is shown in fig. 11. In monocotyledons, a single sheathing cotyledon is developed; in dicotyledons, two opposite leaves; and after their formation, the apex produces the terminal bud or plumule. The embryo is thus suspended in an inverted position in the seed.

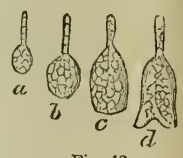


Fig. 12.

The embryo in different stages of development: *a*, Embryo in young state as a globular mass at the end of a suspensor. *b* and *c*, Embryo more advanced. *d*, Embryo showing the division into two cotyledons.

It is impossible to enter into any general description of the organs or process of reproduction in cryptogamic plants. In this great division of the vegetable kingdom, the organs of reproduction are in general obscure, and consist usually of cellular sacs of two kinds—one being called *antheridia*, containing *phytozoa* or *spermatozoids*, representing the stamens, or the male; and the other being called *pistillidia* or *archegonia*, and representing the pistil, or the female. These structures, in a magnified state, are shown in figs. 13 and 14, as they occur in the liverwort. In the fully developed state of the plant, the antheridia disappear, while the pistillidia are transformed into cellular sacs containing germinating bodies known as Spores

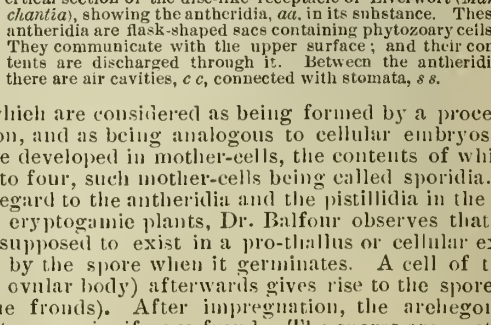


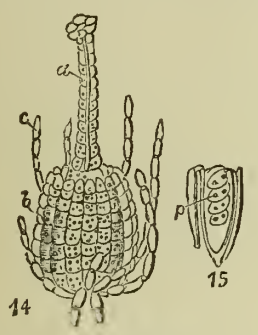
Fig. 13.

Vertical section of the disc-like receptacle of Liverwort (*Marchantia*), showing the antheridia, *aa*, in its substance. These antheridia are flask-shaped sacs containing phytozoary cells. They communicate with the upper surface; and their contents are discharged through it. Between the antheridia there are air cavities, *c c*, connected with stomata, *s s*.

(q. v.), which are considered as being formed by a process of reproduction, and as being analogous to cellular embryos. These spores are developed in mother-cells, the contents of which often divide into four, such mother-cells being called sporidia.

With regard to the antheridia and the pistillidia in the different orders of cryptogamic plants, Dr. Balfour observes that in ferns they are supposed to exist in a pro-thallus or cellular expansion produced by the spore when it germinates. A cell of the pistillum (the ovular body) afterwards gives rise to the spore-bearing leaves (the fronds). After impregnation, the archegonial cells give rise to a sporingiferous frond. The spores are contained in sporangia, with or without an elastic ring, developed on the back, on the side, or at the base of the leaves. In mosses, these organs

are seen at certain stages of the plant's growth, and they are either on the same or on different plants. After impregnation, the archegonial cell gives rise to a stalked theca or sporangium with its spores. In liverworts, they are usually on different parts of the plant, and as frequently in the substance or on the under surface of dise-shaped cellular stalked expansions. Here the impregnated cell gives rise to the fruit or capsules. In lichens, the existence of these organs has not been already established; and the fructification consists of *thecæ* or *asci*, containing 4, 8, 12, or 16 sporidia (or cells containing spores) in their interior. (In fig. 15, a



Figs. 14 and 15.

Fig. 14.—Pistillidium of Liverwort. It is a cellular body surrounded by an involucre, *b*, and septate filaments, *c*, and is provided with a styloid calyptra. Fig. 15.—A Theca of a Lichen, containing four nucleated cells. These cells ultimately form the sporidia or sacs containing numerous minute spores. Round the theca are cellular filaments, *p*.

theca containing four sporidia is shown.) These thecæ are usually united together so as to form a cup-like mass of fructification. When mature, the sporidia or thecæ burst, and discharge the spores. The fungi, antheridia, and pistillidia are obscure, and the organs of reproduction are spores which are either naked or are contained in thecæ. In algæ, antheridia and pistillidia have often been detected; but in some of them, certain cells, in the same or separate filaments, seem to possess the property of producing spores by a process of conjugation or union; and in the lowest forms the cells undergo division into new individuals.

Besides the above-noticed modes of propagation, cryptogamic plants are also propagated by buds or gemmæ, which are either attached to the leaves or fronds, or are contained in peculiar cup-shaped bodies.—See Carpenter's *General and Comparative Anatomy*, and Balfour's *Class-book of Botany*, from which we have borrowed freely.

VEGETABLE TISSUE, the term employed in Botany to denote the whole substance of which plants consist; regarded according to its structure, rather than to functions or chemical composition. See CELLULAR TISSUE and VASCULAR TISSUE.

VEGETA'RIANISM, the doctrine that vegetable substances are the solids intended by nature for the sustenance of man, and that it is wrong—against nature and against good morals—for men to make use of an animal diet. There have never been wanting among speculative persons some who maintained that fruits and vegetables are the proper food for men; and illustrious names, such as those of Pythagoras, Plato, Plutarch, in ancient times—of Rousseau, Shelley, Swedenborg, in modern, can be counted among the upholders of this doctrine. A society for promoting the practice of vegetarianism was established at Manchester in 1847; and three years later, a similar society was established in the United States. Besides a short-lived publication called the *Vegetarian Advocate*, the vegetarians in Great Britain have been represented by the *Vegetarian Messenger* (monthly), from 1849 to 1859; for one year by the *Journal of Health;* from 1861 to 1871 by the *Dietetic Reformer and Vegetarian Messenger* (quarterly); and since 1871 by the *Dietetic Reformer* (monthly). The vegetarian creed has attracted very few disciples in England; and by these the advocacy of it has usually been conjoined with that of temperance, peace, homœpathy, and the cold-water cure.

There is, first, a physiological argument used in behalf of vegetarianism. It is said that the formation of the teeth and of the intestines in man proves that man was not intended to be a carnivorous, but a fruit and vegetable eating animal. Then it is maintained that a vegetable diet is the most favorable to man, in all respects, physical, intellectual, and moral; that with it, his life is longer, his enjoyment of life greater, his brain more vigorous, and his power of manual labor not less than with an animal diet; and that, while the use of animal food begets ferocious dispositions, a carelessness about life, a callousness to the sufferings of men or animals, a vegetable diet 'develops the gentler affections, and produces a broad and genial sense of brotherhood.' It is affirmed that animal food produces febrile and inflammatory tendencies; that, like alcohol, it is a stimulant (some vegetarians call it a stimulating poison); and that a mixed diet is open to all the objections which lie against moderate drinking. It is also alleged that animal food as exposed for sale is often tainted with some disease or unwholesome condition, and that it thus becomes a frequent cause of disease in men. Moreover, it is submitted that vegetables contain all the principles necessary for the sustenance of man; that, therefore, the use of flesh is unnecessary; and that this being so, it is selfish, cruel, and tyrannical—calculated, too, to increase selfishness, cruelty, and tyranny in men—to cut short the existence of inferior animals.

The opinion of physiologists is not favorable to vegetarianism. The structure of man's organs is held to prove that nature intended him for an omnivorous animal, his stomach and intestines being fitted for deriving nourishment from every kind of food, and he being able, by means of cooking, to modify his food, so as to prepare it for mastication and digestion. There is also almost a concurrence of medical experience against vegetarianism, and in favor of the opinion that man, as regards all his powers and faculties, thrives best, and that—if a difference can be made out—he also lives longest upon a mixed diet.

It has been found, in making railways, that differences between workmen in respect of bodily strength and energy were chiefly due to a difference of diet; that, for example, a beef-eating Englishman would almost do the work of three vegetable-fed Frenchmen, and that this difference of working-power disappeared when the Frenchmen took to eating beef. Upon the alleged beneficent moral influence of vegetable food, it may be observed that there is no proof whatever of its reality; moreover, that since the majority of mankind live either mostly or entirely upon vegetables, vegetables must bear a large share of the responsibility which may fall upon diet for the evil tendencies of man; and that, in fact, the most cruel and the most debased of human races live entirely upon vegetables. To the charge of cruelty brought against the practice of killing animals for food, it has been answered, that the plan of nature contemplates such cruelty—if cruelty it be—and makes it impossible to avoid it; that the microscope has shown us that even in taking a draught of water we may deprive a multitude of beings of life; and that, on the other hand, the system of rearing cattle for the butcher—since the cattle would otherwise not be reared at all—really adds very largely to the sum of happy animal existence. It is not disputed that there is a liability to disease from the use of unwholesome meat; but, then, vegetables as well as animals are subject to diseases; and the reasoning which would drive us from the use of animal food because it may be diseased, would really cut us off from food altogether.

VEHMGERICHTE. See FEMGERICHTE.

VE'II, an ancient city of Etruria, in early times the formidable rival of Rome. Its very site is disputed, but is now generally thought to be at *Isola Farnese*, about 12 miles from Rome. The struggle between the two cities is recorded by Roman historians to have commenced as early as the time of Romulus, and to have continued under each of the kings, except the pacific Numa, and always to the advantage of the Romans. The Veientines had their revenge so far under Porsenna; but after his time, being convinced by repeated defeats that they were no match for their enemy in the open field, they had recourse to the plan of sheltering themselves behind their walls on the approach of the Roman legions, and of sallying out on predatory expeditions as soon as they had retired. To relieve the republic from this annoyance, the Fabian clan, to the number of 306, with their followers, probably ten times as numerous, undertook to garrison a fortress near Veii, and act as a guard against the maranders. They were, however, enticed into an ambuscade, and cut off to a man at the Cremera. For the next 60 years, hostilities often broke out, followed by ill-observed truces. At last, the Romans determined to rid themselves of their rival by a siege, and persevered with great tenacity, though the city held out for ten years, and repeated attempts were made by neighboring states to relieve it. It is said to have been taken at last by a mine, which was directed so as to lead into the citadel. The citizens were massacred or sold as slaves, and the land confiscated. The fall of Veii took place 396 B.C. It was debated more than once, especially after the destruction of Rome by the Gauls, whether Rome should not be abandoned, and Veii made the capital. After its fall, it was gradually deserted; and although, in later times, a colony was planted there by Cæsar, and again by Augustus, it always remained an insignificant place. There are remains of the Etrurian, and also of the Roman city, which have latterly been traced out and described.

VEIL. This familiar article of dress is one of the most ancient in use; its origin is lost in remoteness, but we find an allusion to the wearing of veils by the Chinese in Ovid, and Juvenal speaks of women as being so delicate as to be overheated by a silken veil. Although generally considered portions of female dress, we read in the works of Ambrose (374 A.D.), of 'silken

garments and veils interwoven with gold, with which the body of the rich man is encompassed.' Its use is now so extended that it may be found in every part of the civilized world, but almost exclusively confined to women.

VEINS, in Anatomy, if we except the pulmonary, the portal, and the umbilical veins, are the vessels which carry back venous blood from the capillaries, and enlarging as they proceed, finally pour it through the ascending and descending *venæ cavæ* into the right auricle of the heart. See CIRCULATION. Their coats are similar to those of the arteries, but much thinner, and even transparent. They are, however, of considerable strength. The *internal coat* consists of an epithelial layer, supported on several laminæ of longitudinal elastic fibres. The *middle* or *contractile coat* consists of numerous alternating layers of muscular and elastic fibres; the muscular fibres being disposed circularly round the vessel. The muscular fibres are wanting in some parts of the venous system, and specially developed in others (as, for example, the splenic and portal veins, where, perhaps from the physical character of the tissues which they pervade, there may be more than the ordinary resistance to the passage of the blood). In the *venæ cavæ* and pulmonary veins near the heart, striped muscular fibres may be detected, continuous with those in the auricles. The *external* or *areolar fibrous coat* consists of connective or areolar tissue, and of longitudinal elastic fibres; within some of the larger veins, as the inferior *vena cava*, through its whole length, the external iliacs, the azygos, &c., there is also a longitudinal network of unstriped muscular fibres.

The existence of valves in the veins is mentioned in the article CIRCULATION. These valves are most numerous in the veins of the extremities, especially the lower ones, these vessels having to act against the force of gravity more than most others. They are absent in the *venæ cavæ*, the hepatic, portal, renal, pulmonary, and some other large veins, and in very small veins generally. The veins are nourished by nutrient vessels, or *vasa vasorum*, like the arteries; but except in a few instances (including the inferior *vena cava*), nerves are not distributed to them.

The chief diseases of the venous system have been already sufficiently described in the articles PHLEBITIS, OR INFLAMMATION OF THE VEINS; PHLEBOLITES; PHLEGMASIA ALBA DOLENS, OR MILK-LEG; THROMBUS; and VARICOSE VEINS. We shall here merely refer to two conditions of the venous system which must be regarded as the results of natural rather than morbid action: they are *Hypertrophy* and *Atrophy*. Hypertrophy is a natural and healthy change, which will be readily understood by one or two illustrations. When the uterus enlarges during pregnancy, the quantity of blood in it increases in at least a corresponding ratio, and so also do the venous canals by which it is removed; while, shortly after delivery, they return to their natural size; the hypertrophy being accompanied with a proportionate dilatation. This form of hypertrophy, with dilatation, often exerts a compensative action, one vein, or set of veins, taking additional work (and consequently requiring an increase of calibre), to make up for the partial or entire occlusion of another. When, for example, the ascending vena cava is diminished in size, or even entirely and permanently closed, it is well known that the lower portion of the vessel dilates in common with the branches entering into it, and that the superficial abdominal veins or azygos, or both, become enlarged, and thus carry to the heart the blood which ought to have reached the heart by the usual course. If the obstruction is only temporary, the enlarged veins return to their original state, except that additional transverse fibres are found in the middle coat. Atrophy of the veins accompanies the corresponding changes of other tissues, when a part is permanently diseased. Amputation above the knee soon reduces the femoral vein to less than one-third of its previous size. Mr. Callender, in his article on 'Diseases of the Veins,' in Holmes's *System of Surgery*, states that in the case in which a kidney became transformed into a large cyst, the canal of the renal vein was impervious to a common probe; and this condition is daily seen in the change which occurs in the umbilical vein shortly after birth.

VEINS, in Geology, are crevices, more or less vertical, caused by the contraction during drying or metamorphoses, or by the mechanical disturbance of a rock, which have been filled by materials different from the body of the rock. Veins containing substances that have been injected in a state of fusion from heat, have had their origin in some internal force; while those filled with mineral deposits may or may not be connected with upheaval. Granitic and trappean veins differ from dykes chiefly in the greater size of the latter. They produce similar changes in the rocks which they penetrate, indurating clays and sandstones, and converting limestones into marble, or giving them a compact texture like hornstone. Granite veins are generally more sinuous in their course than those of trap. One set of veins often intersects another, having been produced at a later period; and the two sets generally differ in color, grain, and even mineral composition. Granite generally assumes a finer grain, and is even different in composition in the veins it sends into the adjoining rocks. Mineral veins are filled with different kinds of crystalline minerals. Quartz and calcite are the most common of these substances; but frequently several different minerals occur in the same vein, some of these being metallic ores. Veins of the same age are filled with the same metals, and generally maintain a general parallelism of direction. Thus, the tin and copper veins of Cornwall run nearly east and west; while the lead veins run north and south. Three kinds of veins are distinguished by the miners—Rake, Pipe, and Flat veins. The rake veins are simple crevices, crossing all the rocks of a series, generally highly inclined, and apparently formed from the contraction of the rock. The two originally opposite surfaces may retain their relative positions, only separated by the interposed contents of the veins; or a fault may place the originally contiguous surfaces at different levels; and in such a case, the intervening space between the walls of the vein are irregular, sometimes narrowing so that the walls are in contact, and then widening out, and forming large cavities containing ores. The pipe veins are irregular cavities, filled with minerals, and without any apparent connection with faults in the strata. Flat veins have a general direction corresponding with that of the stratification, and are connected sometimes with rake veins, and sometimes with pipe veins. The manner of working the minerals contained in veins is explained in the article MINING (q.v.).

VEIT, PHILIPP, a distinguished German painter, was born at Berlin, February 13, 1793. His mother, a daughter of Moses Mendelssohn, had for her second husband Friedrich Schlegel, and V. became devotedly attached to the religious and artistic ideas of his step-father, whom he followed in his renunciation of Protestantism for Roman Catholicism. After finishing his studies at Dresden, he proceeded to Rome 1815, and became a prominent member of that coterie of young German painters who sought to infuse into modern art the purity and earnestness of medieval times. Of all the associates, V. ventured furthest into the obscure realms of symbolism and allegory. His first famous work was the 'Seven Years of Plenty,' executed as a companion-piece to Overbeck's 'Seven Years of Dearth,' and forming part of a series of frescoes illustrative of the history of Joseph, painted at the Villa Bartholdy in Rome. In richness and freshness of invention it is reckoned one of the best works of the school to which it belongs. Other pictures of a high order of merit, done during his residence at Rome, are 'The Triumph of Religion' (Vatican Gallery), 'Scenes from Dante's *Paradiso*' (Massimi Villa), and an altar-piece, representing 'Mary as Queen of Heaven' in the Trinità de' Monti. These procured him so great a reputation that he was called to the Directorship of the Städelsche Art Institute, in Frankfurt-on-the-Maine. While holding this position, he produced many grand pictures, of which the most celebrated is the large fresco (at the Institute), representing 'Christianity bringing the Fine Arts to Germany,' held by many to be the finest fresco by any modern artist. Others are, 'The Two Maries at the Sepulchre,' and 'St. George.' In 1843 he resigned his post as director, and removed to Sachsenhausen, in Hesse-Cassel. Among his later works are, 'The Ascension of the Virgin,' 'The Good Samaritan,' 'The Egyptian Darkness,' and 'Glorification of the Christian Faith in its Alliance with the Reigning House of Prussia,' for the king of Prussia. In 1868 he painted several frescoes for Mayence Cathedral. He died December 1877.

VELASQUEZ, DIEGO RODRIGUEZ DE SILVA, one of the most famous of Spanish painters, was born at Seville, in June 1599, of a family of Portuguese origin. Very early, the bent of nature became obvious in him; and he was sent to be educated in the studio of Francisco Herrera el Viejo, an artist of considerable force and originality. He afterwards became the pupil of Francisco Pacheco, a man accomplished in theory, but who could practically teach him little. The old pedant had, however, an attractive daughter, named Juana, who, doubtless, to the eyes of the young painter, atoned for her parent's deficiencies, and who married him at the end of five years. His chief education, however, as with all men of real genius, was that which he gave himself; he painted assiduously from the life; the models he selected were, for the most part, of the sordid peasant class, and in this way a certain habit of mind was induced, unfavorable to the attainment of that pure and elevated ideal, some infusion of which is all that is wanted to elevate the noble realistic hardihood of his manner into the very highest region of the art. In 1622, he paid a visit to Madrid, to study the treasures of art there accumulated. During his stay, he painted the portrait of the poet Gongora, and made some influential friends, at whose instance he was, the year after, invited to return by the Conde, Duque de Olivarez, the favorite of Philip IV. His portrait of this magnate so delighted the king, that he himself sat to the artist, and the result was a picture of superb merit, by the public exhibition of which the artist at once became famous. The office of court-painter was bestowed upon him, and he found himself at once embarked on a full tide of the prosperity which continued through life to flow

upon him. Of Philip IV. and his family he painted many pictures; and shortly after his appointment, he executed a portrait—unfortunately lost—of our own Charles I., then (1623) at Madrid on his famous fool's errand. The year 1628 was made memorable to him by the arrival, in Madrid, of the great Rubens, on a diplomatic mission. The two artists were worthy to become friends, and speedily became so; but though Rubens, during his stay, was assiduous in the practice of his art, the familiarity of V. with his florid harmonies of color and riot of animal vigor, seems to have exercised no modifying influence on the restrained gravity and severity of his own style, now thoroughly matured.

V. had long desired to visit Italy; and in 1629, permission was granted him to proceed thither. Everywhere he was received with the highest honors; and in Rome, in particular, Pope Urban VIII. assigned him apartments in the Vatican. Here he chiefly employed himself in copying the frescoes of Raphael and Michael Angelo; and it is remarkable that, in the one or two original pictures which he at this time produced, no hint of an influence can be traced from his studies of these mighty masters. He was not the less profoundly sensible of their power; though he has left it on express record, that of all the Italians he considered Titian the greatest. Such, however, was his powerful individuality, that, his own style once formed, no such external influence was able to affect it appreciably. Having recovered from a severe illness, he proceeded to Naples; and finally, in the spring of 1631, returned to Madrid, where he was cordially welcomed by his royal patron, with whom he now became more and more a favorite. He had a painting-room in the palace assigned him; and the king was wont to come familiarly to watch him at work. It is a noble trait in the man, which deserves to be recorded along with his triumphs as an artist, that when, in 1643, the Duque de Olivarez, to whom he had been indebted whilst yet obscure, incurred disgrace at the hands of Philip, he braved the royal displeasure, by continuing to show him in everything the respect to which he had been accustomed. In 1648, V. proceeded again to Italy, on a mission from the king to buy pictures and other works of art. He returned to Madrid in 1651; after which time many of his finest works were painted. Such was the favor in which he continued to be held by Philip, that, in 1656, the Cross of Santiago was conferred on him, an honor never before awarded except to the highest of the nobility; and shortly after, he was appointed Aposentador Mayor. This post, the duties of which consisted in attendance on the king in his journeys, and superintendence of everything essential to his convenience, was one of much honor and emolument; but it involved at times great trouble and anxiety; and on the specially important occasion of the conferences held, in 1660, to arrange the marriage between Louis XIV. and the Infanta, these were such as to utterly prostrate the painter. On July 31 of that year, he returned to Madrid, worn down with the overwork to which he had been forced to subject himself, and died in a week after, on the 7th August. He was buried with much ceremonial in the church of San Juan. His wife, who was passionately attached to him, only survived his loss about a fortnight.

V.—with the doubtful exception of Murillo—takes admitted rank as the greatest of Spanish painters. His portraits are, for force, penetration, directness, and severity of truth, of almost unrivalled merit; his historical pictures are also of rare value; his landscape effects are full of air and light; and his treatment of religious subjects only fails in defect of that deeper spirituality, the expression of which has been in its fulness attained by none save a few of the earlier Italians. The works of V. are in this country rare. The two or three specimens to be found in our National Gallery very inadequately represent his genius, of the power and variety of which a worthy conception is only to be formed at Madrid. See Sir W. Stirling-Maxwell's *V. and his Works* (1855); Stowe's *Velazquez* (1880).

VELEZ-MALAGA, a town in the south of Spain, in the modern province of Malaga, and 16 miles east of the city of that name. It stands at the foot of a hill which forms part of the south range of the Sierra Tejada, and rises with its fortress and its spires overlooking the river Velez, at a distance of less than two miles from the shore of the Mediterranean. The climate, said by the Andalusians to be 'that of heaven,' is delightful; and owing to the abundance of moisture supplied by the hill-streams from the north, and the heat of an almost tropical sun, the vegetation of the vicinity is of the most luxuriant description. The aloe, palm, sugar-cane, prickly pear, orange, vine, olive, indigo, and sweet-potato (*Batata de Malaga*), grow here abundantly. There are here the ruins of a Moorish castle, with a small tower. The town was taken from the Moors by Ferdinand the Catholic, after a long siege. Pop. (1877) 24,332.

VELIKI-LOUKI, a town of Great Russia, in the government of Pskov, on the river Lovat, 130 miles north-west of Smolensk. It is one of the most ancient towns of Russia, having belonged to Novgorod before the annexation of that territory to Moscow. Boots are largely manufactured, and exported to St. Petersburg. Pop. (1880) 5921.

VELIKI-USTIUG, or USTIUG-VELIKI, a trading-town of Great Russia, in the government of Vologda, at the confluence of the Jug and the Suchona, 350 m. S.-E. of Archangel. It was founded in the 13th c. by a colony from Novgorod. Among the branches of industry are the manufacture of small iron-ware and of linen. Pop. (1880) 16,700.

VELINO, CATARACT OF. See TERNI.

VELLE'IA, or VELEIA, a town of ancient Liguria, situated among the northern slopes of the Apennines, 18 miles south-by-east of Placentia (Piacenza). Little information respecting it can be gleaned from the Latin writers. The Veleiates are mentioned by Pliny among the Ligurian tribes, and seem to have been subjected to Rome in 158 B.C. The town, however, dates from the time of Tiberius, and appears, according to the traditionary account, to have been overwhelmed by a land-slip of the mountains Moria and Rovinazzo, the earth having been loosened by the percolation through it of the waters from a lake high up in the mountains. A comparison of the soil which covers the city with that of the mountains, confirms this story, though, strange to say, there is not the slightest notice in Roman history of such an event having happened. V. remained hid and forgotten till 1747, when a field-laborer turned up a tablet of bronze, on which Trajan's alimentary law for the public maintenance of 279 children was written. This tablet, which measured about 8 feet 8 inches by 5 feet 9 inches, Paris measurement, and weighed 7200 ounces, narrowly escaped being melted down for bell-metal; and in 1760 excavations were commenced by the directions of the Duke of Parma at the place where the tablet had been found. The result of these investigations, which were continued till 1765, was the discovery of a forum, in which was another bronze tablet of a smaller size than the one previously found, an amphitheater, baths, 12 marble statues, numerous small bronze statues, medals, coins, stamps, inscriptions, and bronze instruments of various kinds. From none of the coins discovered being of later date than the time of Probus, it has been supposed that the catastrophe which overwhelmed the city happened either during or soon after his reign. The museum at Parma contains most of the antiquities which have thus been rescued from the bowels of the earth.

For about a century previous to 1747, it was known to a very few that ancient treasures were concealed at the place where the town was subsequently discovered; and so much wealth in coins and gold statues was discovered by a poor priest belonging to the adjoining village of Macinisso, that his family became ennobled.

A few trifling excavations have been made since 1765, but they have now been discontinued for a number of years.—See *La Rovina di Veleia, misurate e disegnate da Giovanni Antolini, &c.* (Milano, 1819); and *Tavola Legislativa della Gallia Cisalpina ritrovata in Veleia, da D. Pietro di Lama* (Parma, 1820).

VELLE'TRI, a city of Southern Italy, in the province of Rome, is walled, well built, and situated on a hill, 21 miles south-east of Rome. The principal buildings are the cathedral, an ancient Gothic structure; and the Ginetti Palace, with a marble staircase, esteemed the finest in Italy. The hill of Velletri, which, like the surface of all the country between it and Rome, exhibits evidences of volcanic action, produces good wines. Pop. 16,800.

VELLO'RE, a town and fort of British India, presidency of Madras, in the district of Arcot, 79 miles west of Madras, on the right bank of the Palar. The fort is extensive, is surrounded by a ditch cut in the solid rock, and contains barracks, hospitals, &c. The town is large, clean, and airy, and has an extensive and well-supplied bazaar. The town contains a most remarkable and splendid pagoda, dedicated to Krishna, whose adventures with the *gopis*, or milkmaids, are represented in a series of elaborate sculptures. Although the heat of V. is great, it is considered one of the healthiest stations in the Carnatic. V. was the residence of Tippoo Saib's family from 1799 to 1806, when they were removed on account of a sepoy mutiny, which resulted in a terrible massacre of Europeans. Pop. 38,022.

VELLO'ZIA, a genus of plants of the natural order *Hæmodoraceæ*, natives of Brazil, Southern Guiana, and the Mascarene Islands. They are sometimes called *Tree Lilies*. They are perennials, with trunks closely covered by the withered remains of leaves, branching by forks, and bearing tufts of long, narrow, aloe-like leaves at the extremities of the branches. Some of them are from two to ten feet high, and the trunk is sometimes as thick as a man's body. The structure of the trunk is very remarkable. It has a slender sub-cylindrical central column, of the ordinary monocotyledonous structure, outside of which are arranged great quantities of slender fibrous roots, which cohere firmly by their own cellular surface, and form a spurious kind of wood. In some of the southern districts of Brazil, vellozias are found covering large tracts. The flowers of the larger species are about

six inches long, either pure white, or of a beautiful purple color, much resembling the white lily of our gardens.

VELLUM. See PARCHMENT.

VELO'CITY (Lat. *velox*, swift) is the common term employed to denote speed, or *rate of motion*. It is obviously greater the greater the space passed over in a given time. But, for its accurate measurement, we must distinguish between uniform and varying velocity.

Nothing is easier than the measurement of uniform velocity. It is measured by *the space passed over in a unit of time*. Thus, we speak of velocities of 10 feet per second, 20 miles per hour, &c. But, for scientific purposes, it is best to keep, as far as possible, to definite units of time and space; and those most generally convenient are the *second* and the *foot*. The latter is defined, from the imperial yard, by act of parliament; the former is usually chosen as the interval between the beats of a good mean-time clock. Unfortunately, its duration is not invariable; but, as ages must elapse before any sensible alteration takes place in its length, it may be used without inconvenience.

If, then, v be the velocity of a point moving uniformly, we mean that v feet are passed over in each second; so that, if s represent the space passed over in t seconds, we have

$$s = vt,$$

a formula which contains the whole properties of uniform motion. It gives

$$v = \frac{s}{t};$$

that is, to find the velocity of a moving point (when uniform), divide the space (in feet) described in *any* period of time by the number of seconds in the period. This will give the same result whether we take a million seconds or the millionth part of a second, as the period in question. This at once shows us how to proceed in measuring a variable velocity, such as that of a stone let fall, in which case the velocity constantly increases, or of a stone thrown upwards, in which case the velocity constantly diminishes.

That a moving body has, at every instant, however irregular its motion may be, a definite velocity, is obvious, and is, in fact, matter of every-day remark. Thus, when traveling in a railway train, we say, shortly after starting: 'We are now going at the rate of a mile an hour;' not thereby meaning that it will take us an hour to complete the mile, but that, *if we were to go on for an hour with the velocity we now have, we should run a mile*. Again, we may say: 'Now we are going at 30 miles an hour;' not thereby meaning that we have so much as 30 miles to travel, or that our journey is to last more than perhaps a few minutes, but that *an hour at the present rate would take us* 30 *miles*. In common language, then, our question is, how to measure our present rate.

If we could at any instant so adjust the steam-power to the resistance of the air and the friction of the rails as to keep the rate unaltered, we should have uniform velocity, measurable with ease, as above shown. But, as we cannot generally do this (though Attwood's machine enables us to do it in the case of a falling body), we are driven to some other expedient. Now, it is obvious that the smaller the interval we take, the less will our velocity have changed during its lapse, i. e., the more nearly will it have become uniform and measurable by the simple formula given above. That is, for a variable velocity we have

$$v = \frac{s}{t}$$

as an approximation, which is more and more nearly true as t, and therefore s, is smaller. In the language of the differential calculus—whose fundamental notions, as laid down by its great inventor, were, in fact, derived from this very question, the velocity being simply the *Fluxion* (q. v.) of the space described—we have

$$v = \frac{ds}{dt}.$$

Practically, by means of the electric chronoscope, we can now measure (very exactly) extremely small intervals of time, such, for instance, as the interval between the fall of the dog-head and the exit of the bullet from a rifle-barrel; so that a variable velocity now presents no formidable difficulty, as we can study and measure it *while it is almost absolutely uniform*.

We define *average* velocity as the space described in any time divided by the number of seconds employed. This may not, except at one or more instants during the motion, represent the actual velocity; but it is a velocity with which, if uniform, the same space would have been described in the same time. We shall presently have an opportunity of usefully applying this definition to one interesting case of varying velocity.

The *resolution* and *composition* of simultaneous velocities follows, almost intuitively, from the most elementary geometrical notions. When a man is walking north-east at a uniform rate, it is obvious to common-sense that he is progressing northwards, and also eastwards. What is his northward, and what his eastward velocity? The answer is very simple. Suppose that in one second he walks from A to B, then AB represents his whole velocity. But draw AN northwards and AE eastwards; also draw BC parallel to AN. Then AC is the space by which B is eastward of A, BC the space by which it is northward. Hence AC represents the eastward, and CB the northward velocity (each being the space in its respective direction described in one second), and these are called *components* of the velocity AB. AB, again, is said to be *resolved* into AC and CB.

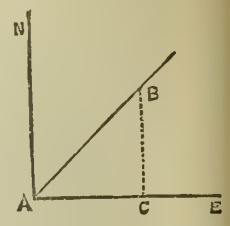


Fig. 1.

The general proposition is this, that a velocity represented by one side of a triangle may be resolved into two, represented in magnitude and direction by the other sides of the triangle. One or both of these may be again resolved by a similar process; and we find, as the most general propositions on the subject, that velocities represented by all the sides of a polygon (whether in one plane or not) but one, taken in the same order round, are jointly equivalent to a velocity represented by that one side, taken in the *opposite* order; also that a point which has, simultaneously, velocities represented by the successive sides of any polygon, taken all in the same order round, *is at rest*. The second law of motion (see MOTION. LAWS OF) enables us to interpret this geometrical theorem into the Physical Truths known as the Triangle and Polygon of Forces in Statics.

Rate of change of velocity is called *Acceleration*. It is measured in the same way as velocity itself. Thus, if the change take place in the direction of motion, it affects merely the amount, not the direction, of the velocity; and an acceleration α adds (or subtracts, if it be negative) α feet per second from the velocity affected. Thus it is found that gravity produces an acceleration of about 32·2 on all falling bodies; so that if a stone be let fall, its velocity after t seconds is $32{\cdot}2t$. If it be *thrown* down with a velocity v, its velocity in t seconds is $v + 32{\cdot}2t$. If thrown upwards with the same velocity, in t seconds its velocity becomes $v - 32{\cdot}2t$, so that it will stop and begin to descend after $\frac{v}{32{\cdot}2}$ seconds have elapsed.

The space passed over by the stone in t seconds is easily calculated by the help of the *average* velocity. For, since in any of the above cases the velocity increases (or diminishes) *uniformly*, its average value during any interval is the average of its values at the beginning and end of the interval. Hence, for the stone simply let fall:

Initial velocity = 0.

Velocity after t seconds = $32{\cdot}2t$.

Average velocity during the first t seconds = $16{\cdot}1t$. Hence, space described in t seconds

$$= t \times \text{average velocity} = 16{\cdot}1t^2.$$

So that the spaces described are as the *squares* of the times.

But, if the acceleration be not in the direction of motion, the direction and magnitude of the velocity will generally change. To exhibit this geometrically, Sir W. Rowan Hamilton (q. v.) invented the following beautiful construction of what he called the Hodograph of the motion. Let O be any fixed point, and from it draw lines OP, OQ, &c., representing, at every instant, in direction and magnitude the velocity of the moving point. The extremities of such lines will form a curve, such as PQ in the figure. If OP and OQ be any two of these, the *change* of velocity is represented (as above) by the third side, PQ, of the triangle. As Q is taken nearer and nearer to P, PQ becomes more and more nearly the tangent to the hodograph, so that the tangent at P has the *direction* of the acceleration, and the rate at which P moves round the hodograph is the *magnitude* of the acceleration.



Fig. 2.

If we consider any uniform motion, we see that the hodograph is a circle (its radius being the magnitude of the velocity), and from this it is easy to see that *in uniform motion the acceleration is always perpendicular to the direction of motion*. If we consider uniform motion, with velocity V, in a circle of radius R, the hodograph at once shows that the acceleration is $\frac{V^2}{R}$, and is directed towards the center of the circle.

Translated into Physics, acceleration (multiplied by the mass of

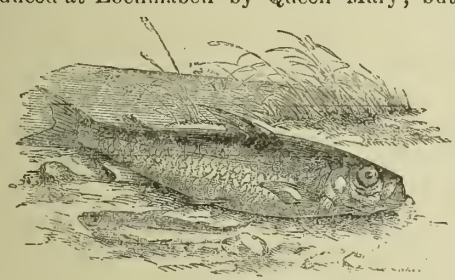
the moving body) is the measure of the force which acts on the body. So the above simple example shows that, to keep a mass moving uniformly in a circle, it must be drawn towards the center by a force proportional directly to the square of the velocity, and inversely to the radius. This is the physical explanation of the so-called Centrifugal Force (see CENTRAL FORCES).

VELOCITY, INITIAL, in Gunnery, is the speed with which the ball leaves the muzzle of the gun. This was formerly calculated from the momentum as shown by the Ballistic Pendulum (q. v.). A great improvement of the last ten years is the Electro-ballistic Pendulum, the invention of a Major Navez of the Belgian service, which actually measures the interval of time during which the shot traverses a short space of ground. The apparatus consists of a steel pendulum falling at the side of a graduated sector of a circle. Behind the segment is a piece of iron capable of being magnetized by a galvanic battery adjoining. The wires for completing the circuit between the battery and the magnet are so arranged that they are in connection with two targets of paper or other thin material in the line of the projectile's fire. So long as the circuit is complete, and before the experiment, the magnet holds the pendulum at its highest point. When the shot pierces the first target, the circuit is broken, the iron demagnetized, and the pendulum released; these effects being absolutely simultaneous. With equal simultaneity, the piercing the second target re-establishes the circuit, magnetizes the iron, and arrests the pendulum in its descent. The distance between the targets is known, and the accumulating resistance of the atmosphere within that time; the sector being finely graduated, the distance traversed by the pendulum shows exactly the fraction of a second occupied, and from these data the initial velocity is a matter of simple computation. Of an ordinary smooth-bore cannon, the initial velocity is about 1600 feet per second.

VELOCITY, VIRTUAL. See WORK.

VE'LVET, a fabric in which, besides the ordinary warp and weft, which are usually arranged as in twill-weaving, there is also a supplementary weft, consisting of short pieces of silk, cotton, or woollen thread doubled under the regular weft, and brought to the surface in loops which are so close together as to conceal the regular web. The loops are afterwards cut evenly, and the ends thus made constitute a covering resembling a very short fur. In silk velvets, the warp and pile threads are both of organzine silk, which is the strongest used in weaving.

VE'NDACE (*Coregonus Willughbii* or *marænula:* see COREGONUS), a fish of the family *Salmonidæ*, found in the rivers and lakes of Sweden, in the Castle Loch at Lochmaben in Scotland, and in some of the English lakes. It is popularly said to have been introduced at Lochmaben by Queen Mary; but the statement rests on no authority, and is highly improbable, as the fish could not be easily transported, except by the roe, living only for a very short time after being taken out of the water. Like most of its congeners, it is highly esteemed for the table. Its food consists chiefly of *Entomostraca*, and it is never taken by angling. Sweep-nets are used for its capture. It generally swims in considerable shoals, often with a remarkable separation of the sexes. It attains a length of 6 or 7 inches, is deeper in proportion than many of the Salmonidæ, and of a compressed form. The outline rises quickly from the snout to the dorsal fin, and the body tapers rather suddenly at the tail. The under-jaw projects a little. The scales are of moderate size, and do not come off very readily. The tail is broadly forked. The back is brown, the sides tinged with yellow, the cheeks partly white, and there is a curious, red, heart-shaped mark between the eyes. It spawns in November and December, and multiplies rapidly, notwithstanding the presence of predaceous fishes in the waters which it inhabits. V.-fishing at Lochmaben takes place only on the 1st of August each year. The V. might probably be introduced with advantage into many of the British lakes. It is doubtful if this fish is the same with the *Coregonus albulus*, found in Pomerania.



Vendace (*Coregonus marœnula*).

VENDÉE, LA, a maritime dep. in the west of France, bounded on the W. by the Bay of Biscay, on the N. by the dep. of Loire-Inférieure, and on the S. by that of Charente-Inférieure. Area, 2587 sq. m.; pop. (1881) 421,139. The dep., which owes its name to a small affluent of the Charente, is traversed from east to west by a range of hills, called in the east the Plateau de Gatin, and in the west the Collines Nantaises; and is watered in the north by the affluents of the Loire, and in the south by the Lay and the affluents of the Charente. The territory of La V. is divided into three parts, the names of which indicate the character of their configuration. In the west is the *Marais*, occupied by salt marshes and lakes, in the north is the *Bocage*, covered with plantations; in the south and middle is the *Plaine*, an open and fertile tract. The coast-line, 93 miles in length, presents few indentations, the chief being the Bay of Aiguillon, which affords secure anchorage for vessels. The climate is warm, humid, and unhealthy in the *Marais*, cold and humid in the *Bocage*, and warm, dry, and healthy in the *Plaine*. Cereals, potatoes, and vegetables are largely cultivated; the wine produced, which is white and of inferior quality, amounts to 5,500,000 gallons a year. Among the mineral treasures, iron ore is very abundant. There are three arrondissements—La Roche-sur-Yon, Fontenay-le-Comte, and Sables-d'Olonne. The capital is La Roche-sur-Yon.—For the *wars of La V.* (by which name the armed opposition to the religious and political changes in France is denoted, and which burst out into a species of partisan warfare in 1793, 1794—1795, 1799, and 1815), see CATHELINEAU, LAROCHEJACQUELEIN, HOCHE, CHOUANS, &c.

VENDÉMIAIRE (i. e., the 'Wine-month') embraced, in the calendar of the first French Republic, the period from the 23d September to the 21st October. Particularly memorable in the history of the Revolution is the 13th Vendémiaire of the year IV. (5th October 1795), when the Paris 'Sections,' worked upon by royalist reactionaries in all sorts of ways, rose against the National Convention, but were decisively beaten by a military force under the command of Barras, or rather of his lieutenant, Napoleon Bonaparte, then a young officer only beginning to be known. The victory of the Convention saved the Republic—for a time.

VENDE'TTA (vengeance), the term used to denote the practice, as it prevails in Corsica, of individuals taking private vengeance upon those who have shed the blood of their relations. In Corsica, when a murder has been committed, the murderer is pursued not only by the officers of justice whose duty it is to punish offences against society, but also by the relatives of the slain, upon whom the received views of social duty impose the obligation of personally revenging his death. In such a case, the relatives of the murdered man take up their arms, and hasten to pursue, and if they can find him, to slay, the murderer. If he succeed in eluding their pursuit, the murder may be revenged upon his relatives; and as the vengeance may be taken whenever an opportunity occurs, the relatives of a murderer whose crime is unavenged have to live in a state of incessant precaution. When they go to the fields, they take their arms with them, and set a watch; at home, they have their doors well fastened, and their windows barricaded; and since the avenger is never far distant, they live, in fact, in a state of siege. Instances are on record of persons who were, as the phrase is, 'suffering the vendetta,' having lived shut up in their houses for 10 or 15 years, and being, after all, shot on the first occasion on which they ventured out of doors. Formerly, when blood had been shed, there was a custom of proclaiming the war of revenge, and announcing to what degree of relationship it should extend; but this custom is gone out of use. Frequently, in the practice of this system of vengeance, each of two sets of relatives has a murder to revenge upon the other; the vendetta, that is, crosses. This is called the *vendetta transversale*. The duty of taking vengeance lies primarily and especially upon the next of kin. Not to take revenge, is deemed in the highest degree dishonorable; and any delay in doing so on the part of the next of kin is made matter of reproach by his relatives.

When the Genoese were masters of the island, their laws declared the *rimbicco*—the uttering of such reproaches—punishable, as an incitement to murder. But there is seldom occasion for the rimbicco, for the Corsican is brought up to regard the vendetta as the most sacred duty of man. The women instigate the men to revenge by singing songs of vengeance over the body of the slain, and displaying his blood-stained garments. Often a mother affixes to her son's dress a bloody shred from the dead man's shirt, that he may have a constant reminder of the duty of taking vengeance. Although the vendetta usually has its origin in bloodshed, smaller injuries may give rise to it, and even purely casual occurrences. Mediators, termed *parolanti*, often interpose to make up a quarrel. When they succeed, an oath of reconcilement is taken, and this oath is regarded as specially binding. It is infamous to break it; nevertheless, it is broken now and then. Brigandage prevails to a great extent in Corsica, and the origin of the career of a brigand, in almost every instance, can be traced to the vendetta. A man commits a murder out of vengeance; he flees to the hills; it never is safe for him to resume his former life again,

and so he turns robber for a living. Besides the vendetta, properly so called, hereditary family feuds are very common in Corsica; and sometimes there are hereditary feuds between whole villages. The great families of the island hand down feuds from generation to generation, in which not only themselves and all their relatives, but all their servants and dependants are involved —the kind of feud which was common in the Italian towns of the middle ages, and which is illustrated in the play of *Romeo and Juliet*.

The origin of the vendetta has often been referred to the lawlessness which prevailed in many parts of Corsica during the period of the Genoese domination, and to the venality which vitiated the Genoese administration of justice. And no doubt, the insecurity and the mal-administration of justice which existed in Corsica for ages, helped to consolidate this barbarous custom; which, thus consolidated, has been perpetuated by the isolated position of the country, and the absence of civilizing influences. But the explanation of its origin must be sought in more general causes, for it is not exclusively a Corsican custom. On the contrary, it may be safely affirmed that a system of private vengeance, almost precisely similar, has existed amongst every people during certain stages of its progress—never entirely passing away until government became strong enough to insure redress of injuries, and to restrain the passions of individuals.

In the case of rude tribes, in the savage or semi-savage state, there is on record such a multitude of instances of the existence of the blood-fued, that its universality among men in that state cannot be doubted. Its incidents are usually the same which Sir G. Grey found subsisting among the aborigines of Australia, and of which, in his *Journals of Travel in the North-west of Australia*, he has given a vivid description. The Australian tribe usually includes several stocks or bodies of men, between whom blood-relationship is acknowledged; and every member of a stock is bound to assist in taking vengeance for a personal injury done to any of his kinsmen. On the other hand, though a hunt is always made for the actual wrong-doer, the injury may be satisfactorily avenged upon any member of his stock. As in the Australian and similar tribes, there is no relationship acknowledged between members of the same family unless they are also members of the same stock (see article TRIBE), the blood-fued occasionally arrays father against son, and brother against brother. It often leads to the break-up of a tribe.

Of the prevalence of the blood-feud among tribes which have advanced to what is called the patriarchal state also, there is very ample evidence. Among such tribes, the cohesion of the family is very powerful; everything relating to the family is quasi-sacred; and the duty of taking vengeance for kindred blood is not merely a matter of honor, but of religion. Volney's description of the blood-feud, as practiced among the Bedouins, will do for all the tribes of this class; and it might almost stand for a description of the vendetta. 'The interest of the common safety,' he says, 'has for ages established a law among them (the Bedouins) which decrees that the blood of every man who is slain must be avenged by that of his murderer. This vengeance is called *Tar*, or retaliation; and the right of exacting it devolves upon the nearest of kin to the deceased. So nice are the Arabs upon this point of honor, that if any one neglects to seek his retaliation, he is disgraced for ever. He therefore watches every opportunity of revenge; if his enemy perishes from any other cause, still he is not satisfied. His vengeance is directed against the nearest relation. These animosities are transmitted as an inheritance from father to children, and never cease but by the extinction of one of the families, unless they agree to sacrifice the criminal, or purchase the blood for a stated price in money or in flocks. Without this satisfaction, there is neither peace, nor truce, nor alliance between them, nor sometimes even between whole tribes.' The blood-feud is observed, almost precisely as described above, among the Circassians, the Druses, and the numerous hordes of Central Asia; it seems to have had the same incidents, too, among similar tribes in ancient times—e. g., among the Greeks of the Homeric period, among the Germans in the time of Tacitus, among the northern nations who overran Europe after the fall of the Roman Empire. The Corsican vendetta seems to be the same thing as the Bedouin Tar, surviving, with slight modifications, in a secluded island, where the law has never made itself supreme, long ages after the progress of society and the consolidation of government have effaced every trace of it, except at a few isolated points on the neighboring continent of Europe. The vendetta exists in Sicily and in Sardinia, as well as in Corsica; in Calabria also; and it (or we should rather say, the blood-feud) flourishes vigorously among the Montenegrins and the Albanians.

The right of private war which subsisted in Europe in the middle ages—introduced by the northern nations who shared the spoils of the Roman Empire—was just a modification of the blood-feud. This right belonged only to the nobility, and could be exercised only against men of equal rank. It was usually resorted to on account of insults publicly done, of atrocious acts of violence or bloodshed, and similar injuries. The right of vengeance devolved first upon the next of kin; but all the kindred within the degrees of relationship to which the ecclesiastical prohibitions of marriage extended, were bound to take up the quarrel; and this obligation was so far sanctioned by law, that if any one failed to fulfil it, he was deemed to have renounced his kindredship, and to have lost his rights of succession. Vassals, equally with kinsmen, became implicated in the vengeance of their lords; and every person present when the cause of quarrel arose was required to take side with one or other of the parties. For several centuries, private wars were constantly being waged within the kingdoms of the continent, and the efforts of kings and ecclesiastics to restrain them produced little effect until governments became strong enough to prohibit them, and to enforce the prohibition.

It is now apparent that the vendetta represents a system which prevailed everywhere before the consolidation of society into the state, and the establishment of a police capable of protecting life and property. This system was a rude substitute for government and the administration of justice. The family, or the body of kindred, formed in fact, a commonwealth of itself; its members held firmly together; and when one was injured, all the little state was injured. The Nagas have no government, and among them the blood-feud is the only check—it is not altogether inefficient—upon the selfishness and the passions of individuals. As society became consolidated, the exercise of this right of vengeance was curtailed —remaining longest with the nobility, who counted it as one of their most valuable privileges, and maintained it as long as possible. They had to surrender it at last, because the state grew strong enough to supersede the action of individuals in redressing injuries, and was able to do this with greater fairness, and without the same admixture of calamitous results.

VENDOME, HOUSE OF. V. was an old county of France, erected into a duchy by Francis I., for behoof of Charles of Bourbon, the grandfather of Henry IV. On the accession of the Bourbons to the throne, it was reunited to the crown, but again separated from it by Henry IV., who conferred it upon Cesar, the eldest of his sons by Gabrielle d'Estrées. Cesar's eldest son, Louis, Duke of Vendome, married Laura Mancini,* one of Mazarin's nieces, and had by her three sons, the eldest of whom was LOUIS-JOSEPH, DUKE OF VENDOME, the celebrated French general who so distinguished himself during the war of the Spanish Succession. He was born at Paris, July 1, 1654, and made his first appearance on the field of battle as a lifeguardsman during the Dutch campaign of 1672, afterwards serving with distinction under Turenne in Germany and Alsace, and under Crequi in Flanders. Released by the peace of Nimeguen (1678), he retired to his château of Anet, near Dreux, where he resigned himself to the most liberal indulgence in all kinds of pleasure. At this time, he became compromised in the affair of Lavoisin (see POISONING); but it turned out that his intercourse with the pretended seer was prompted merely by curiosity. On the outbreak of war in 1688, he was ordered to the Low Countries, where, under Luxembourg (q. v.), he earned deserved renown at the sieges of Mons and Namur, and the battles of Leuse and Steenkerk; and his high reputation was not diminished by his subsequent conduct in Italy, where he commanded the left wing of Catinat's army at the battle of Marsaglia (October 4, 1693). But V.'s brilliant gallantry and military talents had not hitherto succeeded in obtaining for him the honor of an independent command, for it was only too evident that with these valuable qualities were combined inveterate indolence, and careless and disorderly habits, which might, as effectually as the most utter incapacity, ruin the chances of any enterprise under his management. However, the necessities of the case induced Louis ultimately to give him (1695) the command of the army in Catalonia; and he was agreeably surprised at the alertness of V., who closed a series of brilliant successes by the capture of Barcelona, an exploit which did much to bring about the peace of Ryswick (1697).

After five years of inaction, spent in sloth and sensuality, he was despatched by his sovereign to supersede Villeroy in Italy. His arrival was hailed enthusiastically by the soldiery, who relied implicitly upon his brilliant genius and happy audacity to extricate them from all difficulties, and with whom his excessive laxity in the matter of discipline rendered him a great favorite. The restored confidence of the troops was proved by the victories of Ustiano and San-Vittoria; while the enforced retirement of Prince Eugene beyond the Mincio equally showed the superior strategic abilities of their general; and it required the utmost exercise of both to prevent the surprise at Luzzara (August 15, 1702), brought about through V.'s usual carelessness, from becoming a total rout. From this time, a slight though temporary improvement in V.'s habits is visible; in 1703, he drove the Austrians be-

* It is curious to remark the relationship between the opposing leaders in the great war of 1700—1713. Vendôme (French) and Prince Eugene (Allied) were cousins; Vendôme was second cousin to the Duke of Burgundy; Eugene was similarly related to the Duke of Savoy; and Marlborough (Allied) and Berwick (French) were uncle and nephew.

fore him into the Tyrol, repeatedly defeating Starhemberg; when the defection of the Duke of Savoy forced him to retreat. The duke, though joined by Starhemberg, was beaten again and again, and at last cooped up in Turin, whither Eugene was advancing to his relief, when the defeat of his advanced guard by V. compelled a halt. The imprudent Frenchman, however, intrusted the difficult duty of holding Eugene in check to his younger brother, the grand-prior, who, though a gallant soldier, was no match for his opponent in generalship; and had not V. returned to Cassano just in time to divide the honors of the battlefield with his opponent, the army of observation would have been scattered to the four winds of heaven. Again, partially stimulated by this narrow escape, V. displayed unwonted vigor, and drove the Austrians into the Trentin; but in the summer of 1706, he was recalled to supersede Villeroy, who had blundered in the Low Countries, as he had formerly done in Italy.

Unfortunately, V.'s besetting faults were attempted to be remedied by uniting the Duke of Burgundy with him in command; and the want of a thorough understanding between the conjoint chiefs led to the defeat of the French at Oudenarde (q. v.), and to the failure of the attempt to relieve Lille. The cause of these reverses formed the subject of vehement discussions in France, and though undoubtedly V. was mostly to blame, his great reputation gained him the public support; yet Louis XIV. held him in a sort of disgrace for a time. In 1710, a cry of distress arose from Spain, where the British and Austrians were carrying all before them; and in compliance with the urgent request of Philip V. (who had served under V. in Italy) to his grandfather to send him—not a reinforcement, but only V., the heroic old debauchee was once more roused up from his lair, and despatched to Spain. His appearance, like that of Du Guesclin more than three centuries before, brought together as if by magic a numerous army of volunteers; towns, villages, and even religious establishments united in a most enthusiastic manner to contribute the necessary funds, and Philip was settled in his capital before the close of the year. A week after, Stanhope and the British troops were defeated and captured at Brihuega; and on the following day, Starhemberg and the Austrians were completely routed at Villa Viciosa. The grateful monarch raised his deliverer to the rank of a prince of the blood-royal, and presented him with 500,000 livres (£20,000), a gift which V. accepted only to distribute it among his soldiers. V. for the last time relapsed into his usual habits, and after 'a month of extraordinary gluttony,' died of indigestion at Vinaroz in Valencia, June 15, 1712. V., of all the descendants of Henry IV. both then and since, bears the strongest resemblance to his great-grandfather; but of the resolute persistency and self-denial of the first and greatest of the Bourbon monarchs, we cannot discern in him the slightest trace.—Saint-Simon's biography of V., and Voltaire's *Siècle de Louis XIV.*, are the principal authorities for the life of this extraordinary man.

V.'s disinterestedness, like his other good qualities, and they were not a few, became a vice from its very extravagance. It is related that one of his domestics demanded permission to leave his service on the ground that he could not stand by to see a master robbed by his servants in such a barefaced way. 'Is that the reason?' said V.; 'very well, then, rob like the others.'

VENDOME, a town of France, in the dep. of Loir-et-Cher, seated on vine-clad hills, on the Loir, which here divides itself into many canals, 45 miles west-south-west of Orleans. It contains cavalry barracks; a theater; the church of the Trinity, a remarkable edifice; one of the most beautiful colleges of France; and the ruins of a lofty castle. Manufactures of cloths, needles, and embroideries are actively carried on. Pop. (1876) 7806.

V., a very ancient town, and said to have been of importance under the Merovingians, was the capital of the ancient county of Vendomois, which was erected into a duchy-peerage by Francis I., in favor of Charles de Bourbon. Henry IV. conferred it on one of his natural sons, who thus became the founder of the House of V. In 1870, it was the scene of several conflicts between the French and Germans.

VENEE'R (Fr. *fournir*, to furnish), a layer of wood, cut very thin, for the purpose of being glued on to the surface of a commoner kind. Only choice kinds of hard woods are sawn into veneers, and they are usually attached to deal or pine, so as to give all the appearance of being made solid. In this way, the more costly kinds of furniture-woods are economically used by the cabinetmaker, for with the improvements which have been affected in the process of sawing, veneers as thin as paper have been produced.

VENE'REAL DISEASE. See SYPHILIS.

VENE'RIDÆ, a family of lamellibranchiate molluscs, having a regular, closed, bivalve shell; the teeth and laminæ of the hinge near together in a single group under the beak (*umbo*); generally three diverging teeth in each valve; a marked oval impression in front of the beak; the general form similar to that of the cockles (*Cardiaceæ*), but usually more flattened. The mantle has a large opening in front; the siphons are unequal, more or less united; the foot is tongue-shaped, compressed, sometimes grooved, and producing a Byssus (q. v.). The species, all of which belong to the Linnæan genus *Venus*, are very numerous. They are very widely distributed, but abound chiefly in tropical seas. About forty are found on the British coasts, some of them very common. The V. are generally elegant in form, and often finely colored. Some of them have the shell furnished with long spines, but chevron-shaped lines are their common ornament. The V. first appear in the oolitic rocks, and are more abundant in the present than in any former geological epoch.

VENESE'CTION (occasionally termed PHLEBOTOMY, and popularly known as BLOOD-LETTING or BLEEDING) is an incision into a vein, for the abstraction of blood. Although the operation may be performed on many of the superficial veins, it is restricted in this country to the veins at the bend of the elbow. Of these veins, the most prominent are the median-cephalic and the median-basilic; the former being situated on the outer side of the tendon of the biceps muscle, while the latter lies on the inner side, and only separated from the brachial artery by a thin layer of fascia. Hence, from fear of wounding the artery, the median-cephalic should be preferred; but in reality the median-basilic is usually selected, in consequence of its being the more prominent and larger vein of the two. The appliances required are a lancet, a bleeding tape or narrow bandage, lint, a bowl to receive the blood, a basin of water, and a sponge. The patient being placed in a sitting position, the tape or bandage must be tied sufficiently tight around the middle of the upper arm, or rather lower, to arrest the venous circulation without materially affecting the pulse at the wrist.

The forearm having been allowed to hang down till the veins are tense, the operator must make his selection, and taking the blade of the lancet between the forefinger and thumb of the right hand, should fix the vein by pressing his left thumb upon it just below the part he is about to open. Steadying his hand by resting the ends of the three outer fingers on the forearm, he should steadily (and without a jerk or plunge) introduce the point of the lancet obliquely until the interior of the vessel is reached, and the blood is seen rising up. Without penetrating deeper, he should thrust the instrument forward, so as to open the vein longitudinally to a sufficient extent. On now removing the thumb, the blood should emerge in a full jet; and if the stream be scanty, the patient may have a hard body—as a piece of stick or a pocket-knife—placed in his hand, with directions to grasp it firmly, or the surgeon may increase the flow by chafing the palmar surface of the forearm, rubbing from below upwards. When a sufficient quantity of blood has been abstracted, the thumb of the left hand should be placed on the wound, and the ligament loosened; a small pad of lint should then be placed over the orifice, the surrounding parts should be cleaned of blood by a sponge, and the pad of lint compressed against the arm by the tape or narrow bandage, applied in the figure-of-eight form, with the crossing of the tape lying on the pad. After the operation, the arm should be carried in a sling for a day or two. We have, contrary to our ordinary custom, given the details of the operation, because it is one which, if performed at the proper moment, may be the means of preserving life, and which any person of ordinary intelligence could probably perform more safely, after reading these directions, than the farriers, barbers, &c. who are frequently called upon to perform it in remote country districts and in the backwoods of our colonies.

Amongst the occasional ill consequences of venesection may be mentioned: (1) The escape of blood into the surrounding cellular (or connective) tissue, giving rise to a swelling called a *Thrombus*, which, if it does not rapidly become absorbed, should be emptied by the lancet. This is due to a want of coincidence between the wound in the integument and in the coats of the vein. (2) Phlebitis, which generally arises from the use of an unclean lancet. (3) Varicose aneurism and (4) Aneurismal varix, both of which may be included under the term Arterio-venous Aneurism, since in each case there is an aneurismal dilatation of an artery communicating with a vein; while they differ in this respect, that varicose aneurism is said to exist when an artery has been punctured through a vein (in this case, the brachial artery through the median-basilic vein), and a false or traumatic aneurism, composed of lymph that was effused between the vessels, has formed between them, and opens into both; while aneurismal varix is similarly produced, but the two vessels adhere together, the communication between them remaining permanent. These diseases often have such a tendency to remain stationary, that no interference is necessary; occasionally, however, very serious surgical treatment is required, for details of which we may refer to that excellent article on 'Aneurism,' in Holmes's *System of Surgery*.

In children, and occasionally in others, where the veins of the arm are small and undefined, blood is drawn from the external jugular veins. As this operation would only be performed by a

surgeon, it is unnecessary to describe it; and we will merely remark, that as the entrance of air into the vein during the operation, or until the orifice of the vein has been closed, would cause instant death,* this vein should only be opened in extreme cases.

We have no space to notice at any length the general results of bleeding, or the much disputed question, whether venesection should not be discarded from our list of operations,† because no rational doubt can be entertained that, although, until a quarter of a century ago, or later, there was a most unnecessary and probably hurtful effusion of blood, venesection, in properly selected cases, is one of the most valuable remedies. A patient can bear a much greater loss of blood in the horizontal position than when sitting, and in that position than when standing. The condition required to be produced is that there should be incipient faintness; and the loss required to produce this effect varies extremely in different individuals and in different diseases. The late Dr. Marshall Hall, in his work *On the Effects of the Loss of Blood*, states that the average loss of blood required to produce slight faintness in a healthy person in the sitting position is 15 ounces. In some diseases, more, and in others less, than this loss can be borne. The greatest loss can be borne in congestion of the head, or tendency to apoplexy (from 50 to 40 ounces); then in inflammation of the serous membranes and of the parenchymatous substance of various organs (from 40 to 30 ounces); then acute anasarca (about 20 ounces); and then inflammation of the mucous membranes (about 16 ounces); while the system bears less than the quantity borne in health, in the eruptive and other fevers, in delirium tremens, dyspepsia, and chlorosis—a set of diseases in which blood-letting is now scarcely ever resorted to.

VENE'TIAN CHALK, a variety of soap-stone or steatite, used sometimes in the manufacture of drawing crayons.

VENETIAN STYLE of Architecture. This term is applied to the particular phrase of the Renaissance developed in Venice. Under the head ITALIAN ARCHITECTURE, the peculiarities of the various schools of Italian architecture are pointed out. The Venetian is the most picturesque and ornate, as compared with the styles of Rome and Florence. 'Venetian-Gothic' indicates the peculiar phase of that style so common in Venice and the north of Italy, and chiefly applied to domestic architecture. See GOTHIC ARCHITECTURE.

VENEZUE'LA, a republic in the north-west of South America, bounded on the N. by the Caribbean Sea, on the W. by the United States of Columbia (New Granada), on the S. by Brazil, and on the E. by British Guiana. Lat. 1° 20′—12° 25′ N.; long. 59° 45′—73° 17′ W. Within recent years, the country has been variously subdivided. In 1854, there were 13 provinces—those of Apure, Barcelona, Varinas, Barquisimeto, Carabobo, Caracas, Coro, Cumana, Guiana, Maracaybo, Margarita, Merida, and Truxillo—with an aggregate population of 945,408. Subsequently the number of provinces was increased to 21. In 1863, after the Federal victory over the Unionists the number of *states* was reduced to 7; but according to the constitution of 1881, this number has been increased to 9 great states: State of the East, Guzman Blanco, Carabobo, State of the South-west, State of the North-west, State of the Andes, Bolivar, Zulia, and Falcon. Area, 401,700 square miles; pop. (1881) 2,070,497. The capital is Caracas, or more correctly, Caracas (q. v.). The coast-line, extending from the east to west—from the delta of the Orinoco to the boundary of the United States of Colombia—is 1584 miles in length.

The most easterly part of the coast-line, 150 miles in length, and formed mostly by the delta, is washed by the Atlantic, and is very low. The waters of the Gulf of Paria beat upon bold and rocky shores. The remainder of the coast-line, including the north shore of the peninsula of Paria, is washed by the Caribbean Sea, and the coast, for the most part low and marshy, is sometimes precipitous, the mountains rising like a wall from the water's edge. With trifling exceptions, the country is abundantly watered. Its great river is the Orinoco, which drains by far the greater part of it, and the course of which is almost wholly within its boundaries. The other greater rivers of V. are affluents of the Orinoco (q. v.). Numerous streams, small in comparison with the great rivers, flow north into the Caribbean Sea and the Lake of Maracaybo (q. v.), which is by far the largest lake in the country. The Andes enter V. from the west, and divide into two branches, the first of which runs north toward the coast, under the names of the Sierra de Perija and the Montes de Oca, but rise no higher than 4200 feet; while the other branch, running in a north-east direction, terminates near the coast, in long. 68° 30′ W., and attains a much greater elevation. That part of the north-east branch of the Andes called the Sierra Nevada de Merida, and situated about 100 miles south of Lake Maracaybo, contains the only mountain that rises above the line of perpetual snow, and the two peaks of which are 15,342 and 15,310 feet high respectively, the loftiest in the country. South and south-east of the Orinoco, are the most mountainous districts of Venezuela. They form a vast, confused, and mostly unexplored region, but none of these mountains rise to the height of the main peaks of the Andes. The country embraces vast table-lands, known under the names of *Llanos*, *Paramos*, *Mesas*, and *Punos*. There are extensive, low, marshy tracts along the coasts and the lake and river banks, which, however, are abundantly fertile during the dry season. For the most part, the soil of the country is fertile. In the mountainous district in the south-east, there are great tracts well suited for the production of grain. Of this region, the lands not more than 2000 feet above sea-level are called *tierras calidas*, or hot lands; those between 2000 and 7000 feet are called *tierras templadas*, temperate lands; and those above 7000 feet are the *tierras frias*, cold lands, in which the average temperature is 49° F., and which are mostly uninhabited.

The warmest tracts are the palm-lands; and the sago-palm, cocoa-palm, and others, grow here to a most colossal size, and yield most valuable products. Among the forest trees are the mahogany, satin-wood, rosewood, black and white ebony, and caoutchouc; and there are forests of the cinchona or Peruvian-bark tree. The cocoa and coffee trees, sugar-cane, indigo, and cotton plants are cultivated. Vegetables in great variety are raised, and tobacco is a profitable crop. Among the wild animals are the puma, ounce, and wild-cat; the jaguar is now becoming rare. The alligator, crocodile, boa-constrictor, and rattlesnake are found. Of domestic animals, great herds of cattle and wild horses roam over the *llanos*, and mules, asses, sheep, goats, and pigs are reared. The inhabitants are made up of whites of Spanish extraction; Indians, who are docile and industrious, and are the miners, agriculturists, and manufacturers of the country; some negroes and mixed races. Agriculture is the great pursuit, though only about one-tenth of the whole area is under cultivation. Manufactures are few; commerce is important, and would be much more so, were there well-constructed roads and other means of conveyance than mules. The principal articles of export are coffee, cotton, cocoa, sugar, indigo, tobacco, salt, hides, live-stock, tallow, horns, sarsaparilla, dye-woods, and timber. The imports are manufactured goods, provisions, and wine. During the five years 1866—1870, the imports averaged £1,000,000; the exports, £1,200,000. In 1877 the value of the imports was £3,008,670; exports, £3,222,530. The religion of the mass of the people is Roman Catholic, though other forms are tolerated.

History.—The east coast of V. was discovered by Columbus in 1498; Ojeda and Vespucci followed in 1499, and, entering Lake Maracaybo, they found an Indian village constructed on piles, to prevent the evil effects of inundation, and they named the place Venezuela, or Little Venice, a name which afterwards spread to the whole country. The first settlement was made at Cumana in 1520, by the Spaniards; and V. remained subject to Spain till it claimed independence in 1811. It then returned to allegiance to Spain, but again revolted in 1813, and, forming with New Granada and Ecuador the republic of Colombia, was declared independent in 1819. In 1831, the states separated. See COLOMBIA. In 1865, Juan Falcon became president, but fled in 1868, when the Unionists overcame the Federals. In 1870, the Federals regained their supremacy.

VE'NIAL SIN (Lat. *veniale*, pardonable from *venia*, pardon), a term used, chiefly in Roman Catholic theology, to denote the less heinous class of offences against the law of God. Roman Catholic divines infer from many passages of Scripture that there are various grades of guilt in the culpable actions of man, and that these varieties of guilt involve a corresponding variation in the liability to punishment which is thereby entailed. Lowest in this scale of imputability is the class of offences known as venial, and by this name distinguished from those which are called mortal. Much difference of opinion exists even among Catholics themselves as to the nature and origin of this distinction. Some ancient writers explained mortal sins as being offences against a *precept*, whereas venial sins are but violations of a *counsel*. This explanation, however, is now universally rejected; and it is held that sin, of its very essence, whether mortal or venial, supposes the violation of a *law* or precept. Another explanation of the difference declares mortal sin to be that which deprives the soul of sanctifying grace; whereas venial sin only weakens and diminishes, but does not utterly extinguish sanctifying grace in the soul. This is an explanation, however, rather of the effect than of the nature of venial sin; and the more received opinion is that of St. Thomas Aquinas, who explains mortal sin to be that which of itself subverts *the end* of the law; whereas venial sin but diverts it in a greater or less degree from that to which God intended that it should be directed.

* Few deaths are more rapid than those caused by the entrance of air into the veins of the neck. Many surgical operations in that region have proved fatal from this cause; and the knowledge of this fact has been applied to the slaughtering of horses, oxen, &c. It is probably one of the most humane forms of destroying life.

† On this subject, the non-professional reader may consult a long foot-note to Dr. (now Sir Thomas) Watson's *Lectures on the Principles and Practice of Physic*, 4th ed., vol. i. pp. 231—234; and Dr Markham's *Lectures on the Change of Type in Disease; with a Letter by Sir Thomas Watson*, 1866.

Catholics, while insisting on this distinction, are careful to explain that venial sin, although absolutely pardonable, is not to be supposed to be easily pardonable. They hold that it is of its own nature a great 'deordination,' and that it may and does entail a heavy liability to punishment, although not to the eternal punishment of hell, which is reserved for mortal sin. Sins may be venial either objectively or subjectively; objectively, when the 'object' of the law, or what is technically called the 'matter' of the sin, is light or trivial; as in the case of a petty theft, a slight departure from truth, or a passing ebullition of impatience or anger; subjectively, when, even though the 'matter' or 'object' is grave, there is but imperfect advertence, or not full consent, on the part of the subject or agent; as in the case even of a grievous injury done without full knowledge or intention on the part of the agent, or without full and deliberate consent. The degree of culpability in each case is supposed to depend on the objective or subjective qualification of the act. Catholics hold that persons dying in a state of venial sin are not excluded for ever from heaven; but that, since nothing unholy, even though in a minor degree, can approach God, the soul departing from life so stained with venial sin, is compelled to undergo a purification in Purgatory (q. v.), which they conceive to be of greater or lesser severity and duration according to the degree of culpability. Some of these writers teach that even venial sins involve punishment of extreme severity; and all expressly declare that it is never lawful, under any circumstances, to commit the smallest venial sin, even for the purpose of compassing a good and holy object.

Protestants reject the whole doctrine of *mortal* and *venial* sins. They regard all sins as, in one sense, *mortal*, i. e., as exposing the sinner to 'the wrath and curse of God, both in this world and that which is to come;' but all sins of the believer are expiated by the blood of Christ, so that there remains no penalty to be paid, either by penances in this world, or by sufferings after death. The very notion of venial sins appears to them to make light of the law of God; whilst that of the expiation of venial sins by the sufferings of the sinner himself, is inconsistent with their doctrine of justification, and with their views of the efficacy of the sacrifice of Christ.

VE'NICE, a fortified city of Northern Italy, one of the noblest, most famous, and singular cities in the world, is built upon a crowded cluster of islets, in the lagoon of the same name, on the north-west fringe of the Adriatic Sea, 23 miles east of Padua by the Milan and Venice Railway; lat. 45° 25′ N., long. 12° 20′ E. The lagoon of V. is banked off from the Adriatic by a long, narrow sandbank, extending south-west from the mouth of the Piave to that of the Adige, and divided into a number of islands by narrow sea-passages, six in number. Formerly, the chief of these entrances into the lagoon was the *Porto di Lido*, through which all the great merchantmen of the republic passed direct into the city, and which is still frequented by small vessels, and by the Trieste steamers. The Porto di Malamocco, between the island of the same name on the south, and that of Lido on the north, is now the deepest channel into the lagoon. Inside of this sandbank, and between it and the mainland, which is from three to five miles distant, is the lagoon—a sheet of shallow water, navigable for vessels of very light draught, except where channels have been formed naturally by rivers, and artificially maintained.

In some parts of this marshy, sea-covered plain, islets have—by the action of currents and otherwise—become consolidated into ground firm enough to be built upon, and fruitful enough to be cultivated; and in the midst of a crowded cluster of such islets, amounting in number to between 70 and 80, the city of V. is built. In the vicinity of V., the ebbing tide (the difference between high and low water is only between 2 and 3 feet) lays bare nearly everywhere a great plain of calcareous mud, laced, however, by an intricate network of narrow channels, from which the sea never retires; while at high water the whole surface is covered by the sea to the depth of from 1 to 1½ feet. The chief of the islands upon which V. is built is called *Isola de Rialto* (i. e., *rivo alto*), or Island of the Deep Stream. The islands, in many places only shoals, afford no good foundations for buildings; and the city, for the most part, is built upon artificial foundations of piles or stone. The fact that this city of marble palaces seems to rise vision-like from the unsubstantial sea, is sufficient to render its aspect at all times more or less fascinating; but in summer and autumn, the seasons of the highest tides, when the Grand Place of St. Mark's is partially flooded, and when the image of each palace is doubled by reflection in that 'green pavement, which every breeze breaks into new fantasies of rich tesselation,' the city is indeed marvelously beautiful. The Canalazzo, or Grand Canal—its tortuous course through the city being in the form of the letter S reversed, thus, ⊰ —divides V. into two unequal parts, and is the main thoroughfare for traffic or pleasure. But the city is subdivided by 146 smaller canals, or *rii*, as they are termed. These are the water-streets of V., by means of which passengers can be conveyed to any quarter, for here the canal is the street, and the Gondola (q. v.) is the cab or carriage. Access can also be had to all parts of the town by land—across the canals by bridges, and amongst the houses by narrow lanes called *calli*. There are in all 306 public bridges, and of these, three cross the Grand Canal—the Rialto, a stone structure, and the most famous; and two iron bridges.

The Piazza or Square of St. Mark's is the great center of business and amusement, and the locality most frequently visited by travelers in Venice. It is 576 feet in length, 269 feet in greatest width, and 185 feet in least width. The east side of this square is occupied by St. Mark's Church. The first church of St. Mark's was built in 813, but was destroyed by fire in 976. It was rebuilt in 1071, and consecrated before the close of the 11th century. The edifice is Byzantine, with Gothic additions of the 14th c., and Renaissance alterations of the 17th century. It became the cathedral and seat of the Patriarch in 1807. The plan of St. Mark's is the Greek cross. Above the doorway are the four famous horses which Marino Zeno brought from Constantinople in 1205, which were carried away by Napoleon in 1797 to Paris, and restored to V. in 1815. A great dome rises over the intersection of the lines of the cross; and over the transepts, other domes arise. The carved work, which is very profuse, is of the most exquisite description; and the building is perfect as an example of the delicately colored architecture of the East. The structure is of brick, incrusted with richly colored marbles. To the right of this beautiful edifice is the *Torre dell Orologio* (built in 1494), with a splendid dial in gold and azure, and very complex and ingenious movements. The north side of the square is almost entirely taken up by the *Procuratie Vecchie*, built in 1517, for the accommodation of the Procurators or trustees of San Marco, who had the care of the edifice, the management of its property, &c. Facing the Procuratie Vecchie, and on the south side of the square, are the buildings of the *Procuratie Nuove*, which are connected with a façade, which forms the west side of the square; and the two buildings constitute the *Palazzo Imperiale*. Leading south from the Piazza is the Piazzetta, or Little Square; and near the point where it makes an angle with the great square, is the Campanile, or Bell Tower, of St. Mark, placed at some distance in front of the building to which it belongs. It was begun in 902, and completed in 1510, is 323 feet high, 42 feet wide at the base, and is surmounted by an angel, which serves as a weather-cock, and is said to be 30 feet high.

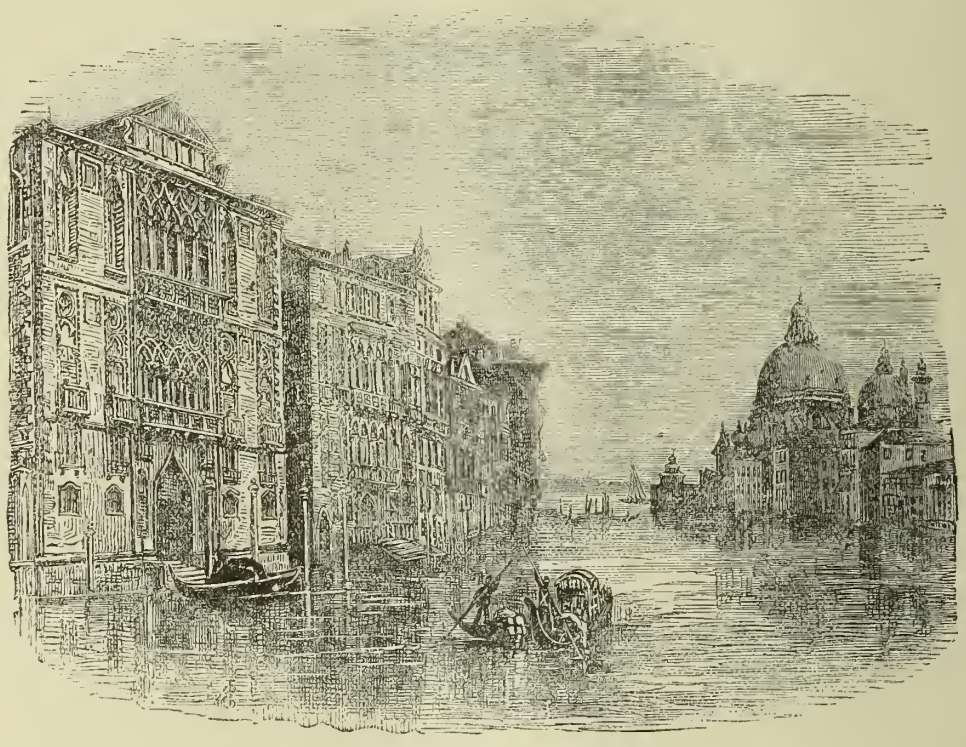
On the west side of the Piazetta are the old Library and the Mint, the former now forming a part of the Palazzo Imperiale. At the south of the Piazetta are the two famous red granite columns of V., one of which is surmounted by a figure of St. Theodore, the patron saint of the republic till St. Mark supplanted him; the other covered by the lion of St. Mark. On the east side of the Piazetta stands the Palazzo Ducale or Doge's Palace. The first palace reared on the site of the present one was built in 813, and though frequently enlarged, re-built, and re-decorated, it retained throughout the character of a Byzantine structure. In the year 1301, its architectural character began to change; and from that time till 1423, all the rebuilding and enlarging were executed in Gothic. After the date 1423, there are no buildings in Venetian architecture properly so called; and the alterations made in the Ducal Palace after that time, as well as the palaces subsequently built, which took their style of architecture from the Doge's Palace, were in Renaissance, and like almost all the architecture now to be seen in V., 'of immeasurably inferior spirit in the workmanship' to that native style which flourished with the republic, and decayed with it. Starting from the landing-place of St. Mark's at the east extremity of the Grand Canal, and proceeding west, a great number of palaces are passed. In former times, these palaces, or the magnificent buildings which occupied the same sites, were the warehouses and places of business of the great merchant-princes, most of whom possessed mansions in the suburbs, i. e., on some neighboring island, which afforded more privacy than could be found in the city itself. A few of these are worthy of mention. Among them are the *Palazzo Giustiniani*, now the *Albergo dell' Europa*, perhaps the best hotel in V.; the *Palazzo Contarini Fasan*, a beautiful specimen of the richest Venetian Gothic of the 14th c.; on the left bank, the *Palazzo Pisani a S. Polo*, in arabesque Gothic of the beginning of the 15th c.; further on, on the right, the *Palazzo Loredan*, the *Ca' d'Oro*, a building of the 15th c., in the oriental style, restored by Mademoiselle Taglioni, the celebrated dancer.

The bridge of the Rialto crossing the Grand Canal consists of one arch, the span of which is 91 feet and the height from the water 24½ feet. The width is 72 feet, and the bridge is divided into three streets—the middle one 21 feet wide—and two rows of shops. The bridge of sighs (*Ponte dei Sospiri*) stretches across the canal called the Rio Palazzo, and communicates between prisons on the east, and the Doge's palace on the west bank of the canal. It is a covered gallery; and prisoners, when led to execution, passed from their cells across this gallery to the palace, to hear

sentence of death passed upon them, and then were conducted to the scene of death between the red columns. The churches of V. are, as a rule, fine edifices, and of various styles. The styles are chiefly, first, Venetian Gothic, massive and solemn; second, Lombard; third, classical, i. e., Italian; fourth, decorated Italian. Among the chief churches after St. Mark's are those of the *Frari*, with a colossal monument of Titian, a number of excellent pictures, &c.; and the church of *S. Giacomo di Rialto* at the foot of the bridge of the same name, occupies the site of the first church erected in V. in 421. But of the multitude of churches, a great many, though of pleasing proportions, are in the later and degraded styles of architecture. The Fine Art *Academia* is located in the ancient convent of *La Carità*, was formed in 1807 by Napoleon, and consists of several schools, and has the finest collection of pictures of the Venetian school, including works by Titian, Tintoretto, Bonifacio, Giovanni Bellini, Paolo Veronese, and many other masters.

Specimens of the works of these artists are also to be found in many of the palaces and churches of the city. There are several theaters, the chief of which is *la Fenice*. Fresh water, formerly and even still to some extent, obtained at great expense, and of bad quality from the mainland, or kept in cisterns, is now obtained by means of a number of Artesian wells, sunk in 1847, at the expense of the municipality. The library of St. Mark's contains 120,000 vols., and 10,000 MSS. Many writers have led to misconception by omitting to note the fact, that the V. of to-day is by no means the same city as the V. of earlier and more famous days. On this subject, it will be of interest to quote the following from Ruskin's *Stones of Venice* (vol. ii. pp. 4, 5): 'The Venice of modern fiction and drama is a thing of yesterday, a mere efflorescence of decay, a stage-dream, which the first ray of daylight must dissipate into dust. No prisoner whose name is worth remembering, or whose sorrows deserved sympathy, ever crossed that "Bridge of Sighs," which is the center of the Byronic ideal of Venice; no great merchant of Venice ever saw that Rialto, under which the traveler now passes with breathless interest.' Among the chief manufactories of V. are the glass-works, in which magnificent mirrors, artificial pearls, gems, colored beads, &c., are made, and which employ 4500 people. Jewelry, especially chains of the precious metals, gold and silver stuffs, silks, laces, velvets, soap, earthenware, wax-candles, &c., are also manufactured; and sugar-refining and ship-building are carried on. The trade of V. greatly declined for several years previous to 1866. This decline, however, being due to the uncertain and unsatisfactory political state of the Venetian provinces, there have been signs of revival since the incorporation of V. with Italy. The goods imported consist chiefly of cotton, coals, coffee, colonial produce, woollen and linen yarns, and manufactured goods. In the period 1870—1880, the total imports had in some years a value of above £10,000,000, while the exports were about £8,000,000 annually. Between 3000 and 4000 vessels (250 British), including coasters, entered the port in a year. Pop. (1881) of town, 129,276; of commune, 132,826.

History.—Previously to the Roman conquest, we know almost nothing of the history of Venetia; but at the time when that event took place, we know that this region was inhabited by two nations, the Veneti and the Carni. The Veneti, from whom the district derived its name, occupied the tract between the Plavis (Piave) on the north, and the Athesis (Adige) on the south. The origin and affinities of this people are unknown, and almost the first thing ascertained concerning them is, that in the very earliest times of which we have any record, we find them a commercial rather than a warlike community, carrying on a trade in amber, which they brought from the shores of the Baltic, and sold to the merchants of Phœnicia and Greece. Under the Roman Empire, the province became opulent and flourishing; and besides its capital, Aquileia, which rose to be one of the most prosperous cities in Italy, it contained also the powerful and wealthy provincial cities, Patavium (Padua) and Verona, and numerous important towns. But before the close of the empire, the early prosperity of this province was swept away by the Huns under Attila, who,



Grand Canal, Venice.

in 452, razed Aquileia to the ground, and devastated the cities of Concordia, Altinum, Patavium, Vicentia, Verona, and other cities of the province. Many of the inhabitants of these cities, driven from their ruined homes, sought shelter in the marshy lagoons, in a position too miserable to provoke the ambition of the conquerors, and defended from invasion from the mainland by the wide tract of muddy shallows which intervened between it and the actual shore, and secured against attack by sea by the shallowness of the water and the intricacy of the sea-passages. Of the cluster of islands upon which ancient V. stood, the principal were Grado Bibione, Caorlo, Heraclia, Equilo, Torcello, Murano, Rialto, Malamocco, Pelestrina, Brondolo, San Nicolo, Chioggia (Piccola and Grande), Amiano, Constanziaco, Olivolo, and Spinalunga. To Rialto and to Malamocco, the refugees from Padua resorted. The name of the province they had left was afterwards transferred to the cluster of the islands of the lagoon—the new settlement being commonly known, at least as early as the 8th c., as Venezia, or as we have it, Venice.

Protected by the peculiar position of the islands in which they had found refuge, the early settlers devoted themselves to the pursuits for which their situation offered the greatest facilities—fishing, and the manufacture of salt. Houses began to cluster thickly on the Rialto; and when, in 568, Padua was sacked by the Lombards, many of its inhabitants emigrated to that infant colony which their ancestors had helped to found. The first form of government of the island commonwealth was republican, administered by a consular triumvirate; but in 457, the consuls were superseded by tribunes, who, elected annually, and varying in

number at different times from one to twelve, administered the government for 240 years. But during this period, although the young republic progressed in wealth and population, it did little to increase its political importance. Society was divided into factions by the ambition of the rival tribunes, and variety of interests rendered united action in warfare impossible. With the purpose of remedying the many evils of the government, Cristofero, Patriarch of Grado, in 697, laid before the Arengo—the periodical convention of the whole adult male population—a scheme in which he proposed that the tribunes should abdicate sovereign power, and that a magistrate, with the title of Duke or Doge, in whom should be vested undivided authority in civic, ecclesiastical, and military matters, should be placed over them. The proposition was received with much favor, and the election to the office fell upon Paolo Luca Anafesto, who was invested by the Metropolitan with his insignia of office, a crown of gold and a sceptre of ivory, March 697. Anafesto remained at the head of affairs till his death in 717, and under his rule the position of the republic greatly improved. Civil discords were in great measure stilled, and the Venetian territory was increased by the acquisition of a strip of the mainland, obtained by treaty from the king of the Lombards. Under Orso, the third Doge (720—737), the Venetians entered upon that career of enterprise in which their prudence and their valor were always equally conspicuous, and which they continued to pursue to the last.

In 735, the Lombards seized Ravenna, compelling the Exarch (q. v.) to seek shelter in the lagoon, and implore the republic to lend her aid in re-acquiring the lost territory. Still considering themselves as nominally subject to the eastern emperor, besides being anxious, in the interests of their commerce, of securing the alliance of Constantinople, and of obtaining the freedom of the seas of the Eastern Empire, the Venetians supplied the required assistance, and re-instated the Exarch in his vice-royalty. The services of the Doge on this occasion were rewarded by the Byzantine court with the honorary title of Hypatos, or Imperial Consul. The common punishment among the Venetians for tyranny was putting out the eyes, and the reigns of several of the doges at this time are but periods of tyranny and excess on the part of the ruler, terminated by exoculation or assassination by the people. By a treaty concluded in 803 between Charlemagne and the Emperor of the East, it was stipulated that the maritime towns of Istria and Dalmatia should be considered an integral portion of the Eastern Empire. This stipulation was adhered to till the year 808, when the aggressive policy of Charlemagne, and of his son Pepin, now king of Italy, prompted Nicephorus, the Emperor of the East, to despatch a squadron to the Adriatic, and to seek the alliance of the Venetians; and as the latter perceived that they had much more to gain from the friendship of the court of Constantinople—the key to the rich waters of the East—than from that of Charlemagne, the alliance was soon cemented. War immediately broke out; and V. was invaded by King Pepin, who took a number of the islands without meeting any resistance—the inhabitants having all been transferred to the central island, Rialto.

The French advanced to the island of Albiola, when, to their dismay, they found that the tide had been ebbing, and that their vessels were stranded in these shallows. The whole French squadron now fell an easy prey to the swift-moving galleys of the Venetians; and such of the enemy as escaped being drowned, were massacred by the relentless islanders (809). This struggle, called the battle of Albiola, was conducted on the part of the republic by Angelo Badoer, tribune of the island of Rialto, who was raised to the rank of Doge, and transferred the seat of government to Rialto—the island of Heraclia and others having previously enjoyed that honor. In his reign also, connection was established between Rialto and all the circumjacent islands, by means of wooden bridges, and the cluster thus united now formally took the name Venezia (Venice), although it commonly received that name early in the previous century. The year 829 is memorable as that in which, according to tradition, the body of St. Mark was transferred to V. from Alexandria. 'That the Venetians possessed themselves of his body in the 9th c., there appears,' says Ruskin, 'no sufficient reason to doubt;' and however we may regard this story, it cannot be denied that the belief in it by the Venetians and others attracted crowds of pious pilgrims to Rialto, and thus increased the traffic and prestige of the port; while the Venetians adopted St. Mark as their patron saint; and their war-cry, 'Viva San Marco!' inspired their courage in many a fight, both on sea and land. For many years after this date, the history of V. is marked by no event of special note; but the naval importance, the commerce, and wealth, and refinement of the republic, increased year by year. Doge Orseolo II. (991—1008) greatly extended the trade of the republic by establishing commercial relations between it and the empires both of the East and West, the Crimea, Syria, Egypt, Tartary, Tunis, &c.; and under his rule, the territory of V., which, until lately, comprised only the islands of the lagoon, and a narrow slip of territory on the mainland, was increased by further acquisitions on the mainland, and by the addition of the sea-boards of Dalmatia and Istria, which he annexed in 998.

In 1085, the provinces of Dalmatia and Croatia were formally ceded to V. by the Emperor of the East; and at the same time the emperor exempted the Venetian traders in all parts of the empire, excepting in Cyprus, Candia, and Megalopolis, from all duties and imposts whatever. In 1099, V. sent forth a fleet of 207 vessels of all sail to the succor of Godfrey de Bouillon and his companions of the First Crusade. The defeat of a hostile Pisan fleet employed by the eastern Emperor, Alexius Comnenus, and the capture of 20 of the vessels, and the obtaining of the body of St. Nicholas at the island of Myra, were the chief incidents of this expedition, which partook more of the nature of a predatory cruise than of a pilgrimage and crusade. But it is noticeable that in all the cases in which V. joined the Crusaders, the chief motive seems rather to have been to monopolize the maritime department of all these movements, and to extend her commercial relations, than to secure the Holy Sepulchre in Christian possession. The great fires of 1106, which, besides destroying the island city of Malamocco, reduced 30 churches and vast numbers of private dwellings in V. to ashes, were indirectly the cause of great improvements in the architecture of the city; for previously to this event, the dwellings of the Venetians were almost all built of wood; but after it, the material used was always either stone or marble obtained from Italy, Istria, or Dalmatia, in all of which it is found in abundance. In 1111, the Doge Faliero sent forth 100 galleys to aid Baldwin I., the successor of Godfrey de Bouillon, in the conquest of such Syrian ports as remained in the hands of the Mussulmans; and for the assistance thus rendered, the Venetians obtained the right to hold in possession a church, street, mill, bakery, bath, &c., and to be represented by a local magistrate in each of the oriental possessions of Christendom—rights of the very greatest importance to a trading community. In 1123, a fleet sent to succor the Christians in Palestine, and led by the Doge Michieli, distinguished itself by gaining a magnificent victory over an Egyptian fleet, and by the capture of ten Turkish galleons richly freighted. In the same year, the Venetians and their allies, the Christians in Palestine, reduced the almost impregnable city of Tyre, after a siege of four and a half months.

In 1122, a decree was passed by Johannes Comnenus, the Eastern emperor, commanding the Venetian residents at Constantinople and the other Greek ports to quit the imperial dominions and declaring the suspension of all intercourse between the two powers. The islanders thus saw the most profitable branch of their commerce threatened with extinction; and, resolved to make reprisals, they launched a fleet in 1123, and in that and the following year, they inflicted a terrible punishment on the empire, capturing Rhodes, and investing and sacking Andros, Samos, &c., all the Ionian islands, a portion of the Peloponnesus, &c. Further, this brilliant expedition was not brought to a close until all the Dalmatian fiefs, stirred to insurrection by Stephen, king of Hungary, were again reduced to submission. The Venetians were prominent members of the League of Lombardy against the German emperor; and in 1177, won a splendid victory over the Ghibellines, headed by Otho, son of Frederick Barbarossa, in defence of Pope Alexander III., who had appealed for protection to the republic. Otho's squadron numbered 75 sail, chiefly drawn from the ports of Genoa and Ancona; the Venetian force consisted of 34 large galleys; and the victory they gained influenced the pope to show his gratitude by presenting the Doge Ziani with a ring, with which he commanded him to wed the Adriatic, that posterity might know that the sea was subject to V. 'as a bride is to her husband;' and it is recorded that in this year the pompous ceremony of the 'marriage' was celebrated for the first time. The result of the naval battle of Saboro was that Frederick agreed to a congress, which took place at Venice in 1177. On the occasion of this congress, when the pope, the Doge, and other dignitaries were assembled in the palace of St. Mark's, Frederick approaching the throne on which Alexander III. was sitting, and prostrating himself, allowed the pope to plant his foot upon his neck. The congress of V. restored peace between the empire and Lombardy, and Sicily. The Doge Ziani died in 1178. He did much to improve the architecture of the city, especially of the Square of St. Mark. Of the three lofty red granite pillars which he is believed to have brought from the island of Scio, two adorn the portico of St. Mark's—the third fell overboard and was lost in the attempt to land it.

In October 1202, the expedition known as the Fourth Crusade set out from V., in Venetian vessels, under the command of the venerable Doge, Arrigo Dandolo: it did not, however, reach Palestine, but directed its force against the Byzantine Empire, which fell into the hands of the so-called Crusaders, April 1204. See DANDOLO. On the division of the conquests of this expedition, V. received the Morea, the Illyric Isles, a large portion of Thessaly, the Sporades, the Cyclades, the cities of Adrianople, Trajanople, Dedymotichos, and Durazzo, the province of Servia, and the coasts of the Hellespont. A fourth part of Constantinople

was set apart as a quarter where the Venetians might reside, under the protection of their own laws; and all restrictions as to trade were abolished. V. was now in possession of the fairest portions of the Lower Empire, and she had long been undisputed mistress of the seas. As she increased in power, she also increased in magnificence; and her nobles, having no lands in which they might employ their wealth, lavished immense sums upon their palaces, their pictures, decorations, and costly garments. Her palaces were decorated with the treasures and spoils of the East, and a school of artists arose, who found noble subjects for their pencils in the deeds of Faliero, Polani, Ziani, and the Dandoli. Her noblemen were now the most opulent in Europe, and travel and refinement had made them also the most polished. The most notable events in the history of V. during the 13th c. are her wars with Genoa, in which her hitherto unfailing good fortune deserted her, and the star of Dandolo succumbed to that of Doria at the desperate battle of Corzuola, from which conflict the Venetians could only retire with 12 out of 96 of their galleys, the others being taken or burned; the truce affected between V. and Palæologus, the Emperor of the East, in 1268; the electoral reforms by which, after a complex and often repeated process of election and reduction by lot, the forty-one members were chosen who formed the Electoral College, and of whom it was necessary that the Doge-elect should obtain at least the votes of twenty-five. In 1289, the inquisition was formally established in V., but this institution was rendered subject to so many limitations by the government of the republic, that it remained comparatively harmless.

In 1310, a conspiracy was formed for the correction of abuses that had crept into the constitution, and for the punishment of actual and fancied crimes. Among the conspirators were members of many of the noblest families of Venice. This conspiracy, known as the Quirini-Tiepolo conspiracy, proved abortive; but among other reforms to which it gave rise was the formation of the famous Council of Ten, who caused themselves to be declared a permanent assembly in 1335. In 1343, Andrea Dandolo, born in the year of the Quiriui-Tiepolo conspiracy, a most accomplished scholar and statesman, was raised to the Dogate. His *Venetian Annals*, remarkable for their precision and accuracy, placed their author in the first rank of medieval historians. In 1348, the lagoon was visited by an earthquake, accompanied by unusually high and destructive tides. These misfortunes were followed in the same year by a most frightful visitation of plague; and in the course of the six or seven months during which the epidemic raged, two-fifths of the population of the city perished, and fifty patrician families became extinct. The middle of the 14th c. is remarkable for the famous conspiracy headed by the Doge Marino Faliero (see FALIERI), and for a war with Hungary, in which V. lost Dalmatia. The commercial rivalry of V. and Genoa in the East lead to a war in 1352, in which the Venetians were defeated (February 13, 1352) by Paganino Doria in the straits of the Bosporus; and though they recovered their lost laurels in a battle (August 29, 1353) off the Sardinian coast, their fleet was totally destroyed by Doria, in the Gulf of Sapienza, November 3, 1354, and they were forced to make peace in the following May. In 1378, the Venetians interfered in the quarrel between the Genoese and Cypriots, and their fleet vanquished that of the Genoese before Antium (July), in revenge for which the Venetian fleet was almost annihilated off Pola (May 1379), and Pietro Doria, advancing upon V. itself, siezed the island of Chioggia. But the courage of the Venetians was nothing weakened by their dreadful reverses, and they soon changed the aspect of affairs by becoming in turn the besiegers themselves, blockading the enemy in Chioggia, and, after reducing him to the brink of starvation, accepting an unconditional surrender, June 1380.

In 1396, Genoa, the oldest and most harassing foe of the republic, ceased to have separate existence as an enemy, for in that year she placed herself under the dominion of the king of France, an arrangement which afforded immeasurable relief to V., because, for several reasons, there was now much less chance of a rupture between the two maritime powers. For a number of years after this event, V. experienced the highest prosperity: a prodigious impulse was given to her trade; her argosies traversed every arm of the ocean; intimate intercourse was kept up with every European country, as well as with Syria, Egypt, and even India; and important articles of Venetian merchandise were the iron of Staffordshire, the tin of Cornwall and Devon, and the wool of Sussex. But no less beneficent than the effects of peace were those of the war which soon broke out between Novello, Lord of Padua, and Venice. At the conclusion of this war (1407), V. found herself in the possession of an empire on the mainland of Italy, the smallest communal section of which equalled their ancient island domain, and of which the principal cities were Vicenza, Verona, Padua, Feltre, and Belluno. With the death of the Doge Mocenigo in 1423, a new era in the existence of V. commences, for now 'the central epoch of her life was past, the decay had already begun.' During the next thirty years, war was continually waged, chiefly against the Dukes of Milan, in the course of which V., taking into pay Carmagnola (q. v.) and his bands, achieved many a splendid victory, and suffered many a disastrous defeat; and though, on the return of peace (1455), the territory of the republic was materially increased, by the acquisition of Brescia, Bergamo, Treviso, &c., on the mainland, this territory was obtained only after a struggle, enormously expensive in life and treasure, and during the continuance of which the commerce of V.—the well-spring of its prosperity at all times—began to decline. Mocenigo's last advice to the senate was to avoid war, which was certain to bring destruction on the country, and to prosecute industriously their trade and commerce, and cultivate the arts of peace. The rejection of this advice, combined with the narrow-minded selfish policy always pursued by the Venetians in the contests among the Italian states, was the prominent cause of its decline.

The same fatal warlike policy was pursued throughout the 15th c.; and the whole of the 16th c. was employed by them in repairing the disasters which the league of Cambrai had brought upon them. Her policy in the 17th c. was to aid the opponents of her most dangerous neighbor, Austria, by recognizing Henry IV. of France, aiding Bethlem Gabor and Ragotski, the Duke of Savoy against Spain, and the Protestants against the Catholics of the Grisons. From 1646 to 1669, war was carried on between the Venetians and Turks, the latter being, in almost every encounter, severely defeated; though, from the disproportionate strength of the antagonists, they ultimately gained Candia, the object of the war. The discovery of the Cape of Good Hope by the Portuguese in 1486, opened up to that nation an ocean-route to India, which was taken advantage of by Vasco da Gama, who rounded the Cape on his voyage from Lisbon to Calicut in 1497. The carrying-trade of the world was now no longer, as it had been, in the hands of the Venetians; and the vast commercial activity which sprang up among the western nations of Europe upon the discovery of America, clearly showed that the naval superiority of the republic had for ever disappeared. But even in spite of these changes of fortune, V. might still have maintained a respectable mediocrity among maritime states, but for the character of her government, which was conducted by an exclusive oligarchy, in whose hands alone all power and freedom were vested. Long prior to the invasion of the republic by Napoleon in 1796, V. had become worn out and corrupted; the government of the Council of Ten had become a reign of Terror; its nobles showed vigor only in the pursuit of pleasure; its peasants, inured to peace, were unequal to war—all the ancient virtue, valor, and hardihood, which had raised a colony of fishermen, 'perched like sea-fowl' on a muddy shoal, to be a nation of the first rank, had died out of the state. Napoleon forced V. to break the neutrality which it meant to maintain in 1796, destroyed its government, and ceded the province to Austria by the treaty of Campo-Formio (q. v.). In 1806, the city of V., with the territory of Venetia, was annexed to the kingdom of Italy by the treaty of Presburg (q. v.); but it was transferred to Austria in 1814. In 1866, the city and territory were ceded to and incorporated with the Kingdom of Italy.

VENETIA, TERRITORY OF, ceded to Austria in 1815 (see VENICE, HISTORY OF), formed from that year, along with Lombardy (q. v.), what was called the Lombardo-Venetian Kingdom, one of the Austrian crownlands. In 1859, Lombardy was ceded to Italy, but V. continued in the possession of the Austrians till 1866, when, as one of the results of the famous 'Month's War,' it also was ceded to Italy, and is now incorporated with that kingdom. While still in Austrian possession, V. was regarded as bounded on the N. by the Austrian crownlands of the Tyrol and Carinthia; on the E. by Görz and Gradisca; on the S. by the Adriatic Sea, the river Po, and the Duchy of Modena; and on the W. by the river Adige and the Tyrol. The territory of V., ceded to Italy by the treaty of peace, October 3, 1866, has the same frontiers which it had as an Austrian province. Area, 9024 sq. m.; pop. (1881) 2,814,173.

VE'NI CREA''TOR SPI'RITUS, an ancient and very celebrated hymn of the Roman Breviary, which occurs in the offices of the Feast of Pentecost, and which is used in many of the most solemn services of the Roman Catholic Church. Its author is not known with certainty. On the authority of an ancient life of Notker, it is ascribed to Charlemagne; and Daniel, in his *Thesaurus Hymnologicus*, adopts this opinion; but it seems to be certainly older than the age of Charlemagne; and its correct classical metre, as well as the purity of its language, bespeak an earlier and purer age. Mone makes it highly probable, by intrinsic evidence, that it is the composition of Pope Gregory I. The Veni Creator Spiritus must not be confounded with another hymn to the Holy Ghost, Veni Sancte Spiritus, which somewhat resembles it. The latter belongs not to the Breviary, but to the Missal, in which it forms a 'Sequence' in the Mass of Pentecost Sunday and Octave. The latter hymn is not in classical metre, but in rhyme; and its language is plainly of a lower age. The author of the Veni Sancte

Spiritus is believed to be King Robert of France, to whom several other hymns of the same class are attributed.

VENLO', a small but strongly fortified town in the Netherlands, province of Limburg, is situated on the right bank of the Maas, 45 miles north-north-east of Maastricht, and has a safe little haven. The fortifications are very irregular, consisting of a main wall, canal, outworks, three powder-magazines, &c. The town is well built, and stands on elevated ground, surrounded by morasses. Principal buildings are the town-house, the great arsenal, the church of St. Martin, &c. V. has good schools and several charitable institutions. Pop. (1879) 9133. The Roman Catholics number upwards of 7000; the remainder, except 100 Jews, being Protestants.

The principal means of living is trade with Germany in coal, stone, lime, iron, bricks, grain, &c.; besides stone-hewing, tanning leather, dyeing, grinding corn, beer-brewing, making cigars, starch, vinegar, chocolate, Venlo pepper-cake, &c.

V. was walled by Duke Reynold of Gelder in 1343. It has many a time felt the horrors of a siege, and been taken and retaken, the last time by the Belgians in 1830, in whose hands it remained till the Conference of London, June 22, 1839, when it returned to the Dutch.

VENN, Rev. Henry, a pious 'evangelical' clergyman of the English Church, was born at Barnes in Surrey in 1725. Having studied and entered into holy orders—in this respect following the example of his paternal ancestors since the Reformation—he was shortly after appointed curate of Clapham. In 1759, he resigned his curacy, to become vicar of Huddersfield in Yorkshire, which he left in 1769, on being presented to the rectory of Yelling in Huntingdonshire. He died in the house of his son, John Venn, rector of Clapham, in June 1797. The memory of his pure life, good example, and earnest preaching was cherished for many years after his death in the places which had benefited by his ministration; and his name is associated with those of John Newton, Thomas Scott, Charles Simeon, and others, as having had considerable influence on the evangelical movement in the Church of England. V. was the author of a book entitled *The Complete Duty of Man*, a sort of development or extension of the *Whole Duty of Man*. His *Life and Correspondence* was published by his grandson, Henry Venn, in 1839.

VE'NOMOUS BITES AND STINGS. Under this title are considered all wounds inflicted by animals which by their bites or stings introduce poisonous or irritating matter into the bodies of their victims. In this country, the subject is of comparatively little importance, since it is very seldom that the bite of our most venomous animal—the adder—is fatal; but in warmer countries, it demands the serious attention of the surgeon. Following Mr. Busk, in his article on 'Venomous Insects and Reptiles,' in Holmes's *System of Surgery*, we shall briefly enumerate the most venomous animals found (1) amongst the invertebrata, and (2) amongst the vertebrata.

(1.) Amongst the invertebrata, the most formidable poisonous animals are to be found is the classes *Arachnida*, *Myriapoda*, and *Insecta*. The *Scorpions* are characterized by a prolonged jointed abdomen, terminating in a hooked claw, which is perforated, and connected at the base with poison-glands. The larger species, which are restricted to hot countries, by their sting give rise to symptoms of great severity, and occasionally cause death. 'The symptoms resemble those produced by the stings of wasps and bees in an aggravated degree, such as acute pain, a general nervous shock, attended with numbness, vertigo, occasionally temporary loss of sight, vomiting, &c.; while the local symptoms are swelling, and other signs of acute inflammation, followed, in many cases, by suppuration, sloughing, and their consequences. The remedy which appears to have obtained the greatest repute, is the application of ammonia externally, and its internal administration as a stimulant also; although it is probable that any other diffusible stimulus, combined with opiates, would be equally, if not more efficacious.'—Busk, *op. cit.*, p. 921. Several species of *Scolopendra*, or *Centipedes*, are regarded as highly venomous, and there is no doubt that the bites of some of the larger kinds inhabiting hot countries (especially of *S. morsitans*), give rise to excessively painful consequences, although less severe than those occasioned by the sting of the scorpion. In these animals, the poison is introduced not by a caudal sting, but by perforated curved fangs, connected with the mandibles, where poison-glands doubtless exist, though their existence has not been clearly established on anatomical evidence.

Although *Spiders* have long had a bad reputation for their venomous bites, it is quite certain that (with certain rare and foreign exceptions) their bite inflicts no more than a simple wound. The most ill-famed of the spiders is the Tarantula or Tarentula (*Lycosa tarentula*), a citigrade or running spider, common in South Italy. See Tarantism. Direct experiments, however, show that the bite of this spider merely causes a slight local irritation. There is a spider inhabiting the island of Elba (*Aranea* 13-*guttata*), which is said to be dangerous and even fatal to men and domestic animals; while the cork-forests of Morocco are said to be infested by an equally formidable spider, which is there known as the *Tendevaman*. It would be well if scientific travelers in those countries would obtain more definite information regarding these spiders. Amongst insects, many inflict more or less troublesome bites, while a comparatively few (and those almost, if not altogether, restricted to the order *Hymenoptera*) inflict serious injury by their stings.

In the case of the majority of biting insects, it is very doubtful whether the local discomfort is due to the introduction of poison, or is the consequence of the prolonged mechanical irritation only. In some cases, as in the ants, we know that formic acid (an irritant of great power) is introduced; and considering the prolonged irritation that follows the bites of many small insects, it is probable that there is some special acrid matter in their salivary secretion. This view is further borne out by the fact, that persons who suffer much from the bites of fleas and bugs (and the degree of annoyance varies extremely in different persons), are relieved by the local application of hartshorn, or some other preparation of ammonia. The 'Tsetse' (*Glossinia morsitans*), whose ravages are so graphically described by Dr. Livingstone, does not attack man, but it affords an example of an insect, very little larger than a housefly, being able to secrete an intense septic poison, which, introduced by its bites, causes certain death to cattle, the sheep, horse, and dog, while it is innocuous not only to man but to the goat, antelope, ass, and pig, to all wild animals, and to the calf until it is weaned.



Tsetse (*Glossinia morsitans*).

Another insect, mentioned but not described by the same traveler, produces by its bite vomiting and purging in man. In the case of stinging insects, the stinging instrument consists essentially of two fine and sharp darts, enclosed in a tubular sheath, at the base of which is a poison-sac, whose contents are injected into the wound made by the darts, which are usually serrated or barbed. The consequences of the sting of a bee or wasp are too familiar to require any detailed notice; and the sting of the hornet, a much rarer insect, is of the same nature, but of an aggravated form. The sting of a bee or wasp scarcely ever proves fatal, except the insect is swallowed in a cavity in ripe fruit, or in the act of drinking, and inflicts its sting on the throat. A sting in the fauces usually excites severe and diffuse inflammation, which may extend to the glottis, and thus cause suffocation. The treatment must be prompt, and consist of scarification internally, leeches externally, and possibly tracheotomy. When a large number of any of these insects make a combined attack, the result may be fatal. For the bites and stings of all these animals, the remedy recommended for scorpion-stings must be used; namely, ammonia in some form or other, and probably sal-volatile is the best. Amongst various domestic remedies for allaying the irritation excited by these stings, are vinegar, oil, spirits, Eau-de-Cologne, the blue-ball employed by washerwomen, consisting of indigo, &c. If possible, the sting should be extracted by bringing it to view by pressure over the wound with a watch-key, and then seizing it by small forceps.

(2.) Among the vertebrata, the only animals capable of inflicting poisoned wounds are the ophidian reptiles or snakes. As the description of the mechanism of the poison-fangs of venomous snakes is sufficiently given in the article Serpents, we may pass on to the subject of the nature of the *venom* and its effects. The venom is described, when fresh, as a transparent, yellowish or greenish, somewhat viscid, neutral fluid, much resembling saliva in its physical character, and exhibiting no obvious indication of its virulent nature. According to Prince Lucien Bonaparte, it contains, in addition to albuminous or mucous and fatty matters and the usual salts, a peculiar principle, to which he has given the name *echidnine* or *viperine*, which appears to be the active poisonous matter.

The poison of the most deadly serpent produces no effect when introduced into the stomachs of living animals, excepting a slight irritation of the air-passages; nor is its effect more serious when applied to the surface of the skin when free from abrasion. From the experiments of Fontana 'on the poison of the viper,' and other observers, it seems that the venom must be introduced directly into the subcutaneous cellular tissue. When, however, properly introduced, as through its natural channel, the poison-fang, 'its effects are very rapidly manifested; in fact, in some cases so rapidly as more to resemble those of prussic acid than anything else; usually, however, a brief interval elapses before the effects are shown. These may be divided into general and local. The first symptoms in nearly all cases appear to be a general shock to the nervous system, attended with faintness, tremor, and great depression, sometimes with stupor, loss of sight, vomiting, lockjaw, and general insensibility; at the same time, great and sometimes intense local pain is set up. The limb, if the wound is

in one of the extremities, rapidly swells. In severe cases, the swelling continues to spread till it reaches the trunk, or even the entire body, whose surface assumes a jaundiced hue. The gravity of the effects of the bite of a venomous snake appears to be in direct ratio to the comparative sizes of the snake and its victim, and also to the quantity of the poisonous secretion present at the time in the saccular gland. It is also greatly governed by the situation of the wound; one on an extremity, for example, being far less dangerous than one on the face or trunk. It has been remarked that two or more wounds at distant points are more rapidly effective than when they are inflicted on one spot.'—Busk, *op. cit.*, pp. 926, 927. The poison is one which seems to act primarily on the nervous system, and also to have a septic action on the tissues with which it is brought in contact; and in order to produce its effects, it must be directly introduced into the circulation.

The viper is the only poisonous snake in this country; but in other countries, there are many snakes whose bite is fatal. America possesses the rattlesnake; the East Indies, the Cobra da capello, the Ophiophagus, Daboia Russellii, &c.; and Africa and Australia are rich in poisonous reptiles. The bite of the viper presents in a mild form the typical symptoms which have been described, and is very seldom fatal. In the case of many snake-bites, however, rapid death is the general result; and should recovery take place, it will often be very protracted and imperfect.

The symptoms produced by the bites of different kinds of venomous serpents differ considerably in character as well as in intensity, although there is a general resemblance.

The treatment may be divided into local and general. The local treatment consists in the *immediate* application of a ligature drawn as tightly as possible above the wound—provided the situation of the latter allow of it—to prevent absorption, and the excision and cauterization of the bitten part, and then, after bathing it with warm water, sucking or cupping it. When the position of the bite prevents free excision, the poisoned tissues must be destroyed by *Liquor Ammoniæ*, or nitric acid. The general or constitutional measures consist essentially in the very free administration of the most powerful diffusible stimulants, such as hot strong brandy or whisky and water, and ammonia (an ammoniacal preparation, known as *Eau de Luce*, is a popular remedy for snake-bites). In these cases, in consequence of the prostration of the patient, he can bear an extraordinary quantity of stimulants. For the bite of the rattle-snake, the popular treatment is to make the patient drunk—a process known as the *Western Cure*. Olive oil, freely administered, has been strongly advocated. We append in a foot-note* a few of the so-called specific remedies said to be adopted by the inhabitants of countries where the most virulent serpents abound.

VENO'SA (anc. *Venusia*), a town of Southern Italy, in the province of Basilicata, 100 miles east-north-east of Naples. Its castle, which gives a picturesque effect to the quarter in which it is placed, is now in ruins. The Norman abbey of the Holy Trinity, founded by the Norman, Robert Guiscard, and consecrated in 1059, though now in ruins, is imposing from its magnitude and regularity, as well as interesting from its antiquity. But the unfailing interest of V. arises from its being the birthplace of Horace (q. v.). In one of the streets is a column surmounted by the bust of the poet; and many of the localities of the vicinity can be identified with the places he has immortalized. Pop. about 7000.

VENT, or TOUCH-HOLE. See GUN.

VENTILATION. See WARMING AND VENTILATION.

VENTIMI'GLIA, a small fortified town of Northern Italy, in the province of Port Maurice, stands on a promontory on the sea-shore, 18 miles east of Nice. Besides an old cathedral, it contains the church of St. Michel, containing two Roman milestones, and inscriptions by Augustus and Antoninus Pius. The strongly fortified castle above the town, recently repaired and strengthened, is the chief stronghold between Genoa and Nice. Wines and fruits are produced. V., the ancient *Albium Intemelium*, was the capital of the Intemelians, a Ligurian tribe, and its possession was contested in the middle ages by the Genoese, the counts of Provence, and the dukes of Savoy. Pop. 4080.

VE'NTNOR, the principal town on the south shore of the Isle of Wight, 10 miles south-south-east of Newport. It is situated amid the finest of the fine scenery of the Undercliff. Fossils are found in great quantity in the vicinity. With a fine southern exposure, and well sheltered from the north, V. possesses a mild climate, suitable for various classes of invalids, and has accordingly become a favorite winter and spring resort. The town is well provided with hotels and lodging-houses. Its beach is composed of beautiful yellow shingle. With these and other recommendations, V. has risen into importance within the last 30 years. Pop. (1861) 3208; (1871) 4841; (1881) 5493.

* Decoction of Virginian SNAKE-ROOT; *Radix corineæ*; GUACO, or the *Sacra vitæ anchora*; the Tanjore pill, whose chief ingredient is arsenic. See the article SNAKE-STONES.

VENTRI'CULITES, a genus of fossil sponges, specimens of which are of frequent occurrence in cretaceous strata. They often form the nucleus around which flints are aggregated, and give their form to the flint-nodules. Indeed, it is believed by some that the flints are the metamorphosed remains of this genus, and other silicious sponges. Ventriculites are sessile, and cup-shaped, gradually opening from the base upwards. Twelve species have been observed.

VENTRI'LOQUISM, the art of producing tones and words without any motion of the mouth, and so that the hearer is induced to refer the sound to some other place. It does not depend on any peculiar structure of the organs of voice, but upon practice and dexterity. The name is founded upon the mistaken supposition that the voice proceeds from the belly. The art of the ventriloquist consists mainly in taking a deep inhalation of breath and then allowing it to escape slowly; the sounds of the voice being modified and muffled by means of the muscles of the upper part of the throat and of the palate. The ventriloquist avails himself at the same time of means such as are employed by sleight-of-hand performers to mislead the attention. Ventriloquism is a very ancient art; and is mentioned by Isaiah (xxix. 4). The Greeks ascribed it to the operation of demons, and called ventriloquists *Engastrimanteis* (belly-seers), and also *Eurykłytes*, from Eurykles, a professor of the art at Athens. In modern times, a Frenchman of the name of Alexandre obtained great reputation for his mimetic representations, combined with ventriloquism and sleight-of-hand; and in England, Love was long one of the most popular ventriloquists.

VE'NUE is the locality assigned in pleadings in English actions at law for the acts or circumstances out of which the action arises. The rule is, that the declaration or plaintiff's pleading must set forth some venue, which is usually the county where the cause of action arose; and this shows where the trial will take place, if at all. If the other party shows that it would be more convenient and less expensive to try the action elsewhere, then he may apply to the court, or a judge, to change the venue, and thus the trial may take place in a different county from that first stated.

VE'NUS, the Roman goddess of Love, subsequently identified with the Greek Aphrodite (q. v.). Originally, she does not seem to have occupied a conspicuous place in the Latin religion, and scarcely, if at all, figures in the history of Rome under the kings; a circumstance that throws no inconsiderable light on the Roman character, for it may be taken as an indication of the grave and serious disposition of the people, who highly valued matrimony and wedded joys, but cared little for the sentimental passion of love. Gradually, however, as the myth of the Trojan origin of Rome gained ground, the worship of V. emerged into importance. Aphrodite was the mother of Æneas, and Aphrodite became V.; Ares was Mars, and Mars was the national god of the Roman people; and as in the Greek mythology, Aphrodite was beloved of Ares, so, of course, V. was represented as the paramour of Mars, and thus was advanced by the poets to the dignity of the divine mother of the Roman people. Several temples were erected to her in Rome at different times and under different names, and rites were celebrated in her honor during the month of April—the spring-time of the year being thought favorable to the growth of tender emotions.


Venus of Canova.

The figure of V. was a favorite subject of ancient sculptors. One of the most famous specimens extant is the VENUS DE' MEDICI, preserved in the Uffizi Gallery at Florence, and generally admitted to be the finest relic of ancient art. It was dug up in several pieces, either at the villa of Hadrian, near Tivoli, or at the portico of Octavia, in Rome, in the 17th c.; and after remaining for some time in the Medici Palace in Rome (whence its name), was carried to Florence by Cosmo III., about 1680. It is a nude statue, 4 feet 11½ inches in height, without the plinth; and from the exquisite symmetry and grace of the figure, it has become a sort of standard of excellence for the female form. The sculptor was Cleomenes, the Athenian (200 B.C.). The beautiful *Venus of Milo*, now in the Louvre at Paris, is so called because it was found in the island of Milo or Melos in the Archipelago. Of modern statues that by Canova is the most famous.

VENUS. See PLANETS.

VENUS. See VENERIDÆ.

VE'NUSBERG, the name of several mountains in Germany, especially in Swabia; it appears to be met with in Italy also. It occurs for the first time, so far as is known, in a poem called the *Children of Limburg*, composed in the Netherlands about 1337 (published by Van den Bergh, Leyden, 1846); but since then it is met with frequently in the literature of the 15th and 16th cen-

turies, and has been preserved to the present day in legends and popular songs. According to these accounts, the Lady Venus holds her court in the interior of such mountains, in brilliant style, with song and dance, banquets, and all kinds of revels. Persons of earthly mould now and then visit her abode (they are always represented as *descending*), and tarry longer or shorter time, some even to the Day of Judgment, leading a life of perpetual delight; e. g., Heinrich von Limburg, a hero of the above-mentioned romance, and the noble Tannhäuser (q. v.). Yet they usually run the risk of eternal perdition; and therefore the faithful Eckhart sits before the entrance of the mountain, and warns people against entering. Nor does the condition of the sojourners always present so enticing an aspect; on the contrary, there are at times heard issuing from the mountain the lamentations of the damned; and Geiler von Keisersberg makes the witches in their night-expeditions rendezvous in the Vennsberg. On putting together the various traits of these traditions, it is apparent that they originated in the mythology of the highest German antiquity. The Lady Venus is, under a name borrowed from the classical mythology, the universal Divine Mother of the old German belief; in her peculiar conception of Subterranean Goddess—the same being that appears under several other German names, each bringing forward some particular side of her character; e. g., Hulda (q. v.), the Gracious, Benign; Hilda, War; Berchta (q. v.), the Shining; Hel, the Concealed (from which our Hell is derived). In this character of goddess of the under-world, she is surrounded by the elves and other subterranean spirits, unbaptized children, fallen heroes, and the wise women devoted to her services, who, in the way of thinking of later times, were degraded to witches. The queen of Elfland, or Faery, is evidently only another form of the Lady Venus modified by a more decided mixture of Celtic and classic elements.—See Tale of Tamlane, and Thomas the Rhymer, in *Minstrelsy of the Scottish Border*.

VENUS'S FLOWER-BASKET. See ZOOPHYTE.

VENUS'S FLY-TRAP. See DIONÆA.

VENUS'S LOOKING-GLASS (*Specularia Speculum*), a very pretty little annual, of the natural order *Campanulaceæ*, which has long been a favorite in flower-gardens, and is a native of cornfields in the south of Europe. It has brilliant blue, white, or violet-colored flowers, which fold up in a pentagonal manner towards evening.

VE'RA CRUZ, or VILLA NUEVA DE LA VERA CRUZ (the New City of the Real Cross), an important city on the east coast of Mexico, about 200 miles east of the city of Mexico, with a pop. of about 15,000, composed of a motley collection from many nations. The city is built in a semicircle facing the sea, and is regularly laid out; the streets, which are wider than is usual in tropical countries, running east and west from the harbor, with others crossing them at right angles. The town is well defended by a strong wall, and other substantial works, as also by the castle of St. Juan de Ulloa, which stands upon an island of the same name, about half a mile from the shore. The principal buildings are the cathedral, and about 15 other churches, generally built in the Moorish style, only six of which are in use; several monasteries; the court-house and prison, which stand on one side of the great square in the center of the city. The houses and public buildings are generally built of rubble masonry, formed of small stones, interspersed with red tiles, the whole being afterwards covered with good durable plaster, and colored with a variety of tints; and as most of the houses are in the old Spanish style, with open arcades, balconies, galleries, &c., the city presents a very picturesque aspect. There are a few good hospitals. The drainage of the city flows down open channels in the center of the streets, which are almost on a level with the sea. This, combined with the wretched water which the inhabitants are compelled to use, the marshy and utterly barren nature of the surrounding country, and the pestilential nature of the climate generally, easily accounts for the frightful ravages of yellow and other fevers. Yellow fever is most prevalent from May till November. Although it is the chief port for all Mexico, V. C. has no harbor, but only an open roadstead between the town and the castle. The anchorage is exceedingly bad, and when the north gales, or *Nortes* (terrible hurricanes, bearing along with them clouds of sand from the sand-hills behind the town), prevail, many vessels are wrecked on the adjoining shore. A railway between this city and Mexico was begun in 1864, and completed in 1869; tramways for covered cars have also been laid down through the principal street to the railway station, a distance of 2½ miles.

The chief exports are the precious metals, cochineal, sugar, flour, indigo, provisions, sarsaparilla, leather, vanilla, jalap, soap, logwood, and pimento; and the imports, cotton, woollen, linen, and silk goods, brandy, iron, steel, wax, quicksilver, paper, hardware and cutlery, earthenware, &c. The exports from V. C. have a value of above £3,000,000 annually; the value of the imports is considerably less.—OLD VERA CRUZ, a village to the north, was the first Spanish settlement on the coast.

VERA'TRIA ($C_{64}H_{52}N_2O_{16}$), an alkaloid occurring in cevadilla (the dried fruit of *Asagræa officinalis*), in the bulbs of *Colchicum autumnale*, and in the roots and seeds of different species of *veratrum*. Cevadilla is the source from which it is most readily obtained; and for the method of extracting it we must refer to the pharmacopœia. In a state of purity, it is a pale, gray, amorphous powder, without smell; but even in the most minute quantity, powerfully irritating to the nostrils, sometimes producing dangerous fits of sneezing. It is strongly and persistently bitter, and highly acrid; insoluble in water, sparingly soluble in spirit and ether, but readily in diluted acids. Heated with access of air, it melts into a yellow liquid, and at length burns away, leaving no residue. In France, it is much used as an internal remedy for pneumonia and acute rheumatism, and for the latter its efficacy is well established. It is given in the form of pills, containing $\frac{1}{14}$th of a grain, of which three may at first be given daily, and the number increased up to eight or ten, unless pain in the throat or stomach, vomiting, or diarrhœa supervene, when their use must be suspended till these symptoms disappear. In this country, it is chiefly employed externally in the form of 'ointment of veratria' for neuralgic affections, and for scrofulous diseases of the joints. It is an extremely acrid and violent poison, and must be prescribed with great care.

VERA'TRUM. See HELLEBORE.

VERB (Lat *verbum*, a word), the name given in Grammar to that part of speech (see PARTS OF SPEECH) which predicates or affirms. See SENTENCE. As the very end of speaking is to assert or affirm something with a view to being believed or disbelieved, the part of speech which performs this office is, as it were, the soul of the sentence, and is called 'the word,' or verb, par excellence. Verbs affirm either some action or some state; as, 'John *reads*;' 'The sun *shines*;' 'The book *lies* on the table.' When the nature of the action requires an object to complete the sense, the verb is called *Transitive*, because the action *passes over* (Lat. *transit*) to an object; as, 'The child strikes *the dog*.' Some verbs complete the conception of the action in themselves, and require no complement; as, 'The child *sleeps*,' 'The bird *flies*.' These are called *Intransitive*. A distinction is attempted to be made between intransitive verbs expressing action (as *flies*, *moves*), and verbs expressing merely a state (as *sleeps*, *lies*), the latter being called *neuter* verbs. It is often impossible to draw the line where activity ends and neutrality begins. Even in such a verb as *sleeps*, it is implied that the sleeper shows certain outward manifestations that make an impression, or act, on the beholder; when we affirm that an object *stands*, *lies*, or even only *exists*, or *is*, we in fact affirm that it 'acts,' in this sense. All verbs, then, agree in affirming action.

Nor can any exact or permanent division be made of verbs into transitive and intransitive. We can say whether a given verb in a particular sentence is used transitively or intransitively; but not that it is absolutely, and in itself, transitive or intransitive. It would be difficult, perhaps, to find a verb that cannot be shown to be both the one and the other. 'The child *sees* the candle,' is unquestionably an instance of a transitive verb; in, 'The new-born child *sees*, but the puppy is blind,' the same verb is unquestionably intransitive. A verb used transitively has reference to particular acts; when the action is to be *generalized*, all specification of an object is dropped, and the verb becomes intransitive. Ex., 'Men *build* houses' (trans.); 'Men *build*, and time pulls down' (intrans.).

Intransitive verbs generally express a kind of action that we think of, at least as composed of a number of parts, all like each other; as, he *walks*, *runs*. Now, with regard to the particular parts, we generally find that the same verb takes an object after it; as, 'He walks *a step*, *a mile*, *a long way*;' 'John played *a stroke*, *a piece*, *a game*;' 'He did not sleep a *wink*' (sleep being a prolonged winking). That any intransitive verb can take its cognate noun as an object is a received doctrine. Ex., 'He *ran* a *race*;' 'They *died* an easy *death*.'

There are two classes of transitive and intransitive verbs, related to each other, in the following way:

Itransitive.	Transitive.	
he sits.	he sets	(causes to sit).
" lies.	" lays	(" " lie).
" falls.	" fells	(" " fall).
" rises.	" raises	(" " rise).
" sucks.	" soaks	(" " suck).
" drinks.	" drenches	(" " drink).
" dives.	" dips	(" " dive).

Those in the second column are called *causative* verbs. In the ancient forms of our language, there were many more such causative verbs, formed from root-verbs by a change, generally of the vowel. In Hebrew, every verb is capable of assuming the causative form. Modern English does not stand much on forms, but employs almost any verb in a causative sense without change

of any kind. Thus: 'The horse *walked*'—'the groom *walked* the horse;' 'The wood *floated*'—'raftsmen *floated* the wood down the stream.'

Passive Form, or Voice, of Verbs.—Instead of 'Cæsar *defeated* Pompey,' we may say, 'Pompey *was defeated* by Cæsar.' In the former, the verb is in the *active voice;* in the latter, in the *passive voice.* In using the passive voice, the thing or person acted upon is made the subject of the sentence, and has the chief attention directed thereto; with the active voice, the doer and his action are more prominent. Of course, it is only transitive verbs that can thus have a passive voice.

One class of intransitive verbs become transitive by the addition of one of the class of words called prepositions; as, *speak—speak to; fall—fall upon.* Some verbs already transitive take prepositions simply to modify the sense; as, *set—set up, break—break down.* In such cases, the verb and preposition are to be considered as forming one compound verb, and might be written with a hyphen—speak-to, break-down. With the addition of a preposition, what was an intransitive verb becomes capable of being used in the passive voice. Thus, 'The king spoke to the duke about it'—'the duke was spoken to about it by the king.' 'Robbers fell upon him'—'he was fallen upon by robbers.'

Not, however, in all cases. For, 'The Thames runs into the sea.' we could not say, 'The sea is run into by the Thames.' And yet, with this same verb, we can say, 'The mail-train was run into by the express.' The distinction seems to be, that when we think of the object as sensibly affected by the action, and wish to call the chief attention to the effect so produced, the object may become the subject, and the verb be passive.

VERBENA'CEÆ, a natural order of exogenous plants, consisting chiefly of trees and shrubs, but partly also of herbaceous plants. The leaves are generally opposite and simple, and have no stipules. The flowers are generally in corymbs or spikes; the calyx is tubular, persistent, inferior; the corolla, hypogynous, tubular, its limb usually irregular; the stamens generally four, two long and two short, sometimes equal, sometimes only two; the ovary 2—4 celled, the style solitary, terminal; the fruit composed of 2—4 achœnia united, sometimes fleshy; the seeds 1—4. The order contains almost 800 known species, chiefly tropical, some of them natives of temperate countries. The V. are allied to *Labiatæ* both in botanical characters and in properties, but the leaves have no oil-glands. Some are beautiful ornaments of flower-gardens and hot-houses; some are highly esteemed for their fragrance; some are used in medicine, as Vervain (q. v.), &c., although no medicinal plant of much value belongs to the order; the fruit of some species, as *Premna esculenta* and species of *Lantana*, is eaten; the leaves of *Stachytarpheta Jamaicensis* are used as a substitute for tea; and the timber of a number of species is valuable. To this order belongs the Teak (q. v.) of India.

VERCE'LLI, a venerable city of Northern Italy, in the province of Novara, stands in a fertile plain, on the right bank of the Sesia, 44 miles west-south-west of Milan by railway. It covers a wide area, is surrounded by boulevards—those on the north-west side commanding a magnificent view of the Alps—is the seat of a bishop, and has the appearance of great prosperity. The cathedral, an edifice of about the middle of the 16th c., has a library containing a collection of ancient and valuable MSS. V. is a thriving commercial city. Pop. (1881) 20,165.

VERDE-ANTIQUE, a beautiful stone of a dark green color, with patches of white, and sometimes also black and red. It is a kind of hard breccia, and was much prized by the ancient Romans, and is still in great favor in Italy.

VE'RDEN, a town of Prussia, once capital of a duchy, in Hanover, on the right bank of the Aller, here crossed by a bridge, and on the railway to Hanover, from which it is distant north-north-west 42 miles. Pop. (1880) 8553.

VERDI, GIUSEPPE, the only living operatic composer of any note in Italy. He was born in 1814 at Rancola, in the duchy of Parma, where his father was an innkeeper, and he received his musical education at Milan. His first work was a musical drama called *Oberto di San Bonifazio*, which appeared in 1839; and he has since produced a number of operas, including *I Lombardi, Ernani, I due Foscari, Attila, Macbeth, Rigoletto, Il Trovatore, La Traviata, Un Ballo in Maschera, Aida*, and in 1878, *Montezuma*. V.'s operas, while they abound in taking melody, and in striking dramatic effects, are characterized by noisy orchestration. In 1861, he was elected to the Italian parliament, and in 1874 was made a senator; while in 1875 he was nominated a Commander of the French Legion of Honor, of which he was already a member. He is a member of many artistic societies, and has been decorated by the Emperor of Russia and the Khedive of Egypt.

VE'RDICT, in Law, is the finding of a jury as to the issue of fact raised between the parties. The usual verdict in criminal cases is guilty or not guilty; in civil cases, it is a verdict for the plaintiff or for the defendant, according to the fact. These are called general verdicts. In some civil cases, the jury, when doubtful, or when the court directing them is doubtful how the law ought to be applied to the facts, find a special verdict, i. e., specific facts, leaving the court to draw the proper conclusion. A verdict by a jury is usually conclusive in all criminal cases, and no new trial can be had; but in civil cases, the party defeated may, within a certain number of days allowed by the practice of the court, move to set the verdict aside, and apply for a new trial on various grounds; as, for example, that the judge misdirected or misled the jury; that the verdict was against the weight of evidence, or was preverse; that the damages were too great, or too small, &c. See NOT PROVEN.

VE'RDIGRIS is the popular name for Diacetate of Copper ($2CuO,C_4H_3O_3 + 6Aq$), a substance which is largely used for commercial purposes, and as an external application in surgery. It is prepared on a large scale by piling up copper-plates with alternate layers of marc or fermenting grape-skins. In the course of a few weeks, the surface of the copper is covered with a crust of the salt, which is detached, made into a thick paste with vinegar, and pressed into moulds. The salt thus obtained is in the form of a bluish-green tough mass, which is not easily pulverized. The formation of the salt by this process is due to the alcohol in the grape-skins being slowly oxidized into acetic acid, while the copper absorbs oxygen from the air, and the oxide thus formed unites with the acetic acid. Verdigris may be obtained more directly by placing the copper sheets in cloths dipped in vinegar.

Verdigris is permanent in the air; when heated, it first loses water, and then acetic acid, the residue being metallic copper. Water resolves it into an insoluble tribasic acetate, and a soluble subsesquiacetate of copper—a point which must be recollected in employing this salt. It is used by the surgeon as a caustic application to venereal warts and fungous growths; it is also a good application in ophthalmia tarsi, and has been of much service in stimulating old and indolent ulcers, in the ulcerated sore throat of scarlatina, and in malignant ulcer of the tongue. It may be used in the form of an ointment or a liniment. The latter, formerly known as *Mel Ægyptiacum*, is composed of 1 ounce of powdered verdigris, 7 ounces of vinegar, and 14 of honey. The verdigris is dissolved in the vinegar, and to the strained solution the honey is added, and the whole is boiled to a proper consistence. It should be applied with a camel hair pencil.

Verdigris is an active irritant poison, but is much more commonly the source of accidental than intentional poisoning, it being often formed in copper vessels used for cooking, or in the very reprehensible practise of putting copper coins into pickles to give them a fine green color. If copper vessels for cooking are kept perfectly clean, they seem not to be dangerous, provided (1) no acid matter be placed in them; (2) that the boiled materials are at once poured out, and not allowed to stand to cool in them; and (3) that the vessels are always at once cleaned. But the interior of such vessels should always be tinned, care being frequently taken that the tinning remains entire. In cases of poisoning, the best treatment consists in the free administration of white of eggs and milk.

VE'RDITER, a pigment which is extensively used in common painting. It is either blue or green, the latter being generally known as Bremen Green. It is formed by a very complicated process from blue vitriol, or sulphate of copper, sea-salt, metallic copper, muriatic acid, caustic potash, and water, and occupies three months in its manufacture. The blue is most valued.

VE'RDOY, in Heraldry, a term indicating that a bordure is charged with flowers, leaves, or vegetable charges. Thus, a bordure argent verdoy of oak-leaves proper is equivalent to a bordure argent, charged with eight oak-leaves proper.

VERDUN, a fortified town of France, in the dep. of Meuse, stands on the right bank of the river of that name, about 150 miles (direct line) east-north-east of Paris. It was fortified by Vauban, and its defences consist of a wall with bastions and a citadel. It is the seat of a bishop, has a fine cathedral, and carries on various manufactures. In November 1871, it was taken by the Germans, who thus established better communication between Germany and the troops before Paris. Pop. (1876) 15,433.

VERGE, a medieval term for a small shaft.

VE'RGER (Lat. *virga*, a wand), an officer of cathedral and collegiate churches, who carries the mace, whether before the dean or other chief dignitary, in procession, or on any other ceremonial occasion. The mace, however, has no sacred significance, but is simply an emblem of dignity.

VE'RJUICE, a vinegar formerly much used, made from sour cider, or from the juice of the wild crab. The expressed juice of unripe grapes is another kind of verjuice used in the vine districts. Both are occasionally employed in cooking.

VERME'JO, an important affluent of the Paraguay (q. v.).

VE'RMÉS (Lat. worms), the name given by Linnæus to one of the classes in his zoological system, in which he included all the lower invertebrate animals, whether of worm-like form or not. The study of their structure has since led to their arrangement in several distinct classes, and the Linnæan term is altogether disused.

VERMICE'LLI (Ital. little worms), a fine kind of Macaroni (q. v.).

VERMICULA'TION, checkering or chancelling formed in mason-work as an ornament, giving the appearance of being eaten by worms.

VE'RMIFUGES, VE'RMICIDES, or ANTHELMINTICS, are remedies which possess the property of destroying intestinal worms, or of expelling them from the digestive canal. The only worms whose presence in the intestinal canal is so common, that the remedies for their destruction and expulsion require special notice, are the two varieties of tapeworm known as *Tænia solium* and *Tænia mediocanellata*, or the *hooked* and the *hookless Tapeworm* (q. v.) the *Ascaris lumbricoides*, or *large round worm*, and the *Ascaris* or *Oxyuris vermicularis*, or *small threadworm*. A few of this class of medicines are said to be useful in destroying all these kinds of worms—viz., the tapeworms, the round worms, and the threadworms. In this category, we may place *Absinthium* or *wormwood*, whose effects are doubtful; *Sabadilla*, or *Cevadilla; Santonica*, or *worm-seed*, and its active principle, *Santonin* (q. v.); and *Oil of Turpentine*. As in our notices of the different human entozoa, we have referred to this article for the appropriate treatment of each, we will commence, in consequence of its greater importance, with the remedies that have been recommended in tapeworm, ranging them according to the repute in which they stand. (1.) The root of the male shield-fern (*Aspidium filix mas*), of which the best preparation is the 'Liquid Extract of Fern-root' of the *Pharm. Br.* It may be taken in the morning before breakfast, in doses of about a scruple, in the form of an emulsion with yelk of egg, syrup of orange-peel, and water; and if the worm does not come away in six hours, a brisk purgative should be administered. Generally, however, it is expelled by a single dose, in the mass, and without pain or much uneasiness. (2.) *Cusso* or *Kousso*, the flowers of *Brayera anthelmintica*, in doses of from half-an-ounce to an ounce of the flowers (infused for a quarter of an hour in ten ounces of lukewarm water and a little lemon-juice), or of four ounces of the infusion of the *Pharm. Br.*, and following in four hours, if it has not acted, by a dose of castor oil, is a safe and very sure remedy. (3.) Decoction of the bark of the root of the Pomegranate tree (*Granati radix*). (4.) *Oil of Turpentine* (q. v.); and besides these, which are the best remedies, the seeds of the Common Pumpkin (*Cucurbita pepo*); *Kamela*, the powder adhering to the capsules of *Rottlera tinctoria;* Santonine, &c., have found their advocates. All these medicines should be taken fasting, or after a light supper on the previous evening.

Foremost amongst the remedies for *Ascaris lumbricoides*, Dr. Cobbold places *Santonin* (q. v.); but kamela is also very efficacious in doses of from one to two drachms every four hours. Dr. Waring, in his *Materia Medica*, gives a long list of remedies employed with success in the East, but unknown in this country. *Ascaris vermicularis*, or the *threadworm*, is more successfully attacked locally in the rectum by injection than by medicines administered in the ordinary method. Amongst the best forms of enemata are half a drachm of tincture of sesqui-chloride of iron in a little gruel, retained in the bowel as long as possible, or injections of salt and water, or of infusion of quassia. As an internal remedy, santonine is the best. The most annoying symptom occasioned by these worms, the intense itching about the lower part of the bowel, especially in the evening and at night, is best relieved by the introduction of a little mercurial ointment within the verge of the anus, when the patient retires to rest.

VERMI'LION, or artificial Cinnabar (q. v.), is a bisulphide of mercury, formed by mixing 100 parts of the metal with 16 parts of sulphur, and subliming them in properly constructed retorts; the result is, a heavy dull red cake, an inch or so in thickness, of acicular crystalline texture, and exactly resembling in these respects the native cinnabar. When, however, it is finely powdered, it acquires the beautiful bright red color so well known in this pigment. The finest European vermilion was, until lately, made at Utrecht in Holland, and this manufactory supplied nearly all Europe. It is now, however, manufactured in other places, particularly in Istria. A new process, invented by Kirchoff, has also been introduced, and is employed in most manufactories, for making the finest quality. It is called the humid process, from the employment of water, with which the ingredients are triturated at a temperature of not more than 130° F., until the mixture, which is first black, turns a brownish red, when the temperature is lowered to 114° F., and steadily maintained at that until the brightest color is obtained; it is then allowed to subside, the liquid is decanted off, and the residue washed in clean water. The Chinese have always been famous for the extreme beauty of their vermilion.

VE'RMIN (Lat. *vermis*, a worm), a term commonly applied to small noxious animals, particularly to those which, unless their increase is checked, are apt to become excessively numerous. Of some of the applications of this term, as to parasitic insects, it is unnecessary to say anything; but it seems proper to notice the use made of it by farmers and gardners, with reference to quadrupeds and birds injurious to their crops, and by gamekeepers with reference to those which are destructive to game. In the estimation of the gamekeeper, all those animals are vermin, which are known ever to prey upon any kind of game, or to rob the nests of game-birds. He therefore wages unceasing war against foxes, polecats, weasels, stoats, hedgehogs, hawks, falcons, ravens, carrion-crows, magpies, and even owls. The results are not agreeable to the farmer, as, the balance of nature being thus interfered with, animals destructive to his crops multiply without restraint, particularly rats, mice, and voles. The farmer is apt to regard some kinds of game themselves as vermin, especially hares (and rabbits), which, when numerous, cause him great loss. As to these, probably, there might be ready enough means found of reducing their numbers, if it were permitted, even although an undiminished assiduity should be maintained in keeping down all animals of prey. It is otherwise, however, as to the smaller quadrupeds already named, and the destruction of their natural enemies is followed by their excessive multiplication. Beasts and birds of prey have their use in the economy of nature. The larger beasts, which are dangerous to man himself, or destructive of the animals valued by him as his property, are no longer of use in thickly-peopled and extensively cultivated countries; their extirpation is therefore to be desired, and they rapidly disappear before advancing civilization; but their use in a different state of things may be seen, if we reflect on the vast multitudes of antelopes and other herbivorous animals in the wilds of Africa, which would soon cease to find sustenance for themselves, but for these destroyers.

Kites, kestrels, owls, weasels, and hedgehogs are particularly useful to the British farmer, as preying upon the mice and voles, which are often extremely destructive to his crops, eating whole rows of seed-wheat and beans, proceeding from one end of the row to the other; and all the injury done to him by game, or at least by feathered game, is generally little in comparison with that which results from the continual shooting and trapping of them by gamekeepers. No expedient is known so likely to rid the fields of mice and other such pests, as to put a stop to the destruction of the quadrupeds and birds which prey upon them. The farmer himself, however, sometimes falls into the error of seeking to interfere unduly with the balance of nature—complaining of rooks as a mere nuisance, and demanding the destruction of rookeries. The money which he expends in guarding his fields from rooks at certain seasons, when they are apt to injure his crops, is more than repaid by their services at other times in the destruction of grubs. Wood-pigeons, which have of late become extremely numerous in some parts of Britain, do more harm to the farmer than any other vermin, as they feed chiefly on grains, seeds, young clover, &c., and are very voracious; their ravages are becoming a serious consideration to farmer and landlord alike, and they are therefore justly regarded in the light of true farm-pests. Small birds, such as feed both on insects and seeds, are, like rooks, not to be regarded as vermin. They consume, it is true, a certain portion of the grain, but they are of incalculable use in devouring those insects which are the worst of all destroyers of crops. The consequences which have ensued from the great reduction of the numbers of small birds in France, where they are eagerly sought for the table, should act as a warning to the farmers of all other countries. The most intelligent agriculturists of France are now extremely anxious for the increase of the numbers of small birds, as their only protection against caterpillars and grubs of many kinds. To give a premium for the destruction of sparrows, as is sometimes done in England, is bad policy, unless peculiar local circumstances have led to their extraordinary multiplication.

Moles are amongst the animals commonly regarded as vermin by farmers and gardeners; and in gardens they are certainly a pest; but it is probable that many pastures owe much of their long continued fertility to the incessant stirring of the soil by moles; and when they are not excessively numerous, it may be better to undertake the labor of scattering the mole-hills, than to attempt the destruction of the creatures which throw them up.

Even rats and mice, although often amongst the most troublesome of vermin, are not, in all circumstances, to be regarded as mere pests. They are so, it is true, in fields, in houses, and in ships; but much of the refuse of towns would probably become far more offensive and injurious than it is, if it were left to putrefy, and the rats, which frequent the most filthy places, render valuable service by devouring it. Police regulations may be imagined, which, if strictly enforced, would render the presence of rats no longer desirable; but in this case, their numbers would

probably soon diminish with the diminution of their supply of food.

Some of the means used for the destruction of vermin may be briefly noticed. Besides the use of cats for catching mice and rats, and of dogs, particularly terriers, to kill rats, the principal means employed are traps and poison. Of traps for rats and mice, there is great variety. The common wire spring-trap for mice, baited with cheese or scorched oatmeal, which catches them by the neck and chokes them, on their biting through a thread, in order to reach the bait, is probably the best, and is too well-known to need description. The stamp spring-trap in general use for rats is equally well-known, but is liable to the objection, that cats, or even dogs, may be caught in it, and have their legs broken, or be otherwise injured, when it is placed in situations to which they have access.

Rats also learn to apprehend danger, and avoid the trap; their sense of smell probably guiding them, which is very acute, and apprises them of the touch of human hands. To overcome this difficulty, oil of aniseed, or oil of caraway, is often used, which seems to render the bait more attractive, at the same time that it hides the warning smell. Professional rat-catchers ascribe especial value to oil of rhodium, but it is more expensive than the oils already named. The poison most commonly used is the white

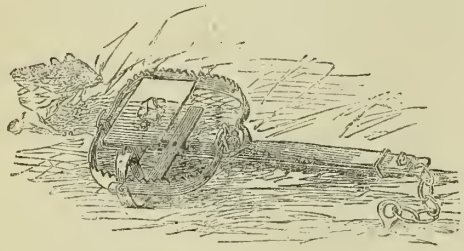


Fig. 1.—Common Stamp Spring-trap, baited and set.

oxide of arsenic, which, however, must be used with great caution, so that only the creatures for which it is intended may get at it. Pieces of bread and butter sprinkled with sugar are laid down for a day or two, and then bread and butter sprinkled with arsenic; some of the oils which have been mentioned being at the same time employed. A better mode of poisoning rats is by a preparation devised by Dr. Ure, which is fatal to them, but scarcely dangerous to other animals. Hog's-lard is melted in a bottle plunged in water at a temperature of 150° F., and an ounce of phosphorous is added to every pound of lard, with a quantity of proof-spirit, to aid the mixture of the lard and phosphorous, which, when cooled, form a white mass, the spirit separating from it, so as to be fit for use again. This compound, very gently warmed, and mixed with flour and sugar, may be made into pellets, flavored with some of the attractive oils, and laid down near rat-holes. It is also used with advantage for field-mice, small pellets being scattered where they are very abundant. It is safer for this purpose than nux vomica, which is sometimes used, and more effectual than the powder of hellebore and stavesacre seeds.

In farm-yards, the precaution of placing ricks on frames or supports which mice cannot climb, is of great importance, as mice, when they get into a rick of corn, soon multiply excessively, and effect great destruction. No sticks should be allowed to rest against ricks. Corn in stacks may be secured from mice by building them on stone staddles, with an overhanging ledge, or on iron staddles, the smoothness of the iron preventing mice and rats from climbing.

The method employed with great success for destroying the field-vole, or short-tailed field-mouse, by digging pits, is noticed in the article VOLE.

Rats may be destroyed in great numbers in a barn, if it can be made nearly air-tight, by placing in it a number of chafing-dishes, filled with lighted charcoal, strewing over them bits of broken stick-brimstone; after which the barn must be quitted as quickly as possible, the door closed, and so left for two days. When the door is opened again, numerous rats will be found lying dead. Another method is that of spreading the floor with caustic potash, which, adhering to the rats' feet, is licked off. The result is obvious.

Where rats and mice are not very numerous, the trap is sufficient, but where they swarm, poison must be employed.

Rubbing the hands with a mixture of essential oils, before setting the trap, is enough to prevent the smell of the hands from being noticed by rats.

Subjoined are illustrations of two traps for taking vermin either alive or dead. They are the invention of Mr. Miles, gardener at Roslyn House, Hampstead, and have been found, we believe, to answer well.

A very good box-trap used for rats, and polecats, &c., is open at both ends, the doors closing when the animal runs upon a bridge in the middle. Another and very simple kind of box-trap is used for rats, open only at one end, the bait placed near the other, and connected with a string, which, being loosed whilst the bait is

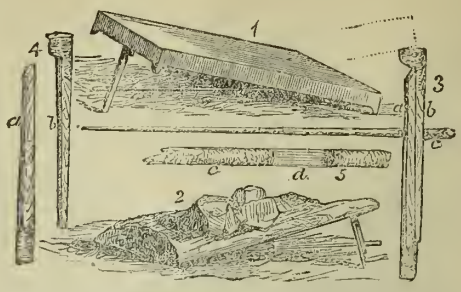


Fig. 2.—Miles' Patent Vermin Traps:

1, trap set for catching animals alive; 2, trap, on the same principle, for killing animals, it being simply a slab of wood loaded with stones; 3,4, enlarged view of apparatus for setting; *a*, the strut-piece, which rests on the ground, is beveled at the top, to catch in the notch of the other strut-piece, *b*; they are held loosely in position by a notch, *d* (5), in the piece *c*, to the end of which the bait, *e*, is attached. When the animal touches the bait, it detaches the piece *c*, causing the two strut-pieces to topple over and release the trap.

being eaten, the door falls. This trap, however, can secure only one rat at a time.

Mixture of oils recommended for rats: oil of rhodium, 1 scruple; oil of caraway, 1 drachm; oil of lavender, 5 drops; oil of aniseed, 10 drops; tincture of musk, 2 drops.

A stamp-trap, such as is used for rats, is used also for foxes, wild-cats, &c.—the difference being merely in size.

VE'RMONT (Fr. *verd mont*, green mountain), one of the U. S. of America, one of the five New England States, and the first state received after the adoption of the Federal constitution; lat. 42° 44'—45° N., and long. 71° 25'—73° 25' W.; bounded on the N. by Canada, on the E. by the Connecticut River, which separates it from New Hampshire; on the S. by Massachusetts; and on the W. by New York, from which it is separated for 100 miles by Lake Champlain. It has an area of 10,212 sq. miles, divided into 14 counties. The principal towns are Burlington, Montpelier (the capital), Rutland, Bennington, Windsor, St. Albans. The surface is rather hilly than mountainous, the Green Mountains being rounded eminences 2000 to 2500 feet high, bearing vegetation, and cultivated to their summits. The rivers are the Connecticut and its western branches, and the Onion, Lamoille, and smaller streams, affording abundant water-power, and falling into Lake Champlain (q. v.). The state is studded with small lakes. The geological formations are the lower groups of azoic and Silurian. East of the Green Mountains is a bed of Devonian limestone, 20 or 30 miles wide. Drift covers the whole state. Along the western part of the state, a great belt of quartz is covered by a bed of crystalline limestone 2000 feet thick.

Slates are found on Lake Champlain, with hæmatite iron, supplying several blast-furnaces. There are deposits of gold, pyritous copper ore, and at Rutland, rich quarries of statuary marble. Clay for white stoneware is found at Bennington, and there are several quarries of soapstone. The climate is cold, with long and severe winters, but healthful—the temperature ranging from — 17° to + 92°. The soil is a rich loam, and the country well wooded with hemlock, fir, spruce, oak, beech, sugar-maple, pine, hickory, elm, butternut, birch, cedar, &c. The hills are well adapted for pasturage. The chief products are wool, cattle, maple-sugar, butter, cheese, hay, and potatoes. In 1880, the state produced 3,743,000 bushels of oats, 2,015,000 bushels of maize, 357,000 bushels of buckwheat, 338,000 bushels of wheat, and 268,000 of rye. The state has some fine scenery, and beautiful waterfalls—as Bellows Falls on the Connecticut, falls on the Lamoille, the Winooski, the Missisquoi, &c. There are 850 miles of railway, two lines crossing the mountains. The chief business is agriculture; but there are 8 cotton-mills, 65 woollen-mills, and manufactures of lumber, machinery, leather, bar and pig iron, scales, &c. V. has 744 churches, or 1 to every 444 inhabitants; the University of V. at Burlington, and 3 other colleges, with several theological and medical institutions, 41 academies, 3 normal schools, and 2830 public schools. In 1878 the taxable property was worth $303,202,424. In 1870 there were 46 newspapers; in 1878, 66 periodicals. The governor, who holds office for two years, has a salary of £200; the state-treasurer, £100; and the secretary of civil and military affairs, £55 a year. There are two houses of the legislature, elected by 'every male citizen of peaceable behavior, 21 years old, and 1 year resident in the state.'

The first settlement in V. was in 1724, when it was claimed as a part of the New Hampshire grants. In 1763, it was claimed by New York, under grants of Charles II. to the Duke of York. For ten years, the New York officers were resisted, and sometimes tied

to trees and whipped by the lawless settlers. These contests were stopped by the Revolution; but V., a refuge for settlers from the other states, remained eight years out of the union. It was chiefly the V. militia that gained the victory of Plattsburg, on Lake Champlain, in 1812; and the Green Mountain state contributed very largely to the Union forces in the War of Secession. The population, one-seventh of which consists of persons of foreign birth, increases but slowly, owing to the large emigration to the western states; it was in 1870, 330,551; and in 1880, 332,286.

VERNAL GRASS, SWEET (*Anthoxanthum odoratum*), a grass very common in Britain and throughout Europe, and the northern parts of the world generally, growing in meadows, woods, and pastures. It is about a foot high, with spiked oblong panicle, the flowers remarkable as having only two stamens. The spikelets are 1-flowered; the glumes very unequal; the floret accompanied with two rudimentary florets, which botanists have very generally described as two outer paleæ. This grass flowers earlier in summer than most of the European grasses. It is relished by cattle, and is sown along with other grasses to form permanent pastures. The pleasant smell of newly-mown hay is often chiefly owing to this grass, which is fragrant when drying, and contains COUMARIN (q. v.). It yields, by distillation, an essential oil of an agreeable odor. The straw of this grass is of use for the finest kinds of straw-plaiting.

VERNA'TION, in Botany, a term employed to designate the manner in which the leaves are arranged in the leaf-bud. It corresponds with ÆSTIVATION (q. v.) in the flower-bud. There are great differences in the vernation of plants, and these differences are characteristic not only of species but of genera, and even of natural orders, but the vernation of the same species is always the same. The vernation of plants is very interesting; in some, the leaves are very simply placed together; in others, they are most curiously folded, rolled, or plaited, and interlaced with each other, yet so as to separate most readily when the proper time for their expansion comes.

VERNET, ÉMILE-JEAN-HORACE, a celebrated French painter of battle-pieces, in whom may be said to have culminated the talent of a family through several generations distinguished in the sphere of art. His grandfather, CLAUDE JOSEPH, born in 1714, was a native of Avignon. By Antoine Vernet, his father, also a painter, Claude Joseph was early initiated in art, and going at the age of 18 to Italy, he remained there 20 years. Towards the end of that period, much of which had been passed in struggle and privation, his reputation as a landscape and marine painter had become so high, that he was invited to Paris by Louis XV, who assigned him apartments in the Louvre. Between this time (1752) and his death in 1789, he painted an immense number of pictures, one of his chief undertakings being a series of large pieces commissioned by government, representing the chief seaports of France. These were 15 in number, and are still to be seen in the Louvre, with many other of his best works. During his life, he was held to be, in France, without a rival in his own department; and an honorable rank continues to be assigned him among the painters of his country. He married at Rome an English lady, a Miss Parker, by whom he had a son, ANTOINE-CHARLES VERNET, born at Bordeaux in 1758, and popularly known as Carle Vernet.

Carle received his education, in the first instance, from his father, and afterwards at the Academy of Paris, where, in 1782, he gained the chief prize, which brought with it the privilege of which he availed himself, of studying for some years in Rome. His subsequent success in Paris was great; he achieved the highest honors of his profession, became Chevalier of the order of St. Michel, as also of the Legion d'Honneur, and died September 27, 1836. He was especially celebrated as a painter of horses; but his chief works were battle-pieces on a large scale, chiefly commemorative of the triumphs of the great Emperor, and as such, amazingly popular with the Parisian public. The principal are—'The Battle of Marengo,' 'The Morning of Austerlitz,' 'The Emperor giving orders to his Marshals,' 'The Bombardment of Madrid,' 'Battle of Rivoli,' 'Entrance of Napoleon into Milan,' and 'Battle of Wagram.'

The youth of HORACE VERNET, his son (born in Paris, June 30, 1789), was passed amid the tumults and anarchy of the Revolution; and his general education was as irregular and incomplete as in such an element we might suppose it; but he had in his father a capable instructor in art, the hereditary genius for which very early became noted in him. It was the wish of his father that as he had himself done, his son should go to study at Rome; but he failed in the competition for the traveling-pension for that purpose, given by the *Académie des Beaux Arts*, and the scheme was necessarily abandoned. Undepressed by his disappointment, the young V. married, and commenced his independent career as a painter, being then (1809) only 20 years of age. The *rôle* which he chose was that suggested at once by the previous success of his father, and the military intoxication of the Parisian public. Young as he still was, he had served for some time as a soldier, not, so far as is known, with any special distinction, yet, doubtless, with such practical experience of the detail of a soldier's life in the field, as would be found exceedingly available in his efforts for distinction of another kind. Whereas the treatment of military subjects by his father and others had been, hitherto, more or less of the conventional and so-called imaginative kind, more properly to be called imaginary, the new aspirant, with his fuller sympathy and knowledge, sought for his effects in that serious rendering of truth which is the basis of all authentic imagination.

In the halt, the bivouac, or the battle, the French soldier should be painted according to the veritable fact of the matter, as V. himself had seen, or could rigorously so conceive it. The success which rewarded this attempt at more earnest and truthful conception, was brilliant and instantaneous, his very first pictures of the kind—'The Dog of the Regiment and the Horse of the Trumpet,' 'Capture of the Redoubt,' 'Halt of French Soldiers,' &c.—being received with an enthusiasm of favor accorded to those of no other artist. In 1812, to confirm this popular approval, the first-class medal was awarded to him; and in 1814, he had the title conferred on him by the Emperor of Chevalier of the Legion d'Honneur. The unrivaled popularity which he had thus at a bound achieved, ever afterwards remained with him; and the favor which he enjoyed from the Emperor, whose victories he signalized on his canvas, was continued to him by the restored dynasty, whose sympathy with these favorite subjects, which, as occasion served, he continued as before to paint, could only be supposed imperfect. By Charles X. he was, in 1825, made Officer of the Legion d'Honneur; and in the next year, he was elected Member of the Institute. In 1827, he was appointed Director of the French Academy at Rome, whither he went to reside. He remained there for several years; and on the withdrawal of the French Legation, occasioned by the revolution of 1830, he was appointed to act as representative of his country at the Roman court.

With Louis Philippe, the services of V. were in especial request; and one of his most gigantic undertakings, the grand series of paintings in the Constantine Gallery at Versailles, commemorative of the triumphs of the French arms in Algeria, was a task prescribed him by that monarch. In pursuance of this object, he more than once visited Algeria; as, indeed, throughout his career, he frequently became a traveler on similar professional errands. To the last, honors continued to flow upon him. In 1842, he was made Commander of the Legion d'Honneur; and in the Universal Exposition of 1855, the grand Medal of Honor was awarded to him. He died January 17, 1863. He left behind him no children; his only daughter, wife of the celebrated Paul Delaroche, having died in 1845.

Though he by no means exclusively confined himself to military subjects, as witness his well-known 'School of Raphael,' 'Judith and Holofernes,' and many others, it is on his consummate treatment of these that his fame mainly rests; and in this particular department, though he has many worthy competitors among his countrymen, no one of them can be said to equal him. With the utmost skill in effective composition, he combines in these works a surprising dash, vigor, and truthfulness; the movement and veritable fiery life of conflict is expressed in them with amazing effect. In the London International Exhibition of 1862, some good specimens were exhibited.

VERNIER, a scale, by which linear or angular magnitude can be read off with a much greater degree of accuracy than is possible by mere mechanical division and subdivision, derives its name from its inventor, Pierre Vernier, 'Capitaine et Chastellaine pour sa Majesté au Chasteau Dornans,' who gave a description of it in a tract published at Brussels in 1631. The principle of this invention is essentially as follows: AB (fig. 1) is a portion of the grad-

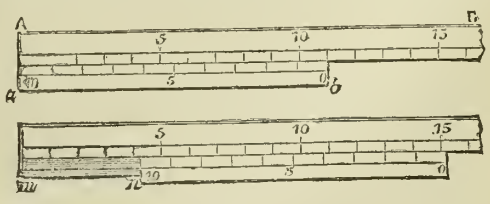


Fig. 1.

uated scale of an instrument showing divisions and subdivisions; *ab*, a small scale (called the *vernier*), made to slide along the edge of the other, and so divided that *ten* of its subdivisions are equal to *eleven* of the smallest divisions of the scale AB; then each division of the vernier is equivalent to $1\frac{1}{10}$th of a subdivision of AB; and consequently, if the zero-point of the vernier be (fig. 1, A) opposite 11 on AB, the 1 on the vernier is at $9\frac{9}{10}$ ($1\frac{1}{10}$ below 11), 2 on vernier is at $8\frac{8}{10}$ ($2\frac{2}{10}$ below 11), &c. Also, if the vernier be slid along so that 1 on it coincides with a division on the scale,

then 0 on the vernier is *one*-tenth above the next division on the scale; if 4 on the vernier coincide with a division on the scale, the 0 of the vernier is *four*-tenths above a division.

The vernier is applied to instruments by being carried at the extremity of the index-limb, the zero on the vernier being taken as the index-point; and when the reading-off is to be performed, the position of the zero-point, with reference to the divisions of the scale, gives the result as correctly as the mechanical graduation by itself permits, and the number of the division of the vernier which coincides with a division of the scale, supplements this result by the addition of a fractional part of the smallest subdivision of the scale. Thus (fig. 1, B), suppose the scale divisions to be degrees, then the reading by the graduation alone gives only a result between 15° and 16°; but as the 2d division of the vernier coincides with a graduation on the scale, it follows that the zero-point is $\frac{2}{10}$ths of a division above 15°, and that, therefore, the correct reading is 15°·2. It will be at once seen that by merely increasing the size of the vernier, as, for example, making 20 divisions of it coincide with 21 on the scale, the latter may be read off to $\frac{1}{20}$ths; and a still greater increase in the size of the vernier would secure further accuracy.

The above is the vernier as proposed by its inventor, and as it was employed for long after his time; but in the more recently constructed astronomical and geodesical instruments, a vernier is employed which has one graduation *more* (fig. 2) than the corresponding portion of the scale. A little consideration will show that the only effect of this modification is to enable the vernier to be graduated towards the same direction as the scale, and thus save a little confusion in the reading off. In small instruments, or where the utmost accuracy is required, a small magnifying lens is fixed over the vernier, to enable the observer, in cases where no two graduations coincide (which is generally the case), to estimate the amount of error introduced by assuming that the two graduations which approach nearest to coincidence actually coincide.

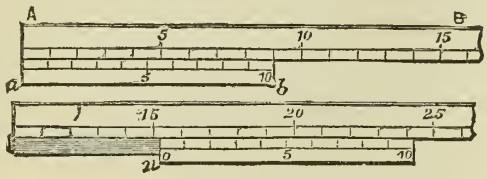


Fig. 2.

Of the various methods for subdivision which were in use before the introduction of the vernier, the most important were the *Diagonal Scale* (q. v.) and the *Nonius*. The latter, so called from its inventor, Petrus Nonius (Pedro Nunez), a Portuguese mathematician, who described it in a treatise *De Crepusculis Olyssipone*, published in 1542, consists of 45 concentric circles described on the limb, and divided into quadrants by two diameters intersecting at right angles. The outermost of these quadrants was divided into 90, the next into 89, the third into 88, &c., and the last into 46 equal parts, giving on the whole a quadrantal division into 2532 separate and unequal parts (amounting on an average to about 2′ intervals). The edge of the bar which carried the sights passed, when produced, through the center, and served, consequently, as an index-limb; and whichever of the 45 circles it crossed at a graduation, on that circle was the angle read off; for instance, if it cut the 7th circle from the outside at its 43d graduation, the angle was read off as $\frac{43}{45}$ths of 90°, or 46° 4′ $17\frac{1}{7}$″.

VERNON, a small town of France, in the dep. of Eure, stands on the left bank of the Seine, 50 miles west-north-west of Paris by the Havre, Rouen, and Paris Railway. It contains a handsome Gothic church, and numerous picturesque old houses with wooden frameworks, and is the seat of some trade in grain. Pop. (1876) 6384.

VERO'NA, an ancient and interesting city of Northern Italy, in Venetia, stands on a plain at the foot of the hills, which lie at the base of the Tyrolese mountains, 72 miles west of Venice by railway. It stands on the Adige, by which it is divided into two unequal parts, connected by four bridges. The aspect of the town, and of rich landscape around, is considered remarkably fine. V. is a fortress of the first rank, a member of the famous Quadrilateral (q. v.), and has always been considered a place of strength since it was surrounded with walls by the Emperor Gallienus, 265 A.D. Its modern fortifications are amongst the most extraordinary works of military engineering in Europe.

After passing into the hands of the Austrians in 1815, it was greatly strengthened; and after 1849, they made every effort to render it impregnable. Of its many interesting edifices, the chief is the amphitheater, built, it is supposed, between the years 81 and 117 A.D. The building has been wonderfully preserved, the interior being still, to all appearance, complete. The lesser diameter of the building is 404 feet, that of the arena 146 feet; and the edifice is calculated to have contained 22,000 people. This, as well as many of the other structures of the city, has a handsome appearance, owing to having been built of Verona marble. The Porta dei Borsari and the Arco dei Leoni are fine Roman gateways, both of the imperial age. The streets of V. are wide, especially the Corso; there are four principal squares, of which the Piazza dei Signori contains the palace of the della Scala and the superb Palazzo del Consiglio, the façade of which is adorned with bronze and marble statues of celebrated natives of V., including Catullus, Pliny the Younger, &c. The picture-gallery contains about 400 specimens, including a Transfiguration by Titian, and a full-length portrait and a Deposition by Paul Veronese. The cathedral, the date of which is uncertain, but which is attributed to Charlemagne, has a handsome porch, guarded by the celebrated paladins, Roland and Oliver. The more modern parts of the cathedral are exceedingly rich, and among other excellent works of art, it contains a famous Assumption by Titian. Altogether, there are in V. about 40 churches, many of them beautiful specimens of Gothic architecture, and containing valuable paintings and other art treasures. The palaces are also numerous and fine; and there are several theaters, hospitals, &c. Manufactures of woollen goods, hats, cotton, silk, hemp, and hosiery are carried on; and the town trades considerably with Venice in garlic sausages. Excellent cattle are reared on the rich pasturage of the vicinity. Wines and fruit are good and abundant. Pop. of V. and suburbs (1881) 68,741.

The early history of V. is involved in obscurity, and there is some difficulty in determining whether it originally belonged to the Euganei or the Cenomani. It afterwards fell into the hands of the Romans, and under the Empire became one of the most flourishing cities in the north of Italy. Constantine took it by assault in 312; Stilicho defeated the Goths here in 402. Charlemagne took possession of it, and made it the royal residence of his son, King Pepin. The Montagues, who were Ghibellines, lived here in perpetual and deadly enmity with the Guelf Capulets; and from the contentions that took place between these families, Shakspeare—drawing upon an Italian authority—has derived materials for his tragedy of *Romeo and Juliet*. In 1259, the town received Mastino della Scala as its ruler. In 1405, the city gave itself over to Venice, in order to free itself from its tyrants, who were alternately of the Scala, the Visconti, or the Carrara families. It has since shared the vicissitudes of the rest of Venetia, and in 1866 was ceded to Italy.

VERONESE, PAUL. See CAGLIARI.

VERO'NICA, the name of a supposed saint of the Roman Catholic Church, whose history, and indeed whose historical existence, has been the subject of much controversy. According to the legend, V. was one of the women who met our Lord on his way to Calvary; and as he was sinking, overpowered by fatigue, under the weight of the cross, V. offered him her veil, to wipe the sweat from his brow, when, wondrous to tell, the divine features were miraculously impressed upon the cloth, and remained as a permanent picture of the face of our Lord. This miraculous picture is reported to have been preserved in Rome at St. Peter's Church from about the year 700. Another, of similar appearance, is preserved at Milan; and many Catholic writers, among whom are the learned Mabillon and Papebrook, have supposed that whatever is to be said of the legend of the pious woman at Jerusalem, the name 'Veronica' is but founded on an erroneous application of what in reality was meant to designate not the personage, but the picture, which was described as *vera icon* (Gr. *eikon*), 'the true image' (i. e., of Christ). Other writers, however, are of opinion that V. is a real name, and designates a real personage, although probably erroneously applied in this legend. The picture has been frequently reproduced both in painting and engraving; the most celebrated of the former is one by the great Spanish painter Morales, surnamed 'the Divine,' from his favorite subject, which was the countenance of our Lord in the 'Ecce Homo' and similar subjects.

VERONICA. See SPEEDWELL.

VERSAILLES, a celebrated city of France, and long the residence of the French court, capital of the dep. of Seine-et-Oise, stands on a plain, 11 miles south-west of Paris by railway. A fine avenue, which forms part of the road from Paris, divides the town into two parts. The town covers a large area in proportion to its population, and is of remarkably regular construction, consisting of long and straight streets, crossing at right angles. V., a city more of pleasure than of industry, long accustomed to find its sustenance in the expenditure of a luxurious court, and subsequently a place of residence for many foreigners, attracted hither by the salubrity of the climate, the fine promenades, and the economy of living as compared with that in Paris—has few manufactures, and little trade. It is the see of a bishop, and contains a public library of 50,000 vols., many palatial edifices, public fountains, spacious squares, and elm-planted avennes; and when taste in architecture and in landscape-gardening was more formal

than at the present time, the town was esteemed the handsomest in Europe. The great attraction of V. is its palace, and the history of this structure may be said to be the history of the town. The site occupied by the palace is known to have been that of the ancient priory of St. Julien, the chronicles of which place the date of the building in the early times of the Capetan monarchy. Later, the priory became a feudal stronghold, and its first superior, *Hugo de Versaliis*, lived in the 11th century. In 1570, the manor belonged to Martial de Léoménie, one of the victims of St. Bartholomew. The building was converted by Louis XIII. into a château; and Louis XIV. devoted enormous sums to its embellishment, or rather reconstruction. Louis XV. altered the arrangement of the interior, and meditated alterations that would have changed the whole character of the edifice, but which he was unable to carry out from want of money.

Under Louis XVI., V. continued to be one of the usual residences of the court down to the period of the Revolution, which great event had its beginning here in the meeting of the States-general, in May, 1789. Louis Phillippe transformed the palace of Louis XIV. into a museum, to contain trophies of the victories of France. The approach to the palace is by the *Place d'Armes* and the *Cour d'Honneur*, in the latter of which is a large equestrian figure of Louis XIV., and other statues. The entire length of the palace is nearly 1400 feet. The collections embrace pictures of events in French history, portraits of French heroes, &c. The most interesting are the pictures by David which illustrate the career of Napoleon, and those by Horace Vernet. The gardens, with their broad terraces and long alleys, are imposing, but formal; the fountains are on the grandest scale. From the middle of September, 1870, till the conclusion of peace in 1871, V. was the center of all the operations of the Germans. On September, 20, King William and the Crown-Prince entered the town; and there, on January 18, 1871, the former was proclaimed Emperor of Germany. On January 28, the capitulation of Paris was signed in V.; after the peace, it was the seat of the National Assembly and government till 1880, and was the headquarters of the army during the Commune. Pop. (1876) 49,522; (1881) 48,324.

VERSE (Lat. *versus*, from *verto*, to turn, a turning of the plough, a furrow; a row; a line in writing and in poetry), a section or group of metres written in one line. See METRE, RHIME. The term Verse is often erroneously applied to a group of lines or verses, which is properly a stanza. Verse is often used to signify metrical composition.

VE'RSECZ, a town of the Temesvar county, Hungary, stands on the Versecz Mountains, 45 miles south of Temesvar by railway. It is the seat of a Greek Non-united bishop. The chief industry is the production of silk, wine, and rice. Pop. 21,095.

VE'RSICLE (Lat. *versiculus*, a little verse), a short verse in the service, which is spoken or chanted by the priest or minister alternately with a 'response' by the people.

VERSIONS. See BIBLE.

VERST, or WERST, in Russian, *versta*, an itinerary measure, equivalent to 1166⅔ yards, or about two-thirds of an English mile.

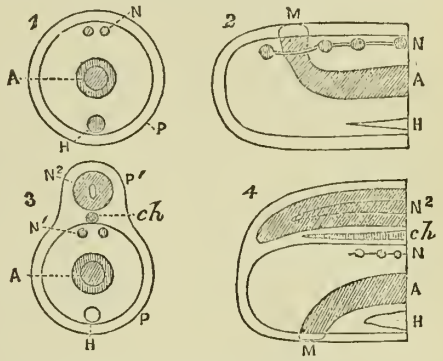
VERT. See HERALDRY.

VE'RTEBRÆ. See SPINAL COLUMN and SKELETON.

VE'RTEBRATA, the highest and most important of the animal sub-kingdoms, characterized by the universal presence of a backbone, composed of a varying number of small bones called vertebræ (see SKELETON and SPINAL COLUMN), which at once serve for the general support of the other parts, and for the protection of the central part of the nervous system (the brain and spinal cord) in a closed cavity in the interior.

We shall notice first the developmental and then the structural peculiarities of the vertebrates. Like the members of the other sub-kingdoms, the vertebrates begin in a semi-fluid nitrogenous substance called plasma, which separates itself (or differentiates, as it is scientifically termed) into albumen, fibrin, primary membrane (the lemma of Owen), nuclei, and cells, in which form, says the above-named physiologist, 'the individuality of the new organism first dawns as a nucleated germ-cell, or germinal vesicle.' The formation of yolk by the evolution of albuminous granules and oil-particles from the plasma, and the development of an outer layer of membrane, complete the unimpregnated egg. For further development, another principle, the spermatozoon, or product of the sperm-cell, is required. Its reception by the egg is followed by the formation of a germ-mass, which is formed by consecutive divisions, cleavages, or segmentations of the impregnated center, which incorporates more or less of the yolk. Thus far there is no difference between the vertebrate and the invertebrate germ.

The next step, to use the words of Professor Owen, 'impresses upon the nascent being its *vertebrate* type.' As has been shown in the article DEVELOPMENT OF THE EMBRYO, the parietal portion of the germ becomes raised up on each side into a ridge, so that a long groove or furrow is formed between these parallel ridges (see figs. 6, 7, 8 in DEVELOPMENT); and the margins of these subsequently uniting with one another, constitute a tube, in the interior of which the vertebrate cerebro-spinal nervous centers are developed. In the meantime, the margins of the germs extend downwards over the yolk till they meet and form the abdominal cavity. Hence, in the vertebrates, there are developed from the *chorda dorsalis*, or *notochord* (see DEVELOPMENT), 'a pair of plates "neurad,"* to enclose the nervous axis, and a pair of plates "hæmad,"† to enclose the vascular axis and organs of vegetative life. Flesh and skin co-extend with the enclosing plates. This formation of two distinct parallel cavities—neural and hæmal—under symmetrical guidance, in the vertical or "neuro-hæmal" direction, with a repetition of parts on the right and left sides, establishing transverse or "bi-lateral" symmetry, constitutes the chief developmental characteristics of the vertebrate animal.'—Owen's *Anatomy of Vertebrates*, vol. i. p. 2. The accompanying diagrams, which we have borrowed from Professor Huxley's *Elements of Comparative Anatomy*, may tend to render this subject more intelligible. In the invertebrates, merely a single saccular or tubular investment is formed, which encloses all the viscera; so that, provided we select one high enough to



Diagrams representing generalized sections of one of the higher Invertebrates (1, 2) and of a Vertebrate (3, 4).

1, 3, transverse; 2, 4, longitudinal section; A, alimentary canal; H, heart; P, parietes of the body; P′, parietes of neural canal; N, nervous centers of Invertebrate; N′, sympathetic, and N², cerebro-spinal centers of Vertebrate; *ch*, notochord: M, mouth.

possess a heart and nervous system—the transverse and longitudinal sections would be represented by 1 and 2, while P represents the parietes, or wall of the body, A the alimentary canal, M the mouth, H the heart, and N the nervous centers.

'It will be observed,' says Professor Huxley, 'that the alimentary canal is in the middle, the principal centers of the nervous system upon one side of it, and the heart upon the other. In none of these animals, again, would you discover in the embryonic state any partition formed by the original external parietes of the body between the nervous centers and the alimentary canal.'—*Op. cit.*, p. 59. But the vertebrate, after it has passed through its very earliest stages of development, is, as we have seen, not a single, but a double tube; and the 'two tubes are separated by a partition, which was, primatively, a part of the external parietes of the body, but which now lies in a central position between the cerebro-spinal nervous centers and the alimentary canal. Hence a transverse section of any vertebrated animal may be represented diagramatically by fig. 3, where, for the most part, the letters have the same signification as in the foregoing case, but where P′ denotes the second or cerebro-spinal tube. The visceral tube (P) contains, as in the case of the invertebrate animal, the alimentary canal, the heart, and certain nervous centers belonging to the so-called sympathetic system. This nervous system and the heart are situated upon opposite sides of the alimentary canal, the sympathetic corresponding in position and in forming a double chain of gangha with the chief nervous centers of the invertebrata; so that the cerebro-spinal tube appears to be a superaddition—a something not represented in the invertebrate series. In close connection with the profound difference between the chief nerve-centers of the vertebrate and the invertebrate, is another remarkable structural contrast. In all the higher invertebrates, with a well-developed nervous system, the latter is perforated by the gullet, so that the mouth is situated upon the same side of the body as the principal masses of the nervous system; and some of the ganglia of the latter lie in front of, and others behind the œsophagus. A longitudinal section of such an animal may therefore be represented by fig. 2. A similar section of a vertebrated animal shows, on the contrary, the chief center of the nervous system not to be perforated by the œsophagus, the latter turning

* Backward in man, upward in beasts.
† Forward in man, downward in beasts.

away from it, and opening upon the opposite side of the body (fig. 4).'—*Op. cit.*, p. 60. No structures having any analogy to the *chorda dorsalis*, or *notochord*, or to the *visceral arches* and *clefts* (see SKELETON), are to be found in the embryonic condition of any of the invertebrates.

Passing on from the developmental to the structural differences, we universally have the vertebral column and the nervous centers, consisting of brain and spinal cord; and the organs of the five senses are usually present. All possess a distinct vascular system, containing blood, with red and white corpuscles in suspension, and in all (with the solitary known exception of the *amphioxus*, or Lancelet), there is a compact muscular heart of two or more cavities, and provided with valves. The breathing organ communicates with the pharynx. The alimentary canal has two apertures, usually at opposite ends of the trunk, the mouth or reception aperture never being formed of modified limbs, or working horizontally, as in the *Articulata*, but provided with two bony jaws, placed one above the other, and acting vertically.

All vertebrates possess a hepatic portal system, by which the blood of the alimentary canal is collected into a portal vein, which ramifies through the liver. The limbs may be totally absent, or one or two pair, never more. The muscles surround the bony levers on which they act, and thus, under the influence of the will, move the limbs and other parts. The sexes are distinct.

Comparative anatomists differ in their division of the vertebrates into classes, and as to the best basis of classification. Professor Owen, in his *Anatomy of Vertebrates*, admits of only four classes, viz., Fishes, Reptiles, Birds, and Mammals; whereas Milne-Edwards, Huxley, and many of our leading authorities, separate the Amphibians from the Reptiles, and assign them a class by themselves. Professor Owen, after describing the modifications of the piscine, reptilian, ovian, and mammalian types, observes that the vertebrates might be binarily divided into oviparous and viviparous; into anallantoic or branchiate, and allantoic or abranchiate; into *Hæmatothermal* (Gr. *haima*, blood, *thermos*, hot), having four-chambered heart, spongy lungs, hot blood, and *Hæmatocryal* (Gr. *haima*, blood, *cruos*, cold), having less perfect breathing organs, less complex heart, with cold blood; and adopts the latter.

Huxley, on the other hand, after noticing the division of the vertebrates into *Branchiate* and *Abranchiate*, and pointing out the non-homogeneous character of the abranchiates—Mammals being so strongly separated from Birds and Reptiles—suggests the removal of them to an independent position. 'Thus,' he observes, 'the classes of the *Vertebrata* are capable of being grouped into three provinces: (1.) The ICHTHYOIDS (comprising Fishes and *Amphibia*), defined by the presence of branchiæ at some period of existence, the absence of an amnion, the absence of a rudimentary development of the allantois, nucleated blood-corpuscle, and a parasphenoid bone in the skull: (2.) the SAURIANS, defined by the absence of branchiæ at all periods of existence, the presence of a well-developed amnion and allantois, a single occipital condyle, a complex mandibular ramus, articulated to the skull by a quadrate bone, nucleated blood-corpuscles, and no parasphenoid, comprising Reptiles and Birds: and (3.) the MAMMALS, devoid of branchiæ, and with an amnion and an allantois, but with two occipital condyles, and a well-developed basi-occipital, and no parasphenoid, a simple mandibular ramus, articulated with the squamosal, and not with the quadratum, with mammary glands, and with red non-nucleated blood-corpuscles.'—*Op. cit.*, p. 74.—For further details, the reader may consult Stannius's *Comparative Anatomy of the Vertebrata* (in German), Wagner's *Comparative Anatomy of the Vertebrata*, translated from the German by Tulk; the works of Huxley and Owen quoted in this article, and in addition, Huxley's *Anatomy of Verteb. Animals* (1871); the special departments of Cuvier's *Règne Animal*, and Blanchard's *L'Organization du Règne Animal*, Balfour's *Embryology*. For a now accepted classification of the V., see ZOOLOGY.

VERTI'GO, in Medicine, designates a sensation which the patient describes as one of going to fall, or of turning round, or of everything turning around him. It comes on without premonitory symptoms, excepting a sense of disturbed balance, which may either precede, accompany, or follow it. Associated with it are frequently some of the following symptoms: flashes of light before the eyes, buzzing in the ears, painful sensations in the head, nausea, vomiting, trembling with cold perspirations, muscular tremors, a full, slow, or small and frequent pulse, flushing or pallor of the face, and cold feet.

Giddiness and *dizziness* are only other names for vertigo, although giddiness is commonly applied to its milder forms. Attacks of it come on in paroxysms, usually repeated several times a day, and lasting from a few minutes to a quarter of an hour. This disease is frequently chronic, the chief pre-disposition to it being in middle and advanced age. Childhood is nearly exempt from it, an observation in accordance with the well-known fact, that children can bear rapid rotatory movements without the induction of giddiness better than adults. A plethoric constitution, especially if associated with a sedentary mode of life, the so-called change of life in women, the debility brought on by exhausting discharges, and the abuse of spirituous liquors, may be regarded as predisposing causes to this affection. The direct cause of vertigo is doubtless an irregularity of the supply of blood to the brain. Hence any condition that occasions either an increase or diminution in the supply of blood, is followed by vertigo. For example, it commonly accompanies disease of the heart, and especially hypertrophy of the left ventricle; it is also induced by suppressed hæmorrhoids, or other constant form of discharge or loss of blood. Injuries and diseases of the brain, and especially of the cerebellum, are often accompanied by this symptom, and so also are diseases of the spleen. Amongst the most common exciting causes are intoxication, not only from alcoholic drinks, but from narcotics, such as smoking tobacco, inhaling carbonic acid gas, or semi-poisoning by belladonna, digitalis, hyoscyamus, &c., gorging the stomach with indigestible food, especially if highly carbonated drinks are at the same time taken); unusual movements or positions of the body, and especially of the head, as in sea-voyages, continued stooping, &c.

There is a peculiar kind of vertigo which occurs in dreams. The direction of the apparent movement is generally from above downwards; dreams of tumbling down stairs being, according to Romberg, the most common; people also dream of sinking into the earth, of chasms opening before them, &c.

According to Boerhaave, 'vertigo is the most easily cured of all the diseases of the head.' This statement is too positive; the vertigo that is caused by profuse discharges and exhaustion is curable, while it is beyond the aid of treatment when it accompanies cerebral disorganization. The *treatment* of course depends upon the cause; while in some cases tonics (the mineral acids, small doses of nox vomica, quassia, &c.) are required, in others, the local abstraction of blood from the nape of the neck, cold affusion, &c., are required. The following rules are, however, generally applicable for the treatment of patients subject to giddiness. They should avoid violent, continuous, or rotatory exercise, abstain from highly nutritious or hearing articles of diet, and from suppers; they should not indulge in much sleep, or the use of feather-beds, or of warm baths. Counter-irritation to the skin by sinapisms, foot-baths with mustard, the use of the flesh-brush, with cold washing of the body, and the administration of cooling laxatives, are to be recommended. (A good laxative of this kind is obtained by mixing six drachms of sulphate of magnesia [Epsom salts] with two drachms of carbonate of magnesia, and taking a tea-spoonful three times a day.) When the patient feels the attack coming on, Romberg directs that he should 'direct his full attention to movement. The patients do this, in a measure, of their own accord, by supporting themselves firmly with their hands and feet, in order to resist the illusory movement. The sense of vision may be employed for the same purpose; thus, the vertigo produced by rotatary movement of the body may be suppressed by looking steadily at the finger held up to the eye, or by turning round in a direction opposite to the previous movement.'—*On Diseases of the Nervous System*, Syd. Soc. Ed., vol. i. p. 102.

Few of our readers are probably aware of the remarkable vertiginous conditions which they can artificially induce in their own persons. Purkinje, the well-known anatomist and physiologist, was the first who brought these remarkable facts within the range of experimental science in two Memoirs published in 1820 and 1827. Vertical vertigo is thus produced. The experimenter—who must be standing—has a somewhat heavy weight attached to each hand, and as he carefully watches the sensation produced by gravitation for some time, he feels the weights growing heavier and heavier, till he can no longer bear them. On putting them down, when he feels he can bear them no longer, it appears to him as if he was impelled to mount straight upwards, and as if the arms were shortened, and the hands must creep up to the thorax. Similar experiments with the muscles of the eye afford still more striking results. 'If the face,' says Purkinje, 'be turned to the ceiling, and the eye be fixed on a given point, round which, as the pole of a vertical axis, the body is turned a certain number of times, the visible objects of the ceiling, as well as the floor of the room, will, if the position of the head and the direction of the eyes be maintained, appear to move in a horizontal direction. If, during the proceeding, the head be brought back into the ordinary upright position, the horizontal will be turned into vertical vertigo; and this sensation will be communicated to the tactile sense of the hands and feet, the floor appearing to sink down on one side, and to rise on the other.'—See Rust's *Magazine*, &c., 1827, vol. xxiii. p. 290.

An analogous effect is produced by standing on the brink of, or in, a running stream, and fixing the eyes on the water; after a time, the sensation begins all at once of being borne along against the current. When this sensation comes on in wading in a river, it is very difficult to keep one's feet; and hence it is dangerous to let the eyes rest on the current close by.

Hitherto, we have spoken of vertigo merely as a sensation; but

there are certain morbid conditions of the brain, and certain operations which experimental physiologists can perform upon it, that will give rise to what may be termed *vertiginous movements*, if we include under the term vertigo *straight* as well as circular movements, as is usually done by writers on this subject. From the experiments of Magendie and Flourens, which have been confirmed by Krauss and Hertwig, it follows that: 1. Removal of both corpora striata of the brain induces an irresistible tendency to advance, the animal shooting straight forward like an arrow; 2. Slicing the cerebellum, whether horizontally or vertically, causes the animal to walk backwards; 3. Section of the corpora quadrigemina of one side, and of one side of the pons varolii, excites rotatary movements and gyrations of the animal towards the injured side; while division of the corresponding parts on the opposite side restores the balance. Vertiginous movements consequent on disease were described by the veterinary surgeons in sheep before they were noticed in the human subject. The *Cœnurus cerebralis*, which is now known to be the larva of a species of tapeworm (*Tænia cœnurus*) infesting the dog, is the well-known hydatid in the brain of sheep, producing in that animal the disease known under the various names of staggers, turn-sick, gogles, rotatory disease, &c. How this hydatid excites these movements when it destroys certain parts of the brain, is now explained by the experiments previously noticed. Dr. Romberg has collected a number of very interesting cases of vertiginous movements in the human subject.—On this subject, in addition to Romberg's work, the reader may consult a paper by Dr. Paget, 'On Morbid Rhythmical Movements,' in the *Edin. Med. and Surg. Jour.*, 1847, vol. lxvii.; and the remarks of Dr. Carpenter (in criticism of some of Magendie's conclusions) on the Cerebellum and its Functions in his *Human Physiology*.

VERTUE, GEORGE, distinguished as an English engraver and antiquary, was born in London in the year 1684, of poor but respectable parents. At the age of 13, he was set to study under an eminent French engraver there; subsequently, he became a pupil of Michael Vandergucht, with whom he remained seven years, and in 1709, he commenced business for himself. He was generously befriended by Sir Godfrey Kneller, the great portrait-painter of the day, who did much to procure him employment. His talent soon made itself recognized; and his eminent success in an engraved portrait of Archbishop Tillotson, for which he received a commission from Lord Somers, at once placed him in the very front rank of his profession. In 1711, on the institution of the Academy of Painting, with his friend Sir Godfrey Kneller as president, he enrolled himself as a member; but his contributions were few and unimportant. In his own more special department, he wrought through life assiduously, confining himself for the most part to reproductions of the portraits of Kneller, Richardson, and one or two others of the more eminent painters of the day. On the accession of George I., he issued a large engraved head of that monarch, which had an immense run, much increasing his reputation with the public. Himself, from an early period, devoted to antiquarian research, which from time to time he prosecuted in journeys hither and thither throughout England, he was appointed, in 1717, Engraver to the Society of Antiquaries, in which capacity he worked up to the time of his death, which occurred on 24th July 1756. He lies buried in the cloisters of Westminster Abbey. In addition to his eminence in his art, he was a man of considerable general accomplishment; an adept in drawing and music, and with a competent knowledge of the French, Dutch, and Italian languages. He projected a *History of the Arts in England*, and had accumulated masses of material for it. At his death, his manuscripts were bought by Walpole, who made free use of them in his *Anecdotes of Painting in England*. In a supplementary volume of that work, entitled *A Catalogue of Engravers who have been born or resided in England*, a full list of his works is given, with some interesting notices of his character, the genuine unassuming worth of which is indicated in an unaffected expression of respect, of rather more than usual significance, as coming from the caustic and supercilious Walpole.

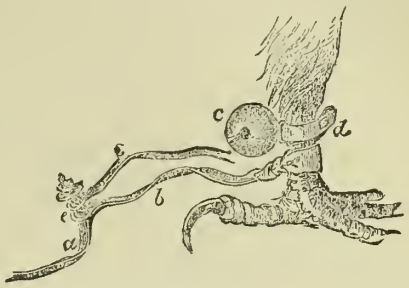
VERTU'MNUS. See POMONA.

VE'RVAIN (*Verbena*), a genus of plants of the natural order *Verbenaceæ*, with a 5-cleft calyx, one division a little shorter than the rest, the limb of the corolla irregularly 5-lobed, the stamens (4 or 2) included within the corolla, the fruit a 4-seeded utricle, which soon breaks, so that the ripe fruit consists of four adherent achœnia. The species are herbaceous plants and small shrubs, with undivided, trifid, or multifid leaves, natives chiefly of the warmer temperate parts of the world. The Common V. (*V. officinalis*), a perennial plant, with erect somewhat hispid stem, rough lanceolate inciso-serrate or trifid and laciniate leaves, and filiform spikes of pale lilac flowers, is a native of Britain and of most of the temperate countries of the world. It is a common ornament of flower-borders, continuing to blossom all summer. It had at one time a very high reputation as a medicinal plant, but its virtues are now regarded as imaginary. It has also been connected with some of the superstitious rites of different nations, as of the Greeks and Romans, the ancient Persians, and the British Druids.—A number of species of V., chiefly American and East Indian, are occasionally cultivated for the beauty of their flowers.



Verbena officinalis.

VE'RVELS, or VARVELS, small rings attached to the ends of



a, the end of leash; *b*, *b*, the jesses; *c*, the bell; *d*, the bewit; *e*, the varvels of silver, with owner's name and address engraved.

the jesses of a hawk, through which the leash is passed that fastens the hawk to its block. They occur as a heraldic charge.

VE'RVICK, or WERVICQ, a town of Belgium, in the province of West Flanders, near the French frontier, on the Lys, 8 miles south-east of Ypres. Pop. (1870) 6800.

VERVIERS, a prosperous manufacturing town of Belgium, in the province of Liége, most picturesquely situated on the river Vesdre, 15 miles east-south-east of Liége, on the Brussels and Cologne Railway. It is of recent growth, and being composed wholly of workshops and of the dwellings of the manufacturers and their workmen, there are no remarkable objects of attraction. V. is the great center of the second-rate cloth-manufactures in Belgium. In and around the town, there are 60 cloth-mills, employing 40,000 hands and 155 steam-engines. The exports of cloth to Switzerland, Italy, and America are valued at £1,000,000 a year; and the goods, which are chiefly coarse woollens, are said to be better and cheaper than those of either France or England. The waters of the Vesdre possess qualities which render them admirably fitted for dyeing. Pop. (1876) 37,828.

VESALIUS, ANDREW, the celebrated anatomist, was a native of Brussels, where he was born in 1514. He studied classics at Louvain, and anatomy and medicine first at Cologne, then at Montpellier, and finally at Paris, where his preceptors were Gunther Sylvius and Fernelius. So keen was his love of dissection, that in order to procure subjects (at that time no easy matter), he ran considerable risks at the hands of the municipal authorities. Driven from Paris by the outbreak of war between Francis I. and Charles V., he returned to the Low Countries, where he served as physician and surgeon in the imperial army from 1535 to 1537. In 1539, he went by invitation to Pavia, where he taught anatomy till 1543. From Pavia he went, again as a lecturer in anatomy, to Bologna and Pisa; and in 1544 was made physician-in-chief to Charles V. at Madrid, where he continued mainly to reside. He was now at the zenith of his prosperity, when an accident befel him which brought his career to a premature and disastrous close.

A Spanish gentleman died in 1564, and permission to dissect the body was granted by his relatives to Vesalius. Life, however, was ascertained to be not quite extinct when V. began the operation, the heart being found still palpitating. The family of the deceased, with inconsiderate vindictiveness, arraigned V. before the Inquisition, by which tribunal some terrible sentence would have been passed upon him, but for the interposition of Philip II., who procured for the unfortunate anatomist the milder penalty of an injunction to make a pilgrimage to the Holy Land. V., accordingly, in the train of the Venetian General Malateste, proceeded to Cyprus, and thence to Jerusalem. While sojourning in that city, he was invited to occupy the chair of Anatomy, just vacated in Padua by Fallopius. It is supposed that, in compliance with this invitation, he embarked for Europe; but the ship in which he sailed was wrecked on the shore of Zante. Hunger and misery of mind proved too much for him, and he died in a village of that island in 1564.

V. was one of those men of science who contributed to disenthral the minds of his contemporaries from their servile belief in the ancients. Galen was then to anatomy what Aristotle was to logical method; and V. assailed his authority by independent researches into nature. His first great publication was a series of

anatomical tables entitled *Suorum Librorum de Corporis Humani Anatome Epitome* (Basel, 1542. fol.). The plates, from drawings by the best masters, and engraved on wood, were nearly all reincorporated in his great work *De Corporis Humani Fabrica Libri Septem* (Basel, 1543). Great value is placed on the earliest impressions of these plates, the explanations of which, however, were revised by V. in his second (Basel) edition in 1555. He published in 1546 his severe attack on the errors of Galen's anatomy, the well-known *De Radicis Chinæ usu Epistola*. The cause of Galen was then espoused by Galen's disciple, Fallopius, to whom V. replied in his trenchant *Anatomicarum Gabrielis Fallopii Observationum Examen* (1561). After his death, a work entitled *Chirurgia Magna*, published under his name, but really a compilation from the ancient anatomists, was edited by his disciple Borgarucci. The great edition of V.'s works appeared with fine plates at Leyden in 1725, 2 vols. fol., under the superintendence of Boerhaave and Albinus.

VE'SICANTS, or BLISTERING AGENTS, are substances which, if kept in contact for some time with the surface of the body, excite such irritation as to cause the effusion of serum from the true skin, leading to the separation and elevation of the cuticle, and the formation of a vesicle or blister. They are employed in the practice of medicine for the purpose of relieving or removing the diseased condition of some internal part, by producing a determination of blood from the interior to the surface over the seat of the affection. They likewise are of great value from their action as general stimulants to the system, and as such are often used with great benefit in the advanced stages of low continued fever. Moreover, they are not unfrequently employed for the direct purpose of withdrawing serum from the vascular system, and with this view they are prescribed with advantage in cases of sudden effusion into the pericardium or the pleura. Blisters used with this object should be of large size, and should be kept in contact with the skin sufficiently long to produce their full effect (twenty-four hours being in some persons necessary for that purpose). Lastly, vesicants are occasionally applied to the surface of the body, for the purpose of removing the cuticle, so as to permit the direct application of various medical agents (especially mercury and morphia) to the absorbing surface of the true skin. It must be recollected that in infancy and childhood, owing to the extreme readiness with which inflammation of the skin is then set up, these agents must be used with extreme caution.

To produce vesication, *cantharidine*—the active principle of *Cantharides*, or Spanish Flies—in one of its various forms is generally employed, although other substances, afterwards to be noticed, are occasionally used. Cantharidine is a white crystalline substance, which is extracted from the powdered insects by rectified spirit, and whose composition is represented by the formula $C_{10}H_6O_4$. It is a very active poison, and produces immediate inflammation of the skin whenever it comes in contact with it, is very volatile, even at ordinary temperatures, and is soluble not only in alcohol, but in chloroform, ether, strong acetic acid, and many oils. This substance is employed in the form of plaster (*Emplastrum Cantharidis* of the *Pharm. Brit.*), blistering fluid (of which there are several excellent forms, such as *Acetum Canth.*, *Æther Canth.*, and *Collodion Canth.*, none of which are in the *Pharm. Brit.*), and blistering tissue (of which there are several forms, known as *Tela vesicatoria*, *Charta ves.*, *Blistering Cloth*,* &c., none of which are officinal).

Although the fluids and tissues are the cleaner and neater preparations, the old-fashioned *Cantharides Plaster* is far the most commonly employed in general practice, and is, by many of the authorities in the profession (amongst whom we may name the late Professor Syme of Edinburgh, and Prof. Lister, now of London), considered as the most efficacious (its superiority being due to its slower and more prolonged action). In prescribing a blister, it is expedient to sketch the size and shape desired. Before applying it, the skin should be well washed with warm water. If the patient's skin is not easily acted upon, the part should be sponged with vinegear; while if it is very susceptible, and he is liable to strangury from the application of blisters, a piece of tissue-paper should be placed between the skin and the plaster. (In speaking of the plaster, which is a solid mass, we assume that it is spread on some fitting material, as wash-leather, soft brown paper, &c., the popular idear of a plaster always including the material on which it is spread.) In order to insure close contact with the skin, the blister should be gently warmed, carefully applied, so as to avoid creases, and kept in its place by a bandage. To produce their full action, blisters should remain from ten to twelve hours, and if on their removal after that time full vesication has not been produced, a hot bread-and-water poultice will often produce the desired effect. The raised cuticle should be punctured, to allow of the escape of the serum (except in the case of children and persons of very irritable skin, when the vesications should be left unopened), and a dressing of simple ointment or spermaceti ointment on soft rag applied; and repeated in twenty-four hours afterwards; or the part may be at once covered with cotton-wool, which, until it gives off a bad smell, can remain till the skin is healed. The troublesome *itching* which often follows the application of a blister, is best relieved by the application of a bread-and-water poultice, moistened with the dilute solution of acetete of lead, formerly known as Goulard's *Vegeto-mineral Water*.

Dr. Neligan, in his highly practical work *On Medicines*, speaks so strongly of *Collodium Vesicans* as a blistering agent, that although we have no personal experience of it, we shall, on his authority, briefly notice it. It is prepared, when required, by mixing together equal parts of collodium and cantharidal ether (obtained by digesting for three days one part of coarsely powdered cantharides in two parts of sulphuric ether, and expressing). It possesses the advantage that its strength can be readily increased or diminished. 'It is now much used for blistering,' he observes, 'owing to its cleanliness, its certainty, and the facility with which it may be applied in the neighborhood of joints, or to other parts which are difficult to blister by the ordinary method. It is applied with a camel-hair pencil; two scruples are sufficient to blister a surface as large as the palm of the hand. It is preferable to apply the quantity to be used twice, instead of at one time, on the place to be blistered.'

When a blistering agent with very rapid action is required, as in the state of collapse in cholera, recourse may be had to the application of boiling or nearly boiling water* to a portion of the abdomen, the surrounding surface being protected by a wall of damp cloths; or in less urgent cases, as retrocedent gout showing itself internally, an almost immediate blister may be produced by saturating a piece of lint of the size of the desired blister in the strong solution of ammonia, and applying it to the skin with moderate pressure. By the time that the ammonia has evaporated, the required result is usually obtained. When it is desired to keep up a discharge from a blistered surface (instead of healing it, as is most commonly required), or to produce a *perpetual blister*, we dress the raw surface with irritants of various kinds, such as savine ointment, *Papier d'Albespeyres*, &c. At each fresh dressing, which in summer should take place twice a day, the part should be cleansed with warm water.

VESICA PISCIS (barbarous Lat. bladder fish, bladder evolved out of a fish), a term often, but not very correctly, used for the aureole or glory, of a pointed oval shape, formed by the intersection of two circles, which, in the religious symbolism of the early middle ages, is often represented encircling the whole body of the Saviour. This form is supposed to have been gradually evolved



Vesica Piscis.

out of the figure of the fish, which is prominent in the symbolism of the early Christians on sarcophagi and elsewhere, and whose use arose out of an anagram on the initial letters of Ἰησοῦς Χριστὸς Θεοῦ Υἱὸς Σωτήρ, Jesus Christ, son of God the Saviour. The ovoidal form, generally designated by English antiquaries the Vesica Piscis, is much used in painted glass, and became from the 12c. the almost invariable form of the seals of ecclesiastical persons and institutions.

VESOUL, a small town in the east of France, capital of the dep. of Haute-Saône, stands in a fertile and picturesque country, overlooked by the mountain called the Motte-de-Vesoul, on the Durgeon, 236 miles east-south-east of Paris. The manufactures

* We have not included the well-known *Papier d'Albespeyres*, which is often sold for this purpose, because it is not sufficiently powerful. It is useful for keeping open an already blistered surface.

* Strange and paradoxical as it may appear, 'in the absence of other more suitable means, *cold water* may be used as efficiently as boiling water, and will not present so formidable an appearance to the patient. A piece of bibulous paper (common blotting-paper, for example) should be soaked in cold water, applied to the part to be vesicated, and covered with three or four folds of dry paper. A common smoothing-iron heated to 212° should now be pressed three or four times over all, and on removing the paper, the part will be found vesicated.'—Neligan, *op. cit.*, p. 325

of the town are unimportant, but the environs are as fertile as they are beautiful; the slopes of the Motte-de-Vesoul are clad with vines; and a trade in grain, hay, and hides is carried on. Pop. (1876) 9097.

VESPASIA'NUS, TITUS FLAVIUS, Roman emperor, was a native of Reate, in the Sabine country, of humble origin. After serving with distinction in various military grades in Thrace, Britain, and Africa, he was sent by Nero to conduct the Jewish war. This appointment he owed to his recognized merits, for he was not a favorite with the emperor, whom he had offended by falling asleep during the recitation of one of his poetical compositions. He conducted the war with vigor, reduced Judæa, and finally laid siege to Jerusalem. At this time occurred the struggle for the imperial dignity between Otho and Vitellius, after the murder of Galba. The legions serving in the East were indignant that the empire should be disposed of at the will of the Prætorian Guards. Their own general was proclaimed emperor, and quickly acknowledged as such by all the East, and, after the death of Vitellius, by Italy and all the provinces. Leaving his son Titus to prosecute the siege of Jerusalem, he repaired to Rome, where he was joyfully received, and immediately set about the work of restoring order. He kept his soldiers under firm discipline, improved the finances, co-operated cordially with the senate in the administration, and did much by his example to lessen the ill effects of the prodigality and luxury of his predecessors. An interesting biography of him has been written by Suetonius, and from the personal anecdotes there recorded, we are enabled to estimate clearly the character of the man. He was simple and unostentatious in his mode of life, too shrewd to listen to flattery, liked a joke, was good-humored, and easy of access. He is charged with being avaricious, and at times he certainly sought to obtain money by rather undignified ways; but though niggardly in personal expenditure, he was lavish in embellishing the city with public works, and a munificent patron of the arts and sciences. He is chargeable also with one or two acts of cruelty, but usually he bore provocation with great good temper. He died 79 A.D., in the 69th year of his age, after a reign of ten years.

VE'SPERS (Lat. *vespere*, in the evening) one of the canonical hours of the Breviary, called also anciently *Lucernarium*, from *lucerna*, a lamp. It is a service of very ancient use, being plainly referred to in the apostolical constitutions, and is noticeable as that one among the canonical hours which in the Roman Catholic Church continues to be regularly sung as one of the ordinary public services of parish churches, no less than in cathedrals where the entire of the hours are chanted. It resembles lauds, and consists of five psalms and antiphones, a lesson, a hymn with versicle and response, a canticle (the Magnificat), and a collect or prayer. The psalms sung at vespers are Ps. cix.—cxlvii., which are distributed over the several days of the week. The service of vespers has given occasion to some of the most brilliant efforts of modern musical composers. The Evening Prayer of the English Prayer-book corresponds partly with the vespers, partly with the compline (*completorium*) of the Roman Breviary.


Vesta.

VESPUCCI, AMERIGO. See AMERIGO VESPUCCI.

VE'STA, VE'STALS. Vesta, an ancient Latin divinity, whose worship was the embodiment of an idea, deeply rooted in the Latin, and particularly, in the Roman mind —viz., that the state was one great family. As the Lares were the tutelary guardians of the individual household, so the Penates and Vesta watched over the welfare of the state. The Greek *Hestia* (hearth) is a kindred conception; and if the word is the same, it may be conjectured that the worship of the chaste divinity that presided over domestic life goes back to a period when the Greeks and Latins were still an undivided people.

The state, we have said, was regarded by the Latins as one great family, so each community had its public altar to Vesta, the central one for the whole Latin people being at Lanuvium, about 20 miles from Rome, on the Appian Way, where the Roman consuls and other officers offered sacrifices on entering upon their offices. The common hearth of the Greeks was at Delphi. There was also a temple of Vesta at Rome, which stood in the Forum, near the temple of the Penates (see LARES, &c.), between the Palatine and Capitoline hills; it was open during the day, and closed during the night. On the first of March each year, the sacred fire was renewed; on the 9th June, the *Vestalia* were held in honor of the goddess; and on the 15th of that month, the temple was cleared out, and the dirt carried into a narrow lane (*angiportus*) behind the temple, which was locked by a gate, that none might enter.

The goddess herself was a virgin, and her fire was carefully tended night and day by the *Vestal* virgins. The number of these priestesses was originally four, but two were subsequently added, increasing the number to six. At first, they were chosen by the kings; but after their expulsion, by the Pontifex Maximus, who, when a vacancy had to be filled up, selected twenty damsels between the ages of six and ten years, from among whom one was chosen by lot. A father could offer his daughter for the office, if he chose, but this seldom happened. The necessary qualifications for the office of Vestal were, that the maiden should be the daughter of free-born parents, then alive and resident in Italy, and engaged in no dishonorable occupation; that she herself should not be younger than six, nor older than ten years, and free from any physical defect.

The period during which the priestess was bound to the service of Vesta was thirty years, the first ten being occupied with learning her duties, the next in performing them, and the last in teaching them to others. When she entered upon her office, the Vestal took upon herself a solemn vow of chastity for the thirty years of her service, the dreadful punishment of a violation of which was, that she should be buried alive in a subterranean vault near the Colline Gate, to which she was carried on a bier, as if dead, and where she found a light, with a scanty supply of bread, water, milk, and oil. The chief duty of the virgin priestesses was to keep the fire on the altar of the goddess ever burning; they had also to present offerings to Vesta, sprinkle the temple every morning with water drawn from the Egerian well, and guard the sacred relics, which were a pledge granted by fate for the permanency of the Roman sway. As the extinction of the sacred fire was looked upon as emblematic of the extinction of the state, the Vestal who, by neglect of duty, allowed this to happen, was severely punished, the penalty being, that she should be stripped and scourged by the pontifex in the dark: the fire was again rekindled by the friction of two pieces of wood from a 'lucky tree.'

As a compensation for the strictness of the lives which they had to lead, the Vestals had many privileges bestowed upon them: among others, they were entirely freed from paternal authority; could make a will, and give evidence without taking an oath; had a seat assigned them in the best part of the theater; were held in the greatest honor, and done homage to by the highest officers of the state; and even the plebs, in their most reckless moments, respected them. If, when out walking, their eye should chance to light upon a criminal, he was set free. At the expiration of her period of service, a Vestal, if she chose, could marry, although to do so was considered very unlucky, so that she generally ended her days in the service of the goddess.

VESTI'BULUM, a porch or ante-room, from which a house or large apartment is entered.

VE'STMENTS, SACRED, the peculiar habiliments worn by ministers of religion in the public discharge of their office, and sometimes in other sacred ministrations, even when privately performed. The use of a distinctive costume in public worship formed a part not only of the Jewish, but of almost all the ancient religions, and has been found in a greater or less degree in the religions of the new world. See Lipsius, *De Monument. et Exemp. Polit.*, l. i. c. 3. The whole 28th chapter of Exodus is taken up with a description of the vestments of the high-priest; and the directions for those of the inferior functionaries are almost equally minute. Whether the same characteristic was carried into the early Christian worship, has been a subject of controversy; some writers being of opinion that the peculiar sacred costume which we find in use among Christian ministers from a very early period was not originally peculiar to the clergy, but was simply the ordinary costume of Rome and of the East in the first centuries, and only came to be a costume distinctive of sacred ministers, because by them it was retained unaltered, whereas in the every-day world the costume varied in fashion, in material, in color from year to year. There seems little room, however, for doubting, that from a very early time Christian ministers did employ some distinctive dress in public worship; and Catholic writers even find traces in the beginning of the 5th c. of the practice of blessing the vestments which were destined for the public services of the church. See Binterim, *Denkwürdigkeiten*, IV. i. p. 198. From the 8th c. downward, the rituals of the West all contain formularies for the blessing of the several sacred vestments worn by bishops, priests, deacons, and lower clergy.

The vestments used in the celebration of the mass by priests of the Roman Catholic Church are six in number—viz. (1) the amice, a square piece of linen, which is worn upon the shoulders, and in some of the religious orders, over the head, which latter, indeed, appears to have been the ancient mode of wearing it; (2) the alb, a long, loose-sleeved, linen gown, sometimes richly embroidered or 'appareled' at the lower border; (3) the cincture, a linen cord tied around the waist, and confining the folds of the alb; (4) the maniple, a narrow strip of embrodered silk, worn pendent from the arm; (5) the stole, a long narrow scarf, similarly embroidered,

and worn by priests around the neck, the ends being crossed over the breast or pendent in front, and by deacons transversely over one shoulder; (6) the chasuble, a loose flowing vestment, open at the sides, having a hole in the center, through which the head passes, and falling down over the breast and back to some distance below the knees. Most of these vestments have been already briefly described. The three last named are always of the same material and color; but this color, which appears primitively to have been in all cases white, now, and for many centuries, varies according to seasons and festivals, five different colors being employed in the cycle of ecclesiastical services—viz., white, red, green, violet, and black. Cloth of gold, however, may be substituted for any of these, except the last. A cap, called *biretum*, is worn in approaching the altar, but is laid aside during mass. Besides these vestments, which are worn by priests during the mass, bishops in the same service use also two inner vestments, of nearly the same form as the chasuble, called 'dalmatic' and 'tunic,' as also embroidered gloves, and shoes, or buskins, together with the distinctive episcopal ornaments—the pectoral cross, the mitre, the pastoral staff, or, if archbishops, the crosier, and ring. Archbishops celebrating mass also wear the Pallium (q. v.). Deacons, at the same service, wear a robe, called dalmatic; and sub-deacons, a tunic. The sub-deacon is not privileged to wear the stole.

In other public services, priests and bishops wear a large flowing cloak, called cope (Lat. *pluviale*), with a pendent cape or hood, called orfrey. In the ministration of the other sacraments, and also in adminstering communion, priests wear the surplice (which is but a short alb) with the stole. The vestments of the Greek priests differ considerably in their general character and effect from those of the Latin clergy, but the several portions of the costume are substantially the same as those of the Latin costume already described. The *stoicharion*, the *zoné*, the *orarion*, the *epimanikia*, and the *phelorion*, correspond respectively with the alb, cincture, stole, maniple, and chasuble. Greek bishops wear the *omophorion*, which corresponds with the later pallium. The *phelorion*, however, is so ample in its folds as to resemble the Latin cope rather than the chasuble; and the general effect of the Greek vestments, which may be said to resemble in all particulars that of the other eastern rites, is much more picturesque.

The natural effect of the religious changes of the 16th c. was to put aside the costume at the same time and on the same grounds with the ceremonies of the existing worship. This was done, however, by the different churches of the Reformers in very various degrees. The Calvinistic worship may be said to have dispensed with vestments altogether. The Lutherans generally retained with the cassock the alb, and in some countries the chasuble. In the English Church, a variety of practice has existed. The disputes about the use of the Surplice (q. v.) have been already described. As to the rest of the costume, the first Prayer-book retained the Roman vestments with little change; and as, by a remarkable accident, the rubric of this Prayer-book has never been formally repealed, a so-called ritualistic movement in the English Church has re-introduced in some places almost every detail of the Roman costume in the communion and other services, an innovation which has in many instances been vigorously resisted.

VESTRY, in English parishes, is a meeting of the inhabitants of the parish assembled to deliberate on some matter which they have a right to decide (see PARISH). The vestry is the regular organ through which the parish speaks; and in numerous matters relating to church-rates, highways, baths and wash-houses, and other sanitary matters, it has important functions to discharge, and is a conspicuous feature of parochial management. A statute was passed in 1818 to regulate the mode of procedure. No vestry, or meeting of inhabitants in vestry, shall be held until public notice of the place and hour of meeting be given, as well of the special purpose of such meeting. This notice is required to be given by publishing it on some Sunday before the celebration of divine service, by affixing a written or printed copy on the principal door of the parish church or chapel. Such notice is to be previously signed by a churchwarden of the church or chapel, or by the rector, vicar, or curate of the parish. These meetings were formerly held in the vestry-room of the church, hence the name given to the meeting itself. In large parishes, the vestry-room of the church was found too small; and wherever the population exceeds 2000, the vestry may apply to the Poor-law Board to have some room, or other place of meeting than the church, built or hired for the purpose of the vestry-meetings. The minister of the parish—that is to say, the rector, vicar, or perpetual curate—if he be present, is entitled to be the chairman; but if he be not present, then the meeting may nominate one of the inhabitants to be chairman. The chairman has the power of adjourning the meeting, but he must exercise such power prudently, and so as to facilitate the business. None but persons rated to the relief of the poor can vote in a vestry; and though formerly none could vote unless actually residing in the parish, this is no longer necessary, provided the person is rated to the poor of the parish. The number of votes depends on the rental or value of the occupation, one vote being allowed for each £25 of value, or rental, provided that no person shall have more than six votes. In case of joint-occupiers, each votes according to his own share of the joint-value.

One of the incidents of holding a vestry is, that any vestryman, after a show of hands is taken, may demand a poll, and if the poll be refused, the resolution come to is void. The law has surrounded this parochial right to a poll with jealous care; and if there is not fair-play given, and ample notice and time for all the inhabitants entitled to vote to come and give their vote, the whole proceedings are void. It is the duty of the churchwardens and overseers to keep a book in which to enter the minutes of the vestry. The vestry appoints annually churchwardens and highway surveyors. While church-rates were compulsory, a church-rate could only be made by a vestry; and if the majority chose to make none, then no rate was possible. The vestry also deliberates and resolves as to stopping up, diverting, or turning highways; whether the owners of small tenements ought to be excused from paying poor-rates; whether baths and wash-houses, parish libraries, &c., shall be adopted. In large parishes, a vestry-clerk is usually appointed, and paid out of the poor-rate; and in such case, he is appointed by the vestry. His duty is to give notices of all vestry-meetings; to summon the churchwardens and overseers; to keep the minutes, accounts, and vestry-books; to make out the church-rate; recover arrears of rates; make out lists of persons qualified to act as jurymen, and to give notices for claims to vote for members of parliament. Some parishes are governed by a select vestry, which means a small part of the chief inhabitants appointed by justices of the peace under a statute, and their duty consists of relieving the poor, and they supersede the common vestry of the parish.

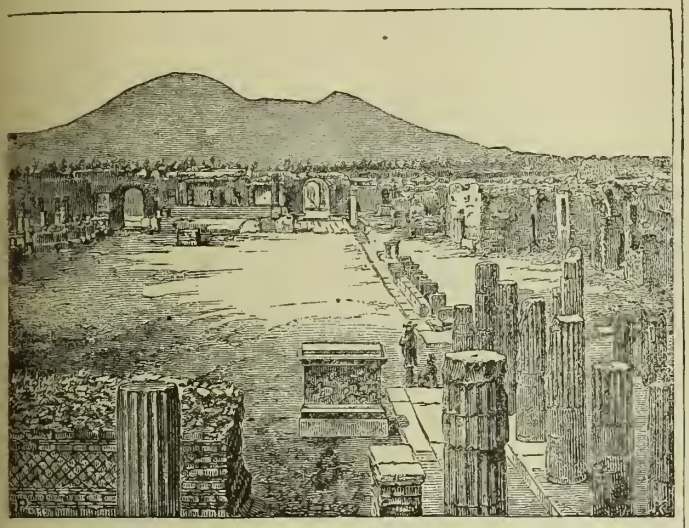
VESU'VIAN, or IDOCRASE, a mineral, allied to garnet, and sometimes called *Pyramidal Garnet*. It is found in volcanic and in primitive rocks. It is frequent in masses ejected from Vesuvius, whence its name. The hardness is about equal to that of quartz. The colors are various—yellow, green, brown, almost black, rarely azure. V. is composed of silica, alumina, and lime, in somewhat varying, but not very unequal proportions, with a little oxide of iron and oxide of manganese. It is employed as an ornamental stone, but is not very highly valued. The green-colored varieties are known as *Volcanic Chrysolite*, and the brown as *Volcanic Hyacinth*.

VESU'VIUS, a well-known volcano, is situated near the east shore of the Bay of Naples, about ten miles from the city of that name. It is a solitary mountain, rising majestically from the plain of Campania, having at the base a circumference of about 30 miles, and dividing, at a certain height, into two summits, Somma and Vesuvius Proper. The height of the mountain and form of its apex are subject to frequent changes by eruptions. It is estimated to be at present nearly 4000 feet high. In the single eruption of 1822, it lost 800 feet, nearly all of which has been restored by subsequent eruptions. Before that event, the summit was a rough and rocky plain, covered with blocks of lava and scoriæ, and rent by numerous fissures, from which clouds of smoke were given out. But it was then altered to a vast elliptical chasm, three miles in circumference, three-quarters of a mile at the greatest diameter, and about 2000 feet deep.

The first recorded eruption took place in the year 79 A.D. Warnings had been given 16 years before by a great earthquake, which shattered the cities of Herculaneum and Pompeii, and the earth was frequently shaken by slight shocks until August of the year 79, when they became more numerous and violent. Previous to this, V. was not suspected to be a volcano. Its sides were covered with famous vines, and its ancient crater, partly filled with water, formed the stronghold of the rebel chief, Spartacus.

The morning of 24th August brought comparative repose; but in the course of the day, a huge black cloud rose from the mountain, from which stones, ashes, and pumice were poured down on all the region around. The elder Pliny, who commanded the Roman fleet at Misenum, sailed to the help of the distracted inhabitants: he landed near the base of the mountain, was enveloped in sulphurous vapor, and was suffocated. The younger Pliny gives a graphic account of the eruption in two letters to Tacitus, which are well known. No lava was ejected on this occasion, nor indeed in any eruption in historic times up to the year 1066. Pompeii was buried under a thickness of 20 feet of loose ashes, and remained unknown till about a century ago. A torrent of mud spread over Herculaneum, which, by additions from subsequent repeated eruptions, now forms a thickness of 80 or 100 feet. Since this first famous eruption, V. has been an active volcano, and has been frequently but irregularly in eruption, about 60 great and numerous smaller ones having taken place. In 472, the eruption was so great that the ashes fell even at Constantinople, and caused great

alarm there. The summit known as Monte Nuovo was, in 1538, forced up in two days to the height of 413 feet, and with a circumference of 8000 feet. In 1631, the villages at the foot of the mountain were covered with lava, and torrents of boiling water were sent forth. Since that described by Pliny, one of the most famous is the eruption of 1779, of which Sir William Hamilton, then British minister at Naples, gives an interesting account. In



Foro Civile at Pompeii, with Vesuvius in the distance.
(From a Photograph.)

the spring of that year, it began to pour forth lava; this was succeeded by rumbling noises and puffs of smoke; then jets of red-hot stones and ashes made their appearance, and increased in number and intensity, until the eruption arrived at its climax between the 5th and 10th of August. Then enormous volumes of white clouds rose from the crater to a height four times that of the mountain, and lava poured from the crater in torrents down the sides of the cone. This was followed by columns of fire, which rose on some occasions to three times the height of V., or more than two miles. In the midst of all this, showers of stones, scoriæ, and ashes were thrown out to a great height. One mass of rock ejected was 108 feet in circumference, and 17 feet high.

A more terrible eruption took place 15 years later, by which the greater part of the town of Torre del Greco was destroyed. The violent erruption of 1822 has already been alluded to. A remarkable eruption occurred in May 1855. In 1865 began a series of erruptions, which have been repeated at intervals since. For a full account of the fearful outbreak of April 1872, we are indebted to Palmieri, director of the Meteorological Observatory on Mount Contaroni, a part of V., who with great courage remained in the observatory while it seemed threatened with destruction. An eruption equal in brilliancy to that of 1872, but much less destructive, took place in 1878, and another in 1880. A railway to the top of V. was opened in 1880. There are two lines of rails, so that while one carriage goes up the other comes down.

VE'SZPRIM (Ger. *Weiszbrunn*), a town in the west of Hungary, and 70 miles S.-W. of Pesth. It contains a handsome episcopal palace, a fine cathedral, a Piarist college and a gymnasium. Cloth and flannel-weaving, silk-spinning, the cultivation of wine, fruits, and tobacco, are the principal industries. The town has been on several occasions in the possession of the Turks; and an interesting memorial of them is a slender minaret, which rises from an old Gothic tower, and which now serves as a watch-tower against fire. Pop. (1880) 12,575.

VETCH (*Vicia*), a genus of plants of the natural order *Leguminosæ*, sub-order *Papilionaceæ*, having a tuft of hairs on the style beneath the stigma, nine stamens united, and one free. To this genus the *Bean* (q. v.) is generally referred. The species, however, are mostly climbing plants, annuals, with pinnate leaves ending in tendrils, and with no terminal leaflet. A number of species are natives of Britain. The Common V. (*V. sativa*), sometimes called by agriculturists TARE, frequent in cultivated ground in Britain and throughout Europe, and itself much cultivated as green food for cattle, has rather large purple, blue, or red flowers in pairs, axillary and almost sessile. In cultivation, it varies considerably both in size and other particulars, as in the breadth of the leaflets, the number of them in a leaf, &c. Oats are generally sown along with it, to afford it a little support, and thus prevent its rotting in wet weather.

V. Cracca and *V. sepium* are very common British species, the former with many-flowered stalks, bearing beautiful bluish-purple flowers, being one of our most beautiful climbing plants, and a chief ornament of trees, hedges, and bushy places in the latter part of summer. These and other species, natives of Britain or of different parts of Europe and the north of Asia,



Common Vetch (*Vicia sativa*): *a*, seed-pod.

have been either occasionally cultivated as food for cattle or recommended for cultivation, and generally agree with the Common V. both in their qualities and in the mode of cultivation which they required. *V. biennis* and *V. Narbonnensis* are amongst those chiefly cultivated in some part of Europe. The species of V. are very numerous, chiefly in the temperate parts of the northern hemisphere.

VETCH, BITTER. See OROBUS.

VE'TCHLING. See LATHYRUS.

VE'TERAN CORPS are among the Military Reserves of all nations. They consist of old soldiers past the prime of active manhood, and incapable of taking the field. Their discipline and steadiness, however, admirably fit them for garrisons or fortresses, and for the instruction of young troops. The Veteran Battalions did good service during the French war as home guards, releasing the active troops for foreign service. The Army Estimates for 1879–80 made provision for an Army Reserve (including pensioners) of 46,000 men. But from the short periods during which men serve as soldiers, and the number of officers who quit the army on reaching the rank of captain, it is almost certain that very large veteran corps could be formed from civil life in any case of national emergency.

VE'TERINARY MEDICINE (Lat. *veterina*, beasts of burden; probably for *vehiterina*, from *veho*, to carry) embraces the medical management of the domestic animals, and appears to have been studied by the ancient Egyptians as well as by the Greeks and Romans. Hipprocrates contributed a treatise on equine disorders; Columella and Vegetius (the latter of whom flourished about 300 A.D.) have left several curious veterinary works. Until after the middle of the 18th c., there were, however, no schools for the teaching of veterinary science or art. The several works published in France, Italy, and elsewhere were not of great value. In this country, Blundeville and Gervase Markam, who lived in the reign of Elizabeth, published volumes on farriery; Snape, farrier to Charles II., produced an anatomical treatise on the horse; Mr. Gibson, previously a surgeon in a cavalry regiment, paid much attention to the disorders of animals, and about the middle of last century, published *The Farrier's Guide*, which continued for many years the best authority on the subject. The treatment of sick horses remained, however, in the hands of the riding-master, the groom, or the shoeing-smith or farrier (from *ferrum*, iron); whilst the doctoring of the other domestic animals devolved upon the goatherd, shepherd, or cowleech.

Veterinary medicine, as a scientific art, takes date from 1761, when the first veterinary college was established at Lyon with royal patronage, under the able teaching of Bourgelât. Five years later, the flourishing school of Alfort, near Paris, was founded. In February 1791, the London College was organized, Charles Vial de St. Bel being appointed principal, with Delabere Blaine as assistant-professor. St. Bel died in 1793, and was succeeded by Mr. Coleman, who, during many years, zealously improved the position and teaching of the college. In Scotland, lectures on veterinary medicine were first given by Mr. Dick in 1819.

Under the auspices of the Highland and Agricultural Society, and Senatus Academicus, Mr. Dick, in 1823, began his systematic teaching of veterinary surgery. Soon afterwards he erected the college buildings in Clyde Street, Edinburgh, with hospital for sick animals; he collected a valuable museum; extended the curriculum of study; and engaged efficient assistants, among whom were John Barlow and Dr. George Wilson, to instruct his pupils in anatomy and physiology, chemistry and materia medica, cattle-

practice and histology. At his death in April 1866, Mr. Dick bequeathed to the city of Edinburgh the college which he had founded, and his entire fortune, to be devoted to the teaching and improvement of veterinary medicine. For many years upwards of 80 professional pupils, with a number of agricultural and amateur students, have annually attended the classes at the Edinburgh Veterinary College. About 150 are enrolled at the Camden Town College, London. In 1857, Mr. John Gamgee established the New Veterinary College in Edinburgh, which existed till 1865, when Mr. Gamgee went to London. The New Veterinary College, Gayfield House, Edinburgh, was established by Principal Williams, and recognized by royal sign manual in 1873. Since 1861, a veterinary school has been conducted in Glasgow by Mr. James Macall. An attendance at one or other of these colleges, during three sessions of six months each, and two sessions of two months, is required before a pupil can present himself to be examined for his degree. At the best continental schools four years study is usually necessary. The fees for the whole curriculum at the different educational establishments are about 36 guineas. At all the colleges—at London by the College of Preceptors; at Edinburgh by the rector of the Royal High School and mathematical master; at Glasgow by the principal of the college—a preliminary examination is now required.

In 1844, a royal chapter was granted, under which veterinary surgeons (graduates of either the London or Edinburgh College) became a corporate body, entitled 'The Royal College of Veterinary Surgeons,' with authority to appoint examining boards, and grant diplomas or licenses to practice. In 1876, a supplementary charter was obtained, empowering the Royal College of Veterinary Surgeons to grant the higher title of Fellow, without examination, to the most eminent members of the profession who had been fifteen years in practice, and to appoint a board to examine candidates for the fellowship degree, each candidate to have been five years in practice. Nearly 3000 persons now hold these diplomas, which cost £10, 10s., and constitute the holder a member of the Royal College. For many years, the Highland and Agricultural Society of Scotland annually appointed an examining board, and granted to pupils of the Edinburgh Veterinary College, a certificate recognized as a guarantee of professional ability by the public and by the authorities. The old arrangements were superseded by the Veterinary Surgeons Act of 1881. This act, which is designed to prevent unqualified persons from assuming misleading titles, enacts that the Royal College of Veterinary Surgeons shall provide for the examination in England of students from English, Scottish, and Irish veterinary colleges (when Irish ones have come into existence), and shall grant membership of the Royal College to those who pass. The council has power to remove names from its register; and valid diplomas are granted by universities, colleges, and corporations recognized by the council. In many English towns and districts, there are veterinary practices worth from £600 to £1000 a year; whilst in London, Manchester, and elsewere, the receipts of a few exceed that amount.

The literature of veterinary medicine is rapidly widening. Mr. Percivall and Messrs. Gamgee and Law, and the late Professor Strangeways, have published text-books on anatomy. The chief reliable authorities on diseases consist of Mr. Dick's exeellent little manual of veterinary science; Percivall's *Hippopathology*, in 3 vols.; Mr. Gamgee's *Domestic Animals in Health and Disease;* F. Dun's *Veterinary Medicines, their Actions and Uses, with an Appendix on Diseases of Animals;* Tuson's *Pharmacy*. Late important contributions are Professor Williams's *Principles and Practice of Veterinary Surgery* (Edinburgh, 1872); and *Principles and Practice of Veterinary Medicine* (Edinburgh, 1874), which have now reached their third and second editions. Mr. Fleming, V.S., R.E., has translated M. Chaveau's elaborate treatise on the *Anatomy of the Domesticated Animals* (1873); has published *Sanitary Science and Police*, 2 vols.; *Rabies and Hydrophobia; Animal Plagues; Veterinary Obstetrics;* and founded *The Veterinary Journal*. The *Veterinarian*, a monthly periodical, has been published for many years.

VETERINARY SURGEON (Army), an officer of a cavalry regiment, or in the artillery, who is charged with the supervision of the horses, and with their cure, if in need of medical aid. A veterinary surgeon is required to produce proper testimonials of qualification, and to pass an examination. On appointment, he receives 10s. a day, and ranks as lieutenant. By service, his pay rises to £1, 3s. a day, and his relative rank to that of major. After 25 years' service, he becomes entitled to retire on half-pay.

VE'TIVER, or CUSCUS, the dried roots of an East Indian grass (*Andropogon muricatus*), which has a very agreeable and persistent odor, something like sandal-wood. It is much prized in India and other parts of the world, and is used to perfume linen, &c. Baskets, fans, and mats are made of it in India; it is remarkable for giving out its perfume for many years, and it is strongest when moistened.

VE'TO, in Politics, the power which one branch of the legislature of a country may have to negative the resolutions of another branch. In the United Kingdom, the power of the crown in the act of legislation is confined to a veto—a right of rejecting, and not resolving. The crown cannot of itself make any alterations in the existing law, but may refuse to sanction alterations suggested and consented to by the two Houses of parliament. The necessity for such refusal is generally obviated by an observance of the constitutional principle, that the will of the sovereign is that of the responsible ministers of the crown, who only continue in office so long as they have the confidence of parliament. The royal veto is reserved for extreme emergencies; the last instance in which it was exercised was in 1707, when Queen Anne refused her assent to a bill relating to the militia in Scotland. The House of Lords will generally support the prerogative of the crown by rejecting a measure repugnant to the sovereign; and a knowledge of this may enable the ministry to defeat it in the House of Commons—a result which the constitutional influence of the crown and the House of Lords in the Lower House may assist in producing, so as to avoid a collison between the branches of the legislature. In bills of supply, the power of the House of Lords amounts merely to a veto, as does that of the House of Commons in bills affecting the peerage.

In the United States of America, the President has a qualified right to veto all laws passed by Congress; but after that veto has been exercised, the bill which he has rejected may become law by being passed by two-thirds of each House of Congress. For the Polish *liberum veto*, see POLAND.

In the French constitution of 1791, it was resolved to have but a single house of legislature, on the principle that it was inconsistent with the idea of a legislature representing the national will that one part of it should have a veto on another, and the same view was adopted by the Convention of 1793. But the arbitrary and violent measures of that latter body induced a strong general conviction that a division of the legislative power, and a veto in some form, was essential to give stability to the government, and moderation to faction; and in the constitution of 1795, a Council of Ancients was introduced, with a power to veto the resolutions of the legislative body.

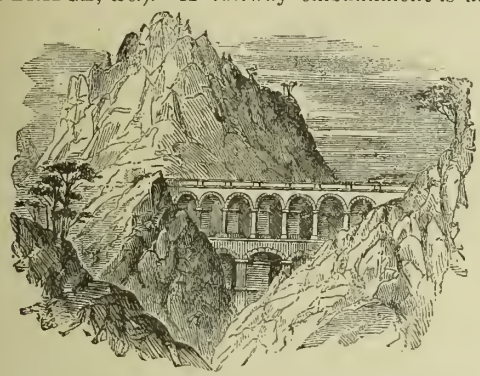
VETO ACT, in Scottish Ecclesiastical Law. See PATRONAGE; SCOTLAND, CHURCH OF.

VEUILLOT, LOUIS, French journalist and author, born in 1813, at Boynes en Gatinais (Loiret). The son of a small cooper, he was sent to a school near Paris, from which he was transferred in 1826 to a lawyer's office. He chose the profession of journalism, and filled several engagements on the provincial press, in the course of which his personalities involved him in various duels. He visited Rome in 1838, previous to which, he states, he was without much faith, either religious or political. He returned to Paris, however, a zealous adherent of the papacy, and, as editor of the *Univers*, soon signalized himself as an aggressive and uncompromising champion of the church. In 1842, he accompanied Marshal Bugeaud to Africa as his secretary, and on his return was made Chief Secretary to the Ministry of the Interior. He again edited the *Univers* in 1848; but his polemical disquisitions brought upon him the censure of the Archbishop of Paris; and in 1853 the clergy of the diocese of Orleans were expressly forbidden by their bishop to read the *Univers*, which, after the usual three warnings, was suppressed by the French government in 1861. It was afterwards replaced by the *Monde*, in which V. discussed religious matters in a more temperate spirit. In 1862, he published a pamphlet, under the title of *Parfum de Rome*, which was principally devoted to heaping coals of fire on the head of Cavour, and assailing the Abbé Passaglia with the bitterest objurgations. He prays, for instance, that 'his robe may become a robe of fire,' and that Heaven 'may refuse him a single tear to temper its burning.' In 1867, the *Univers* was revived. V., besides polemical pieces, has written novels, hymns, and a collection of articles under the title of *Mélanges Religieux Historiques, et Littéraires* (1857). One of the most brilliant of his productions is *Les Odeurs de Paris* (1866). In 1868, a collection of extracts from his writings was published by the Abbé Charbonnell.

VEVAY (Ger. *Vivis*), a small town of Switzerland, in the canton of Vaud, remarkable for the beauty of its situation, on the north shore of the Lake of Geneva, 11 miles east of Lausanne. It stands at the mouth of the gorge of the Veveyse, where it opens upon the lake, and where the scenery of the banks is exceedingly beautiful. From the elevations about the town, the fine view to the east commands the gorge of the Rhone, backed by the magnificent rampart of the Alps of Valais. In the church of St. Martin (date 1438), Ludlow, one of Charles I.'s judges, and Broughton, who read to him his sentence of death, are buried. The country in the vicinity, especially that between V. and Lau-

sanne, is much occupied by vineyards and orchards, and the wines of the vicinity have some reputation. Pop. (1880) 7820.

VI'ADUCT, a structure for conveying a roadway across a valley or low level, being so called in distinction from an *Aqueduct* (q. v.), which is an erection of the same description for the conveyance of water over a hollow. It is in every respect similar to an extended bridge. The great extension of railways within recent years has rendered the use of viaducts much more common than formerly. These are of every kind of construction—of wood, iron, stone, and brick work (see BRIDGE, TUBULAR BRIDGE, LATTICE-BRIDGE, &c.). A railway embankment is also a species of viaduct; but the term is limited to those structures which are more or less open, and rest upon piers. A very peculiar example is that over the Moine, near Nantes in France. The piers are all perforated by a pointed arch, which intersects the main cylindrical arches, and forms a groined roof, similar to that of a Gothic cathedral. This viaduct consists of 15 arches, and is 348 feet in length, and is all built of fine granite.



The Bollerswand Viaduct on the Great Sömmering Railway.

VIA-MA'LA, a remarkable defile in the canton of Grisons, Switzerland, is a portion of the Hinterrheinthal (see RHINE) which lies between Thusis and Zillis. The sides of the cleft, which is about two miles in length, are immense walls of rock, almost parallel to each other, and so hard that the disintegrating influence of the elements appears not to have produced the slightest effect on them, each projection on one side corresponding to an indentation on the other, almost as perfectly as at the time they were separated. The walls have a maximum height of about 1600 feet, and at various parts of the defile are not more than ten yards apart at the top. Far beneath, the Hither Rhine, compressed till it appears to one above like a mere thread, rushes like an arrow through the gorge. The first part of this defile was long deemed quite inaccessible, and had received the name of the Lost Gulf (Fr. *Trouperdu;* Ger. *Verlorenes Loch*), but in the early part of this century, a magnificent road was constructed along the whole length of the defile, from 400 to 600 feet above the river, by blasting and cutting a 'notch' in the side of the rock. The road is necessarily steep and narrow, crosses from side to side of the defile by three bridges, and is protected now by a canopy of rock overhead, and again by a wooden roofing, from falling stones and trees. So narrow is the crevasse in some places, that fallen trunks and stones are often wedged in between its sides at a considerable distance above the ordinary water-level; and on the occasion of the great flood of 1834, the river, which is generally 400 feet below the second bridge, rose to within a few feet of it, and at the same time carried of the upper bridge.

VIA'NNA, a fortified city and seaport in the north of Portugal, in the province of Minho, stands at the mouth of the Lima, 40 miles north of Oporto. It is handsome and clean, with a tolerable harbor, which admits vessels of 150 tons burden; and it carries on considerable trade with Newfoundland in salt-fish. Pop. about 9,000.

VIARE'GGIO, a town of Central Italy, in the province of Lucca, close to the shore of the Mediterranean, 30 miles south-east of Spezia. It is modern, stands in a delightful plain, and has wide straight streets. At the beginning of the present century, it consisted of only a few huts; but its climate, which is healthy and delightful all the year round, and its fine situation, have induced many rich families to settle here, and it is yearly increasing in extent. It is much frequented for bathing in summer. The vicinity is productive in olives, grapes, &c. Pop. about 10,000.

VIA'TICUM (Lat. *viaticum*, money allowed for a journey), the word applied in the ancient as well as modern ecclesiastical terminology to the communion administered to dying persons, which, in the case of the great journey to eternity, is thus quaintly likened to the money-provision made for a journey upon earth. This special ministration of the Eucharist to the dying is very ancient (see LORD'S SUPPER); it was the one exceptional case in which, during the times of rigorous canonical penance, the penitents were admitted to the communion before the completion of the appointed cycle of penance. By the modern practice of the Roman Church, it is permitted to the sick, to whom the Eucharist is administered in the form of the viaticum, to receive it, although not having fasted (as is required in all other cases) from the midnight previous. The viaticum may be given frequently during the same sickness, at intervals anciently of ten or seven days, but, by the modern practice, even daily, should it be earnestly desired by the sick person. The priest is ordered to bring the sacred elements from the church to the dying person at any hour, whether by day or by night, when he may be called on for this last service of religion.—Protestants reject the very idea of a *viaticum*, and regard the administration of the Lord's Supper in that character as superstitious.

VIA'TKA, a government of the east of European Russia, bounded on the E. by the governments of Perm and Orenburg, and on the S. by that of Kazan. Area, 59,000 sq. m.; pop. (1880) 2,620,000. The surface consists for the most part of marshes and sandy plains, varied here and there by hills. The soil, fertile only in the southern districts, is mostly a mixture of sand and clay. In the south, agriculture is effectively carried on, wheat, rye, barley, and oats being produced in abundance, as well as flax and hemp, which supply materials for the linen manufactures. The principal rivers are the Viatka and Kama (navigable throughout the whole year), and their affluents. Owing to the number of navigable streams, and to the well-regulated land-communications, the traffic of the government is successfully carried on. Horses of a fine breed are reared, but the principal source of the wealth of V. is its timber. Iron-works, distilleries, tanneries, and glass and cotton factories, are in operation.

VIATKA, a town of Russia, capital of the government of the same name, on the river Viatka, 280 miles north-east of Nijni-Novgorod. It was founded by the inhabitants of Novgorod, and was annexed to the Muscovite dukedom in 1489. The chief branches of industry are the preparation of skins and the manufacture of tallow and wax-candles. Corn is exported annually to the amount of 300,000 rubles (£46,875). Pop. (1880) 21,694.

VIA'ZMA, a town of Great Russia, in the government of Smolensk, and 100 miles east-north-east of the town of that name, on the Viazma. It is first mentioned in 1239, and, after being owned successively by the Lithuanians and Poles, it finally became Russian in 1634. In 1812, after a bloody battle between the Russian and French armies, in which the former was victorious, V. was demolished, and there are now hardly any remains of the old town. It carries on an active trade in corn, flax, hemp-seed, tallow, &c., and is the entrepôt for goods exported to St. Petersburg and Riga. V. ginger-bread is exported to all parts of the empire. Pop. (1880) 11,637.

VIBI'CES. This term is applied, in Medicine, to patches on the skin, varying in tint from bright red to violet, which occur in certain diseased conditions of the blood, and especially in purpura. They are caused by minute hæmorrhages of the capillaries of the true skin. The word is a Latin one, being the nominative plural of *vibex, -icis*, the mark of a stripe.

VI'BORG, the oldest city in North Jutland, and one of the oldest in Denmark, on a small lake, 25 miles west of Randers. Its cathedral, originally founded in the 12th c., was rebuilt in 1726. V., at which all the great highways of the interior converge, is important as a military post. Pop. (1880) 7653, engaged in the manufacture of woollen fabrics, leather, and tobacco.

VIBRIO'NIDÆ, a family of Infusoria, having an elongated or worm-like form, of which the Ear-cockle (q. v.) is an example. They derive their name from their darting and quivering motion. Some of them, as the ear-cockle, are found in living plants, others in corrupting organic matter, as the *eels* of paste and vinegar.

VIBU'RNUM, a genus of plants of the natural order *Caprifoliaceæ*, having a 5-toothed calyx, a 5-lobed, wheel-shaped, bell-shaped, or tubular corolla, 5 stamens, 3 sessile stigmas, and a one-seeded berry. The species are shrubs with simple leaves, natives chiefly of the northern parts of the world. *V. opulus* is the Guelder Rose (q. v.), or Snowball Tree, and *V. Laurustinus* is the Laurustinus (q. v.), both well-known ornamental shrubs. *V. Lantana*, sometimes called the WAYFARING TREE, is a native of the warmer temperate parts of Europe and Asia, not unfrequent in England, and often planted as an ornamental shrub. It is a large shrub or low tree, with large elliptic serrated leaves, downy, with star-like hairs on the under side. The young shoots are very downy. The flowers are small and white, in large dense cymes; the berries purplish black, mealy, and mucilaginous, with a peculiar sweetish taste, disagreeable to many, but relished by some. They are useful in diarrhœa and catarrh. Bird-lime is made from the roots in the south of Europe. The inner bark is very acrid, and was formerly used as a vesicant. The wood is white and

hard, and is prized by turners. Tubes for tobacco-pipes are made of the young shoots.—Two North American species, *V. edule* and *V. oxycoccus*, nearly allied to the Guelder Rose, produce berries of an agreeable acid taste, which are used like cranberries.

VICAR (Lat. *vicarius*, from *vicem*, i. e., *gerens*, acting in the place of another), the title given to the substitute, whether temporary or permanent, employed to act in the place of certain ecclesiastical officials, whether individuals or corporations; as of the pope, a bishop, a chapter, a parish priest, &c. Vicars take different names from these various considerations. Vicars of the pope are called 'vicars-apostolic,' and they are generally invested with episcopal authority, in some place where there is no canonical bishop. Vicars of a bishop are either 'vicars-general,' who have the full authority of the bishop all over his diocese, or 'vicars-forane' (Lat. *foraneus*, from *foris*, abroad), whose authority is confined to a particular district, and generally otherwise limited. A vicar-capitular is the person elected by the chapter of a diocese, during the vacancy of the see, to hold the place of the bishop, and to exercise all the authority necessary for the government of the diocese. The vicar-capitular, however, is not competent to do any act of episcopal order, as ordination, confirmation, &c. His power is restricted in other ways which it would be out of place to detail here. Parochial vicars are either perpetual, as in parishes which were anciently held *in Commendam* (q. v.), or which were held by religious corporations; or temporary, whose appointment may be recalled at pleasure, or after a fixed time. The name, in this sense, is sometimes given, especially in the Roman Catholic Church, to the assistant-priest, or, as he is called in England, the curate, in a parish. The functions of 'vicars-apostolic' are described under the head IN PARTIBUS INFIDELIUM.

VICE-A'DMIRAL. See ADMIRAL and FLAG-OFFICER.

VICE-CHA'MBERLAIN. See CHAMBERLAIN, LORD.

VICE-CHA'NCELLOR, a judge in equity, appointed by the crown under letters-patent, to assist the Lord Chancellor of England. The title and functions are at least as old as the reign of Henry II.; but the office long fell into disuse, and was revived by statute 53 Geo. III. c. 24, appointing one vice-chancellor. Act 5 Vict. c. 5, s. 19, afterwards appointed two more, on the abolition of the equitable jurisdiction of the Court of Exchequer. The office is ancillary to that of the Lord Chancellor, for whom the vice-chancellor is empowered to act in his absence, besides being entitled to hold separate courts. The vice-chancellor and the Master of the Rolls are now part of the Chancery Division of the High Court of Justice, each sitting as a separate divisional court. The vice-chancellors hold their office *ad vitam aut culpam*, and are not bound, like the Lord Chancellor, to resign office with the ministry.

The vice-chancellor of a university is an officer who is empowered to discharge certain duties of the chancellor, chiefly those connected with granting degrees, in his absence.

VICE-CO'NSUL, a subordinate officer, to whom consular functions are delegated in some particular part of a district already under the supervision of a consul. A British vice-consul is selected by the consul under whom he is to act, and his name is transmitted for approval to the Secretary of State for Foreign Affairs. If he is approved of, the consul is directed to furnish him with authority to act, and to impart to him instructions similar to what he himself has received from the Foreign Secretary. The vice-consul acts under the general supervision of the consul, corresponding with him in ordinary cases, but in some special cases with the Foreign Office. A consul is not at liberty to dismiss a vice-consul acting within his district without the sanction of the Foreign Secretary; but if of opinion that sufficient grounds for the dismissal exist, his duty is to give information to the Foreign Secretary, suspending the vice-consul in the meantime, if the circumstances be urgent; and in all cases awaiting the decision of the Foreign Secretary, before taking ulterior steps.

VICE'NNIAL PRESCRIPTION, in the Law of Scotland, is the limitation which is put to certain actions after the lapse of 20 years, such as actions by heirs to reduce an erroneous retour.

VICE'NZA, a handsome city of Venetia, beautifully situated at the confluence of the rivers Bacchiglione and Retrone, 42 miles west of Venice by railway. The rivers are crossed by eight bridges, one of which, a bold single arch, is attributed to Palladio, who was a native of the city, and to whose genius it is much indebted for its beauty. V. is surrounded by a moat, and walls half in ruins, and contains many fine palaces and churches. The Piazza dei Signori, a remarkably fine square, contains a lofty and slender campanile, 270 feet high, and only 23 feet wide. The Palazzo della Ragione is a handsome Gothic building, by Palladio. The Palazzo Prefettizio, by the same architect, is a rich and fanciful Corinthian edifice. The Duomo, built in 1467, is Gothic; the nave of it is 60 feet wide; and in certain of the chapels are interesting pictures. The Teatro Olimpico, the scenery of which is fixed, and represents a species of piazza, with diverging streets of real elevation, but diminishing in size, is by Palladio. V. contains a lyceum, a seminary, and a picture gallery; a library, numbering 60,000 vols., and a hospital, and many benevolent institutions. Manufactures of silk, linen, earthenware, paper, and velvet are carried on. The surrounding country, studded with mansion-houses, and rich in vineyards, is exceedingly beautiful. Pop. (1881) 24,331.

V. (anc. *Vicentia*, or, more correctly, perhaps, according to inscriptions, *Vicetia*) is a very ancient city. An inscription records its existence in 136 B.C.; and it continued to be a municipal town of some consideration, till it was laid waste by Attila, 452 A.D. It revived again under the Lombards, and became for a time, in the middle ages, an independent republic.

VI'CEROY (Lat. *vice*, in place of, and Fr. *roi*, king), a title popularly given to any officer who is delegated by a sovereign to exercise regal authority in his name in a dependency, as the Lord-lieutenant of Ireland—who, however, is never officially so styled. It was the proper official designation of the governors of Naples, Spain, and Peru, under the old Spanish monarchy. See KHEDIVE.

VICH, or VIQUE, a city of Spain in Catalonia, modern province of Gerona, on a hill-girt plain about 45 miles north of Barcelona. Its cathedral, built about 1040, but repaired and modernized about the end of the 18th c., is bold and elegant in the interior, and the Gothic cloisters are of the most rich and elegant description. Corn, fruit, and a bad wine are the products of the vicinity; and the inhabitants are employed in weaving, and in the manufacture of hats and paper. Pop. 12,100. V., the Roman *Ausa*, was afterwards called *Ausona* and *Vicus Ausonensis*, of the first part of which its present name is a corruption.

VICHY, a small town of the interior of France, in the dep. of Allier, stands on the Allier, in a fine valley, surrounded by hills clad with vines and fruit-trees, 35 miles S.S.E. of Moulins. Pop. (1876) 6154. V. is the most fashionable bathing resort in France. The springs which rise at the foot of the volcanic mountains of Auvergne (q. v.) are of the alkaline class, and the most efficacious of the kind that are known. They vary in temperature from 68° to 112° Fah., and are used both for drinking and bathing. They are resorted to in cases of indigestion, chronic catarrh, gout, &c. See MINERAL WATERS.

The virtues of the *aquæ calidæ* of this place were known in Roman times, as is testified by the numerous remains of marble baths and coins of the times of Claudius and Nero that have been dug up; but their modern repute arose only in the present century.

VI'CIA. See VETCH and BEAN.

VI'CKSBURG, a city and port of Mississippi, U. S., on the Mississippi River, 408 miles north of New Orleans, 44¼ west of Jackson, built on a collection of high bluffs. It is the chief town between Memphis and New Orleans, exporting at present as many as 200,000 bales of cotton per annum. It was strongly fortified in 1861, and provided with a large garrison. In January 1862, it was attacked by the U. S. naval forces from Memphis and New Orleans, but without success. In April 1863, a naval attack was combined with the land-forces under General Grant, who defeated General Pemberton near Jackson, cut off supplies and reinforcements from the garrison, and with a close siege and continual assaults, compelled a surrender, July 4, 1863, with 30,000 prisoners, 200 cannon, and 70,000 stand of arms. Pop. (1870) 12,443; (1880) 11,814.

VICO, GIAMBATTISTA (or GIOVANNI BATTISTA), a jurist, philosopher, and critic, was born at Naples in 1668, spent the whole of his life in that city, and died there in 1744. He was the son of a small bookseller. He was educated by the Jesuits, and afterwards studied for the bar. Weak health preventing him from following his profession, he became tutor in jurisprudence to a nephew of the Bishop of Ischia; and after filling this position for nine years, he obtained the chair of Rhetoric in the university of Naples. This office was poorly paid; but though much distinguished by persons of the highest position, V. did not succeed in getting a better one until the accession of the Bourbons in 1735, when he was appointed historiographer to the king of Naples. As he married early, and had a large family, his life was passed in great poverty, and it was, moreover, embittered by family troubles, and by constant ill-health. The great work which has made his name illustrious, the *Scienza Nuova*, first appeared in 1725; but it was completely recast in a subsequent edition, published in 1730, with the effect of making it more imposing as a system, at the expense of a great loss of clearness. A third edition, in which the work was considerably enlarged, was published in 1745, shortly after the author's death.

In the *Scienza Nuova*, V. brought together, and attempted to fuse into a system, opinions which he had previously advanced in a somewhat numerous series of separate treatises. The work was long in arriving at its proper place in European literature, which must be in a great measure attributed to its obscure and enigmati-

cal style. Much of the obscurity arises from the use of an uncouth terminology, which the author often leaves unexplained, and (in the case of the later and authoritative editions) from the rigorous application of the deductive method to subjects which do not always admit of it. The *Scienza Nuova* was virtually unknown out of Italy in 1822, when a German translation of it appeared at Leipzig. It was, a few years later, translated into French (with some curtailment) by M. Michelet (*Principes de la Philosophie de l'Histoire, traduits de la 'Scienza Nuova' de G. B. Vico;* Paris, 1827); and the author has since that found his proper rank among the most profound, original, and ingenious of modern thinkers.

The *Scienza Nuova (De' Principj d'una Scienza Nuova d'interno alla Comune Natura della Nazioni)* may be described as a *Novum Organum* of politico-historical knowledge. Observing, amid the infinite variety of thoughts and actions, of language and manners, which the history of nations presents, a constant recurrence of the same characteristics, in the political changes which peoples the furthest removed from each other in time and place have passed through, an essential similarity of development, V. proposed to himself the task of distinguishing amid social phenomena the regular from the accidental; of finding out the laws which govern the formation, the growth, and the decay of all societies; in fine, of tracing the outlines of the universal, the ideal history of society —the idea of which he himself believed to have existed from eternity in the mind of God. In doing this, he attempted, by means of historical criticism on the widest basis, to illustrate the inter-dependence of all the sciences; to show that the progress of each of them is related to that of all the others, and the progress of all of them dependent upon, while also acting powerfully upon the general condition of society. And while holding that the actual state of every society is the result of a free development of the human faculties, he attempted to give a historical demonstration of the existence of a Divine Providence directing the career of nations, overruling the designs which men propose to themselves; operating, however, not by positive laws, or arbitrary interferences, but by means of methods and expedients which men resort to freely.

It has been not inaptly said that the *Scienza Nuova* includes a system of social (as distinguished from natural) theology—a demonstration of God's government of the world, and of the laws in which that government consists. V., in these inquiries, accepted from Descartes the individual consciousness as one of the criteria of truth; but he also employed another—the collective consciousness, or the common sense of mankind—the accord of the race, as it may be gathered from history—in a word, authority.

It would be difficult to overrate the ingenuity and originality of many of the inquiries into which V. was led by the attempt to delineate the ideal history of society; and he has rarely failed to put forward views rational and probable compared with those which were accepted among his contemporaries. With a truly admirable insight, he has not seldom hit upon the conclusions to which increased social knowledge and more scientific conceptions have conducted inquirers of later generations. Thus, in clearing the ground for the foundation of his system, he was led to precisely those views about Homer and the authorship of the Homeric poems which are popularly associated with the name of Wolf; and to anticipate the general view of the credibility of early Roman history which was elaborated by Niebuhr. (See also COMTE, the germs of many of whose speculations may be found in Vico.) The beginnings of religion, the origin of poetry and language, the commencement of society (which he ascribes to the influence of a common religious belief and worship), the foundation of the privileges of the heroic or aristocratic class, are among the earlier subjects of his speculation. He proceeds to trace the origin of jurisprudence, and to show how its development has been dependent upon social changes; and he afterwards deduces from the history of ancient societies, and in some degree from the history of the governments which sprung out of the ruins of the Roman Empire, the laws which govern the progress, the conservation, and the decay of nations. A monarchy, with an equality of civil and political rights as between subjects, was his ideal of good government for advanced societies.

Though he ascribed to religion a paramount influence in forming and in conserving society, and though it was one of his principal objects to demonstrate the divine government of the world, V. did not escape the suspicion of having written in a spirit of hostility to religion. It was alleged that he had written so obscurely, as he often did, through the fear of incurring ecclesiastical censures. Some critics of another school charged him, with at least equal plausibility, of having striven, both in his particular doctrines and in his consecration of the principle of authority, to satisfy the Roman Catholic Church. The cavils made on either side, however, do not seem deserving of much attention; and it is pleasant to know that V., though not unconcerned about the accusations made against him, felt in his later years consoled for the many trials and disappointments of his life, by the completion of a work, the greatness of which he knew better than any of his contemporaries. In 1818, the Marquis de Villa Rosa published a collection of the whole of V.'s works. A second edition appeared in 1835.

VICTOR, CLAUDE PERRIN, Duke of Belluno, and Marshal of France, was born 7th December 1764, at La Marche, in the dep. of Vosges, and at the age of 17 enlisted as drummer in a regiment of artillery. He received his discharge after eight years of service as a common soldier; but re-enlisted in 1792, and having fortunately attracted the attention of Napoleon by his able conduct at the siege of Toulon in 1793, was promoted, through his influence, at the close of that year. In the Italian campaigns of 1796—1797, and 1799—1800, he commanded the vanguard, and aided by the favor of Napoleon, who threw opportunities in his way, displayed great skill and extreme daring on numerous occasions. At Marengo he maintained such an obstinate resistance for eight hours to the overwhelming numbers of the enemy, that the expected reinforcements had time to arrive, and convert the imminent victory of the Austrians into a crushing defeat.

In 1806, he commanded with distinction a *corps d'armée* in the Prussian and Russian campaigns, and though captured in 1807 by Schill's partisans, he was exchanged (for Blücher) in time to win, on the bloody field of Friedland, the baton of Marshal of France, and the title of Duke of Belluno. As governor of Berlin, he gained the esteem of the Prussians by his dignity and moderation; and in 1808, he was sent to command the first corps d'armée in Spain. Here he gained several victories, notably over Blake at Espinosa, and Cuesta at Medellin; but was defeated by Wellington in the obstinate battle of Talavera (q. v.), and again by Sir Thomas Graham at Barrosa (q. v.). After a fruitless blockade of Cadiz, he was recalled to command the ninth corps d'armée in the Russian campaign of 1812; and though occasionally defeated in his many contests with the Russians, his general conduct and success were worthy of his previous high reputation. When the allies, in overwhelming numbers, were closing round France, V. appeared prominently in the fore-front of the defence, made a valiant stand at the passes of the Vosges, and retook Saint Dizier and Brienne at the point of the bayonet; but his neglecting to occupy the bridge of Montereau was a fault which Napoleon could not pass over, and he was deposed in favor of Gérard (q. v.). Notwithstanding this disgrace, he persisted in continuing with the army, and his zeal for his country suffered no diminution, as his energetic conduct at subsequent minor combats, and at the battle of Craonne, sufficiently proved.

A severe wound which he received at this last battle brought his military career to a close; and had it chanced to be mortal, the character of V. would have stood out in bold relief on the page of history as an able soldier, a faithful friend and follower, and a sterling patriot. But though not mortal, in a physical sense, it brought death to his hitherto spotless reputation; for the sickening ardor of his professions of loyalty to the Bourbons, and his vile calumniations of the now fallen chief, to whom he wholly owed his rise, displayed the foulest ingratitude. V.'s servile attachment to Louis XVIII., however, gained him a peerage and other honors; but the readiness with which he accepted the presidency of the military commission appointed to try such of his old companions in arms as had deserted to Napoleon during the 'Hundred Days,' brought upon him merited obloquy. His subsequent career requires but brief notice: he was minister of war in 1821—1823; second in command in the Peninsula in 1823; and was afterwards accredited as ambassador to the court of Vienna. The Austrian court refused to receive him unless he laid aside his ducal title; and this question of etiquette attracted so much attention, and gave rise to so much vehement discussion, that the good understanding of the two countries was for a time endangered. After this event, V. took no part in public affairs, and died at Paris, March 1, 1841.

VICTOR-AMADEUS, the name of three sovereigns of the House of Savoy.—VICTOR-AMADEUS I., Duke of Savoy, succeeded his father, Charles-Emmanuel the Great, in 1630, and carried on the war with France; but in 1631, he was forced to surrender Pignerol, La Perouse, Angrone, and Luzerne to France, in exchange for Montferrat and Alba. He paid great attention to the internal improvement of his dominions, and re-established the university of Turin on an extended scale; but the irresistible pressure exercised on him by Richelieu, forced him into a war with the Spaniards in Italy; and after routing his opponents at Tornavento (1636) and Montebaldone (1637), he died at Vercelli, October 7, 1637.—VICTOR-AMADEUS II., grandson of the preceding, and one of the most able of princes, was born May 14, 1666, and succeeded his father, Charles-Emmanuel II., in June, 1675. Till 1680, the administration of government was in the hands of his mother, Marie Françoise of Nemours, who, in spite of the pressure of France on one side and Austria on the other, succeeded in preserving a neutral attitude in the quarrels between her two powerful neighbors. In 1684, V. married Anne-Marie of Orleans, the niece of Louis XIV.; but the overbearing insolence

of the 'Grand Monarque,' who forced him to persecute the Waldensis (q. v.), and arrogantly ordered him to contribute an auxiliary force to the French army, and give up the citadel of Turin, roused the ire of the high-spirited young duke, speedily put an end to the good understanding which would naturally have accompanied their intimate relationship, and drove him into a league with Austria and Spain against France. In revenge, a French army under Catinat assailed V.'s dominions, and though he was reinforced by 4000 Austrians under his relative, Prince Eugene, the allies were completely routed at Staffarda (August, 1690), and the victorious Catinat had completed the reduction of Savoy and Nice before the winter of 1691.

The duke, aided by considerable reinforcements from Austria and Spain, gallantly maintained the contest; but a second and much more disastrous defeat at Marsaglia (October 4, 1693), where he left 10,000 dead on the field, put almost the whole of Piedmont at the mercy of the French. The war, however, continued; the duke's obstinacy and almost romantic daring balancing Catinat's high military genius; till in the autumn of 1696, a treaty much more favorable to Savoy than to France, detached the former from the grand alliance. When the quarrel respecting the Spanish Succession (q. v.) broke out, V. took part with France—an alliance cemented by the marriage of his second daughter, Louisa Gabriele, to Philip of Anjou, the new monarch of Spain, as well as by the previous (1697) marriage of his eldest daughter (the mother of Louis XV.) to Louis, Duke of Burgundy, Louis XIV.'s grandson—and was appointed commander-in-chief of the combined armies of France and Spain; but though he was aided by the counsels of his old opponent Catinat, the Austrians, under his former ally, Prince Eugene, defeated him at Chiari (November 1701), and drove him behind the Oglio. Two years afterwards, the successes of Vendome in Italy and Villars in Germany, by bringing more prominently before his imagination the possibility of having the Bourbons for his neighbors on the east as well as on the west, along with the tempting offers of Austria and Britain, induced him to abandon France, and join the alliance against her.

In revenge for what they called the duke's treachery, the French under Vendome overran and devastated Piedmont; but with the recall of their chief, fortune deserted the French, and they were totally routed by the Duke and Prince Eugene under the walls of Turin, 7th September 1706. The duke, who had some years before retired from this contest, was rewarded by the treaty of Utrecht (1713) with the rest of Montferrat, Val-Sesia, Lomellino, and the island of Sicily, with the title of king; besides being acknowledged as heir to the Spanish throne, in case of the failure of the Bourbon dynasty. In 1720, he was made to surrender Sicily to the emperor in exchange for Sardinia. The latter portion of V.'s long reign was wholly free from foreign strife; and his restless energy was employed in improving the system of administration, thoroughly assimilating the new continental acquisitions, in replenishing the treasury, which, in spite of the British subsidy, had been drained by the long contest with France, and in encouraging agriculture and industry, especially the cultivation of mulberry trees and tending of silk-worms. Reforms and improvements were effected in the university of Turin, and several colleges founded. On September 2, 1730, the king abdicated; but attempting, in the following year, to resume the regal dignity and functions, he was arrested and imprisoned. He died at the château of Moncalieri, near Turin, 31st October 1732.—VICTOR-AMADEUS III., grandson of the preceding, succeeded his father Charles-Emmanuel III. in 1773. His reign was full of misfortune and disaster, and was brought to a close by his death in 1796, after the compulsory cession of Savoy and Nice to the French Republic.

VICTOR-EMMANUEL I. (Ital. *Vittore-Emanuele*), king of Sardinia, the second son of Victor-Amadeus III., was born 24th July 1759, and till his accession, bore the title of Duke of Aosta. He was one of the most determined adversaries of the French Revolution; and on the outbreak of war in 1792, he was chosen to command the Sardinian army, repulsed the French at Gillette, and forced his way to the mouth of the Var, but was ultimately compelled to seek shelter among the Alps. He opposed himself strongly to the conclusion of peace with France in 1796; and from this time lived in Southern Italy, and afterwards at Cagliari, whence he did not return to Turin till 1814. He had assumed the royal title on his elder brother's abdication in 1802; and the treaty of Paris restored to him Piedmont, Nice, and the half of Savoy in 1814; the treaty of 1815 added the remainder of Savoy, while the Congress of Vienna presented him with the duchy of Genoa—so that the little kingdom had profited territorially by its troubles. But the loyal delight of the Savoyards and Piedmontese at the return of their legitimate ruler was speedily quenched by the first acts of his administration. The French institutions to which they had been long enough accustomed to feel their immense superiority over the system they had supplanted, were abolished, and the old absolutism gradually restored. This change, which was no doubt to a certain extent effected by way of destroying all trace of French domination, by depriving the people of various important privileges and amenities, restoring old and hated abuses, and increasing taxation, excited wide discontent, which was heightened by the odious religious persecutions of the Vaudois and the Jews; secret societies were formed, and on March 10, 1821, a revolution broke out. The army proclaimed the constitution promulgated by the Spanish Cortes in 1812; and the king, rather than take the oath to it, resigned in favor of his brother, Charles Felix. March 23, 1821. He died at Moncalieri, near Turin, January 10, 1824.

VICTOR-EMMANUEL II., the first king of a united Italy, was the son of Charles-Albert (q. v.) of Sardinia, and was born March 14, 1820. He was a pupil of the Jesuits, but under his father's superintendence received an excellent education; and, being heir to the throne, he commanded, in accordance with an old custom of his House, the brigade of Savoy in the campaign of 1848—1849, and displayed great gallantry at Goito and Novara. On the evening of the latter battle, his father, seeing the hopelessness of the struggle, and unwilling to bow to the onerous conditions offered by Radetsky, abdicated in favor of V., who, being the husband of the Archduchess Adelaide (the cousin of the Austrian emperor), and uncommitted to the views of the Italian Ultra-democrats, might hope to obtain more favorable terms from the victor. V. thus ascended the throne of Sardinia, 23d March 1849, and restrained effectually, for a time, the enthusiasm of the more ardent among the national party, though, on the other hand, he maintained, with the utmost fidelity, the provisions of the liberal constitution granted by his father. He made a happy choice of ministers in such men as Cavour, D'Azeglio, &c.; whose policy it was to increase the strength and importance of the country by improved administration, rigid economy in the finances, care of the army, and encouragement to trade by the conclusion of commercial treaties with foreign nations. They saw too clearly that, despite the intense and almost unanimous desire for unity throughout Italy, a contest single-handed with Austria was utterly hopeless, and preferred, till a more convenient season, to seem to renounce all idea of any such project.

The property of the state was sold, and various measures calculated to greatly diminish the privileges, and restrict within moderate limits the inordinate influence of the clergy, adopted—changes which brought upon the king the thunders of the Vatican; but V., nothing daunted, protested by a vigorous 'memorandum,' and more obstinately asserted and maintained his independence of the papacy. The revolt at Genoa was sternly suppressed; but the king and his ministers were, in secret, by no means displeased to see that the feeling of nationality was still vigorous; for, following the traditional policy of the House of Savoy, he was only biding his time to 'descend with the valley of the Po,' and swallow 'another leaf of the artichoke.' With the view of improving his position in Europe, and gaining a place at its council-board, he sent an army of 17,000 men, under La Marmora, to take part in the Crimean war on the side of Turkey; and visited (1855) in person, the courts of Paris and London, being received by French and English with great enthusiasm. After the peace of Paris (1856), he entered into a closer alliance with France, gave his elder daughter Clotilde in marriage (30th January 1859) to Prince Napoleon, and backed by the French arms, provoked a war with Austria. The campaign was brief but decisive—the Austrians were routed in every battle, and the Italians were hailing with exultation the near approach to fulfilment of their long-cherished dreams of unity, when the suddenly concluded peace between France and Austria at Villa-Franca dashed their hopes to the ground.

The Milanese (minus the fortresses of Mantua and Peschiera) only was added to the Sardinian monarchy, and for this the king ceded Nice and Savoy (the cradle of his race) to France as the price of its alliance. But the people of Central Italy refused indignantly the offer of Prince Napoleon as their sovereign; and Tuscany, Modena, Parma, and the Romagna, renouncing their allegiance to their respective sovereigns, voted for annexation to Sardinia, and were formerly adopted by V. as his subjects. This was a greater advance towards the unification of Italy than the French emperor wished, and accordingly, V., who was still dependent on his ally for safety, though secretly favorable to Garibaldi's expedition to Sicily, disavowed all knowledge of this project, and after the island was conquered without a blow being struck by a single Sardinian soldier, forbade the 'Italian Liberator' to pass over to the continent; yet he subsequently, with the consent of Napoleon III., sent an army to aid Garibaldi in conquering Naples, and formerly accepted the sovereignty of the Two Sicilies. But in 1862, Garibaldi, thinking that the conquest of Rome in the same way would be equally acceptable to his sovereign, returned to Sicily, raised an army of volunteers, and was rapidly advancing on the ancient capital, when V., forced by France, put an end to the expedition by capturing Garibaldi and his army at Aspromonte. Though proclaimed by the Senate and

House of Deputies *King of Italy* in February 1861, V. prudently postponed all attempts to annex Rome and Venice; and directed his attention to the internal affairs of his kingdom, which was much distracted by the intrigues of the sovereigns whom he had supplanted.

At length, in the quarrel between Prussia and Austria for supremacy in Germany, appeared his opportunity; and an offensive and defensive alliance with Prussia was followed by an Italian invasion of Venetia (June 1866). The Italians were defeated in the bloody battle of Custozza; but the disasters which befell Austria in her simultaneous contest with Prussia, forced the Austrian empire ultimately to surrender Venetia. In August 1870, after the outbreak of the war between France and Germany, the last detachment of the French garrison which had occupied Rome since 1849 was withdrawn; the imperial city, finally united to the kingdom, became the capital of Italy and the seat of V.'s court. The last years of V.'s life were uneventful. He died after a short illness, 9th Jan. 1878, and was succeeded by his son Humbert.

VICTORIA I., Queen of the United Kingdom of Great Britain and Ireland, daughter and only child of Edward, Duke of Kent, 4th son of George III., was born at Kensington Palace, May 24, 1819. Her mother, Victoria Mary Louisa, was 4th daughter of Francis, Duke of Saxe-Coburg-Saalfeld, and sister of Leopold, late king of the Belgians. Her first husband, the Prince of Leiningen, died in 1814; and on the 11th July 1818, she married, at Kew, the Duke of Kent. The duke died January 23, 1820, leaving his widow in charge of an infant daughter only eight months old, who had been baptized with the names of Alexandrina Victoria.

The Duchess of Kent fulfilled the important duties which devolved upon her with more than maternal solicitude, and with admirable care and prudence. The infant princess, as she grew up, was taught to seek health by exercise and temperance, to acquire fearlessness even from her amusements, such as riding and sailing, and to practise a wise economy united to a discriminating charity. After a few years, the Duchess of Northumberland was associated with her mother in her nurture and education. The Princess V. became accomplished in music, drawing, and the continental languages; and acquired a knowledge of some of the sciences, particularly botany. Her father having belonged to the Whigs, her political education was naturally derived from the members of that party; and to Viscount Melbourne (q. v.); belongs the credit of having thoroughly instructed her in the principles of the British constitution. She ascended the throne of the United Kingdom on the demise of her uncle, William IV. (q. v.), June 20, 1837; her uncle, the Duke of Cumberland, becoming king of Hanover, in virtue of the law which excludes females from that throne. By this event, the connection which had lasted for 123 years between the crowns of England and Hanover was terminated. Victoria was proclaimed June, 1837, and crowned at Westminster, June 28, 1838. She found on her accession Viscount Melbourne at the head of the government; and during his premiership, and with the cordial assent of her subjects, the young queen was married at St. James's Palace (February 10, 1840) to Prince Albert (q. v.), Prince of Saxe-Coburg and Gotha, and second son of the then reigning duke.

Her Majesty has had issue—four sons and five daughters; the Princess Royal, Victoria, born November 21, 1840, married, Jan. 25, 1858, to Frederick William, now Crown Prince of Prussia, and Prince Imperial of Germany; Albert Edward, Prince of Wales, heir-apparent to the throne of the United Kingdom, born Nov. 9, 1841, married, March 10, 1863, Princess Alexandra, eldest daughter of Christian IX., king of Denmark; Princess Alice, born April 25, 1843, married, in 1862, Prince Frederick William of Hesse (died Dec. 14, 1878); Prince Alfred, born August 6, 1844, created Duke of Edinburgh 1866, married, Jan. 23, 1874, Marie, only daughter of the Emperor of Russia; Princess Helena, born May 25, 1846, married in 1866 to Prince Christian of Denmark; Princess Louisa, born March 18, 1848, married in 1871 to the Marquis of Lorne; Prince Arthur, born May 1, 1850, created Duke of Connaught 1874, married in 1879 Princess Louise Marguerite of Prussia; Prince Leopold, born April 7, 1853, was created Duke of Albany in 1881, and married to Princess Helena of Waldeck in 1882; Princess Beatrice, born April 14, 1857.

The changes of administration in this reign may be traced in the articles GREAT BRITAIN, MELBOURNE, PEEL, RUSSELL, DERBY, ABERDEEN, PALMERSTON, GLADSTONE, DISRAELI. The legislative measures of greatest importance were the establishment (1840) of the penny-postage (see POST-OFFICE); the Amendment of the Poor Laws (q. v.) in Scotland (1845) and Ireland (1847); the Abolition (1846) of the Corn Laws (q. v.), and (1849) of the Navigation Laws (q. v.); the Irish Encumbered Estates Act (see TITLE, &c.); the transfer (1858) of the Indian possessions from the East India Company to the crown (see INDIA); the admission (1858) of Jews into the House of Commons; the Reform Act of 1867; Disestablishment of the Irish Church (1869); the Irish Land Acts (1870 and 1881); the Abolition of Purchase in the Army (1871); the Elementary Education Act for England (1870), and the Scotch Education Act (1872). See NATIONAL EDUCATION. Other events which will signalize this period of British history were the formation of the Free Church (q. v.) of Scotland (1843); the discovery of the North-west Passage (q. v.) by Sir Robert M'Clure (1850); the Exhibitions (q. v.) of 1851 and 1862; the discovery of gold in Australia (q. v.) and in British Columbia; the war (1854—1856) with Russia (q. v.) in defence of Turkey (q. v.), in which the siege of Sebastopol was the chief item; the Indian Mutiny in 1857 (see INDIA); the Volunteer (q. v.) movement (1859); the establishment (1866) of telegraphic communication with America (see TELEGRAPH); the Abyssinian War, 1867 (see THEODORE); the formation of the Dominion of Canada, 1867; the wars with Ashantees (1873), Zulus (1879), and Afghans (1878–80), the rising in the Transvaal; the agitations in connection with the Fenian Society (q. v.), Home Rule (q. v.), and the Land League; the passing of the Land Act (1881); and the war in Egypt (1882).

In 1848, the only disturbance in Britain was a Chartist demonstration (see CHARTISM); while, during V.'s reign, France (q. v.) has been successively a constitutional monarchy, a republic, an empire, and again a republic. The great civil war in the United States of America (q. v.) has resulted in the extinction of slavery; the formation of the kingdom of Italy (q. v.) has been completed by the acquisition of Venetia and Rome; the unification of Germany, begun by the formation of the North German Confederation, as the result of the war between Prussia and Austria in 1866, has been consummated by the events of the Franco-Prussian War (1870—1871); and the ever formidable 'Eastern Question,' raised again in 1876 by the insurrection in Herzegovina led in 1877 to war between Russia and Turkey, and to sweeping changes in the Balkan Peninsula (see TURKEY).

In 1876, 'Empress of India' was added to the royal titles of Queen V. The premature death of the Prince-Consort (see ALBERT) on December 14, 1861, caused the Queen to seclude herself for several years from public life. Queen V. has published two volumes—*The Early Days of His Royal Highness the Prince-Consort;* and *Leaves from the Journal of Our Life in the Highlands* (1869).

'In Queen Victoria,' according to Macaulay, 'her subjects have found a wiser, gentler, happier Elizabeth.' No former monarch has so thoroughly comprehended the great truth, that the powers of the crown are held in trust for the people, and are the means, and not the end of government. This enlightened policy has entitled her to the glorious distinction of having been the most constitutional monarch this country has ever seen. Not less important and beneficial has been the example set by her Majesty and her late Consort in the practice of every domestic virtue. Their stainless lives, their unobtrusive piety, and their careful education of the royal children, have borne rich fruit in the stability of the throne, and have obtained for the royal family of England the respect and admiration of the civilized world. See Theodore Martin's *Life of the Prince Consort* (vols. i.–iv. 1873–79).

The progress made by the nation in the various elements of civilization, especially in that of material prosperity, has been unparalleled (see GREAT BRITAIN); and perhaps during no reign has a greater measure of political contentment been enjoyed.

VICTO'RIA, although one of the youngest, and, in point of area, the smallest of the colonies of the Australasian group, is already the most important. In extent of commerce, indeed, it takes precedence of all other colonies—India alone excepted. The extreme modernness, so to say, of the Australian colonial picture is one of its most striking features, for it belongs emphatically to the present generation. Men who are still in middle life may recollect when the Port Phillip Settlement—the name first given to V.—had no existence; and those are not yet very old who may remember when even the geographical outline of Australia was incomplete, and when the great harbor of Port Phillip now the busy scene of the world's commerce, was undiscovered and unheard of.

Geographical Position and Extent.—V. comprises the south-east corner of Australia, at that part where its territory projects furthest into cool southern latitudes. Wilson's Promontory, to the south-east, the most southerly headland, just passes the 39° of S. lat.; while the most northern point, which is at the opposite or north-west extreme, is in S. lat. 34°. The long. comprises 9°—between 141° and 150° E. of Greenwich. To the W. is the colony of South Australia, separated by the 141° of E. long.; to the N. is New South Wales, separated by the line of the Murray River eastwards from 141° E. long. to its source, and thence by a straight line south-east to Cape Howe; and from Cape Howe to South Australia, again, the colony is bounded on the S. by Bass's Strait. The extreme length is east and west, and is about 480 miles, by an extreme width, north and south, of 250 miles. But a remarkable indentation of both the north and south boundary opposite

each other, about the middle of the colony, reduces the breadth between the head of the Port Phillip inlet and the Murray to only 120 miles. The superficial area is 56,446,720 acres, or 88,198 sq. miles.

Physical Aspect.—Although V. may be called mountainous, as compared with the general flatness of Australia, it has much of the quiet and peculiar scenery characteristic of that division of the world. Vast naked plains are deviously traversed by broad and deep river-channels, which are mostly, however, mere chains of ponds, if not altogether dry, excepting in winter and spring, or after heavy showers. Overspread, in cool and moist seasons, with brilliant verdure, the drought and heat of summer quickly convert the grass into a natural hay, which, in the scarcity of sustenance from its ceasing to grow in that condition, is eaten off to the very roots by the sheep and cattle, leaving the surface a bare and blackened mass. The 'open forest' is another and very pleasing variety of scenery characteristic of Australia, and largely prevalent in Victoria. It distinguishes the gently undulating country of the better soils, whose surface is overspread by large trees, chiefly of the red gum (*eucalyptus*) and silver wattle (*acacia*). The trees being widely apart and of spare foliage, and the surface free from underwood, there is commonly a good growth of grass, the whole presenting a charming and park-like aspect, although felt to be somewhat tame and monotonous, especially under the great defect of most Australian landscapes, the general want of water.

Mountain and forest prevail most in the east division, where the Australian Alps of Gipps' Land, the loftiest of Australian chains, culminate in peaks ranging from 1000 to 7000 feet above the sea. The west district, on the other hand, is chiefly remarkable for its numerous isolated hills of voleanic origin, some of them with craters still perfect, which probably have not, in a geological sense, been very long at rest. To this extensive volcanic system, V. owes the large proportion of its good arable land, as compared with the light sandstone and granitic soils that prevail elsewhere in Australia. The chief rivers, besides the Murray and its branches (elsewhere treated of), are the Snowy River, the Tambo, the Mitchell, the MacAllister, and the La Trobe—all of Gipps' Land; the Yarra-Yarra, the Goulburn, the Loddon, the Wimmera, the Avoca, the Wannon, the Ovens, the Hopkins, and the Glenelg, of which rivers, however, several are not perennial streams. The Australian fauna is very remarkable; notably the kangaroo or pouched family, and the emu or great wingless bird. There are besides the *echidna* and *platypus*, of quite a different family, and even more singular in structure, especially the last, as indicated by its other name of *Ornithorhynchus paradoxus*. The dingo, or native dog, is remarkable as a non-marsupial exception, on which account it has been regarded as an introduction by human agency. But several years ago, Professor M'Coy of Melbourne met with its fossil remains associated with those of extinct animals, and in deposits that, although recent, geologically speaking, are in other respects so remote as to establish this animal's indigenous claim.

Climate.—This is on the whole healthful and agreeable, but subject to frequent and sudden change in condition and temperature. The average temperature of the year is between 57° and 59°, or about 9° above that of London, and 11° above that of Edinburgh. The common summer-heat is from 65° to 80°, with an occasional advance to 90° and even to from 100°–108°, during hot winds and a dry season. The winter-range is mostly from 45° to 60°. Ice occurs in the midwinter of July, but it rarely, except on elevated ground, survives the noonday sun. Every few years, an unusually severe season will cover the higher levels, and even the country generally, with snow, to recall to the colonists the familiar scenes of ancestral homes. The cold of winter is keenly felt, and household fires are not uncommonly indulged in for even six months of the year, especially in the morning and evening.

Civil and Political Divisions.—Victoria is divided into four districts and 37 counties, the principal counties being Bourke, Talbot, and Grant. Prior to 1848, there were but three counties, the still existing Bourke, Grant, and Normanby, laid out in 1837, along with the sites of several chief towns, when the infant settlement, then but two years old, was officially taken charge of by the New South Wales government, within whose jurisdiction the territory was then comprised. One chief object of the counties was to distinguish by certain special regulations the more accessible and valuable of the colonial lands, leaving the remainder (the districts) to pastoral or squatting uses. But the subsequent discovery of the gold-fields in 1851 interfered with this arrangement, as the new condition created towns and markets indiscriminately in county and district.

Squatting is still an important colonial vocation, second only to gold-mining, and still pursued over most of the colonial area. The electoral districts, in general, coincide (but not always) with county and municipal divisions. This is the case for the Assembly, but for the Council or Upper House there is (since 1882) a division of the colony into fourteen districts. For the purpose of local self-government, there are, besides counties, some 60 cities, towns, and boroughs, and about 120 'shires.' These are incorporated under the Local Self-government Act of 1874.

History.—The distinction of first settling V. is due to the Messrs. Henty of Launceston, Tasmania, who occupied the south-west part at Portland Bay with some flocks of sheep in 1834. But the settlement that mainly influenced the future was that of the following year upon the shores of Port Phillip. This enterprise also was from Launceston, first in May and June by a small party under Batman, which occupied Indented Head, on the west side, 15 miles inside the harbor; and again in August following by another party sent forth by Fawkner, he himself having been detained a short while longer by sickness. This last party passed on to the head of Port Phillip, ascended the Yarra, and settled upon the site of the present capital, Melbourne. The story of the subsequent progress is marvelous even in an age of marvels as to colonies. When the gold mines were discovered, the settlement, after 16 years' existence, had a colonial population of 80,000, of whom nearly one-third were in the capital. Thenceforth for several years the advance has scarcely been paralleled. The imports, exports, and the public revenue increased tenfold.

In 1856, Melbourne had become a city of great wealth and commerce, containing 100,000 inhabitants, while the colony comprised above 400,000. Although the race has since been at a more leisurely speed, Melbourne has continued to advance, and in 1881 the pop. had increased to 280,836. See MELBOURNE. Some interior towns, besides, are rising to importance, in particular Ballarat. Geelong, with 21,157 of population, finely situated on the western arm of Port Phillip, was long second only to Melbourne, but is now surpassed by Ballarat (with 38,469) and Sandhurst (with 28,128), the two principal gold-field towns of Victoria. The pop. of V. in 1871 was 731,528, of whom 330,478 were females; in 1881 the pop. was 849,434.

V., while a part of New South Wales, was termed the Southern or Port Phillip District of that colony. As early as 1840, an agitation for separation, and a government independent of that of New South Wales, began, and was ended successfully in 1851, when the new colony received the name it now bears. The title of Lieutenant-governor was then given to the Queen's representative in this colony as well as in others adjacent, the Governor-general being in New South Wales. But the rising importance of V. led to this distinction being discontinued some years afterwards. This importance indeed expedited, to these colonies, their concession of self-government, which was inaugurated in the years 1854—1856, with very lively demonstrations on the part of the colonists, who have since shown no want of interest or earnestness in the charge of their own affairs. During this last brief term, although the progress, in point of population, owing to diminished immigration, has been unimportant, there has been a very marked advance in the improvement of the colony generally, and of the arts and industries and amenities of social and commercial life.

At the Great International Exhibition of 1862, V. stood at the head of the entire colonial department; and in less than twenty years this enterprising colony held an international exhibition on a large scale in its own capital (1880–81), which was visited by over a million of people.

Population, Colonists.—The population of V., in common with that of the other members of the group, is in the main English, in the wider sense of the word. The whole foreign element, including Germans and Chinese, does not exceed one-tenth. Of that proportion, the Chinese, whose sudden irruption into the colony, above 20 years ago, was at once one of the many novelties, as well as one of the doubtful benefits resulting from the world-wide fame of the gold-fields, now number 12,000. The Germans are the only other foreign element of any noticeable strength. They began to arrive in 1849, Australia having become favorably known to them by a considerable preceding emigration to Adelaide. They have proved, on the whole, an advantageous immigration, for although slow to adapt traditional usages to their new circumstances, they have set a commendable, and often a much-needed example of frugality, industry, and sobriety. The various divisions of the United Kingdom contribute somewhat rateably their quota to the colonial population. The census of 1881 gave the numbers in connection with the various denominations (in a total pop. of 849,434) as follows: Church of England, 299,652; Presbyterians, 132,591; Methodists, 108 303; Independents, 19,878; Roman Catholics, 203,480; Baptists, 20,373; Lutherans, 4859; Jews, 4330. There are in the colony 3320 churches, chapels, and other buildings used for public worship.

Natives.—By the census of 1881, the aborigines were found to number 770, consisting of 461 males and 309 females. In 1871 there were still 1333 natives. The number when the settlement began is usually stated to have been 6000, although probably much larger, seeing that Tasmania, only one-fourth of the extent, is supposed to have contained 5000. But that is a point about which we can now only conjecture. The native is fast dying out from the colonized area. The progress of colonization has been utter destruction to his prospects. Philanthropic and Christian

efforts on his behalf have not been absolutely barren. Mission stations in Gipps' Land, conducted by the Church of England and the Presbyterian Church, have diffused the influences of civilization and religion to a considerable proportion of the survivors. These missions are under the immediate supervision of Moravians, and aim a little at the culture and preservation of the race, not without some evidences of success.

Commerce.—The two staple articles of export from the colony are wool and gold. The exportation of the former in the year 1880 was valued at £6,507,765; of the latter, at £3,887,534—the latter a slight increase as compared with the previous year. After the gold discoveries in 1851, there came an extraordinary commercial development. For that year, the imports had been £1,056,437, and the exports £1,422,909. In 1854, the amounts were respectively £17,659,051 and £11,775,204. But this sudden extension—at least as regarded imports—was not maintained, because it was due, in part, to a temporary extravagance, and partly because the colony has since then been successfully organizing its industry, so as to produce cheaply, and partly by the introduction of a heavy protective tariff. For 1880 the imports were £14,556,894; the exports, £15,954,559. In 1880, the shipping entries amounted to 2,179,899 tons—namely, inwards, 1,078,885; outwards, 1,101,014.

The gold production of V. has gradually diminished from £12,000,000, to which it rose in 1856, to a little less than £3,200,000 in the year 1877. This diminution is partly made up to the world by the greatly increased gold-mining of late in New Zealand and New South Wales. The yearly production of all these colonies is now about £7,000,000, distributed thus: V. 4; New South Wales, ½; Queensland, 1; New Zealand, 1½. The greater part of this gold is usually sent direct to Britain, but the proportion is very irregular, depending on the state of the exchange with India. Thus, while in 1873, £9,444,495 was received in England, in 1876 it was only £4,956,777, and the following year £6,655,438. The exportation of articles, the produce of this country, to V. amounted for 1880 to the value of £4,963,160; and the exports from V. to Great Britain were £6,818,886. A little coal is produced in the colony.

The chief colonial vocations are squatting or pastoral pursuits, agriculture, and latterly, gold-mining. The first-mentioned was the earliest that rose to importance; but the last has rapidly outrivaled every other. Agriculture, at first dwarfed by the success and influence of squatting, and for a time impeded afresh by the social upturning during the first years of gold-mining, is now, however, rapidly extending, and is improving, socially as well as physically, the aspect of the country.

Squatting.—This colonial term has long since passed from its originally semi-savage and outcast associations, to represent in Australia a rural aristocracy. The squatter, using the country just as he found it, placed upon it his live-stock, which lived and throve on the natural herbage. This ready adaptation of the surface, with comparatively little of preliminary outlay, is the chief cause of Australia's rapid progress. At first, the pastoral 'stations,' or 'runs,' as they were then very appropriately called, were unenclosed areas, parceled out to a small number with a very bountiful hand, and at a nominal rent or occupation license-fee. Now, however, these areas have been much subdivided, and much has been done in enclosing the runs with stout fencing. By a late official return, there were in V. 701 different stations, comprising an area of 17,183,843 acres, and contributing to the revenue a yearly rental of £104,843. The rate is from ¼*d.* up to 8*d.* per acre, according to a valuation of pastoral capability. In 1880, there were in the colony 216,710 horses, 1,129,358 head of cattle, 8,651,775 sheep, and 144,733 pigs.

Agriculture.—Comparatively little was accomplished in this branch for 25 years, until 1860, when the government began to increase the facilities for acquiring and cultivating the public lands. In 1861, there were but 180,000 acres under the plough; in 1878, the extent of land under tillage was 1,420,502 acres. Comparing the returns of 1877–78 with those of the previous year, it appears that 2391 new holdings had been taken, 255,569 acres of land purchased, and 189,397 additional acres brought under tillage. In the latter year 97,376 hands were employed on farms, 5488 on stations. The dry climate of Southern Australia seems favorable to the quality of wheat; and the Victorian samples at the Great Exhibition of 1862 ranked amongst the very best. The wine-produce for 1880–81 was 487,066 gallons. Vine-culture rapidly extends, and wine-making is now general.

Manufactures.—The manufacturing industry of the colony is extending, and presumably in its interest a heavy protective tariff is maintained. In 1880, there were in V. 1709 manufacturing establishments, employing 29,194 hands. A branch of the Royal Mint was opened in 1872. Meat-preserving is carried on on a large scale; very large paper-mills have lately been built near Geelong.

Gold-mining.—This may now be termed one of the skilled labors of the colony; but it is not by any means, on an average, among the most remunerative. Of the two great branches of mining—viz. (1), the crushing of the auriferous rock for the washing out of the gold, and (2) the washing from the débris or 'drifts' which nature has already pounded down—the latter, as a simpler process, was at first the most general, but lately the other has been increasingly followed.

Railways.—The system is more extensive and complete than in any of the other southern colonies. At the end of 1880 there were 1199 miles of railway open for traffic, and 487 miles in construction.

Finances.—The public revenue is derived mainly from three different sources—customs dues, excise, land sales and rents, and public works. The total revenue of V. for the year 1880—1881 amounted to £5,115,121. The chief items were — customs, £1,481,018; excise and inland revenue, £508,805; land sales, £833,146; public works (chiefly railway receipts), £1,700,464. The estimated revenue for the year ending June 30, 1880, was £5,241,544. The income is generally ample for all expenses. The outstanding public debt amounted in 1880 to above £20,000,000; about £16,000,000 of which was incurred for railways, all of which now belong to the State, traversing the colony from Port Phillip to the river Murray. The remainder is the cost of water-supply to Melbourne and other parts of the colony, and of aids to Melbourne and Geelong for town improvements. This debt exists in the form of debentures, nearly all bearing interest at 6 per cent., and due at various terms up to 1891. These debentures are nearly all, excepting about one million, held in this country, and are well known in the London market, the chief stock being 'The Railway Loan' of £7,000,000.

Taxation, according to the revenue accounts, amounts to a little over £5 per head. Deducting, however, the revenue from railways and from the sales of land, the amount per head is reduced by one-half, bringing it to about the same as in this country, although more equally distributed, owing to the greater equality of condition among the colonists, and more equal consumption of articles subject to customs dues. The customs revenue is derived mainly from strong drinks and tobacco. There are also moderate duties on sugar, tea, and coffee, and various other articles. Municipal and road-district taxation are additional.

Political Institutions.—The self-government conceded to V. and the adjacent colonies gives them a responsible system similar to our own. The governor represents the sovereign, who appoints him; and he governs by ministries, who are of the crown's, that is, of the governor's nomination, but who must possess the confidence of parliament. There are two houses of legislation, both in V. being elective—the Council or Upper House by a high and special qualification; the Assembly by manhood suffrage without any qualification for members. Elections are by secret ballot. The term of the governorship is usually seven years. The present salary of the office in V. is £10,000 a year; and in the expensive times more immediately succeeding the gold discoveries it was £15,000.

Judged by the criterion of salary, the Victorian appointment is the most important of the colonial list, excepting the governor-generalship of Canada (which is of the same value), and the governor-generalship of India. The salary is paid wholly by the colony; but by a recent imperial act, the home government allows moderate pensions to retired governors, according to the term of service—a measure that had been called for in face of occasional reverses of fortune to the later life of persons who had previously represented royal splendor.

Religion.—The divergence of our self-governed colonies from home example is perhaps most striking in two very important subjects—religion and education. In religion, as in politics, the tendencies are towards a complete equality, and therefore opposed to the privileges involved in church establishments. In this respect, change of scene, and equality and independence of condition, sensibly weaken the strength of tradition and usage as exhibited in the senior country. All religious bodies, therefore, stand alike before the civil power, none having any coercive jurisdiction except such as its own members voluntarily impose upon themselves, either by their own rules, or by a special act solicited from the colonial legislature. In V., until lately, there was a yearly donation of £50,000 from the public revenue to the support of religion. It was distributed rateably among the sects, Unitarians and Jews included, and was 'scheduled'—i. e., not subject to yearly vote—under the Constitution Act. This system, introduced into Australia as a substitution for the preceding Church of England supremacy, terminated in 1875.

Lately, the public feeling had tended to a disapproval of the system of indiscriminate support to religion, and some of the smaller bodies had altogether rejected it. The state aid was therefore abolished in some of the colonies. In V., the Assembly had repeatedly passed an abolition act, which, however, the Council negatived. Ultimately, a few years ago, a bill passed both Houses, whereby the grant in aid to religion wholly ceased in 1875.

Education.—The energy displayed on this subject by the popular administrations of our self-governed colonies, and the tena-

cious persistence with which they encounter the problem of the education of the whole people, are among the best results presented to us by these young offshoots. Under the preliminary 'imperial régime' of colonial public life, the comparatively neglected field as to education is taken up, and with creditable zeal, by the various clergy, who institute, of course, the denominational system. But essential difficulties stand in the way of the successful importation of a general education under this system. A national system, to compete with the previously established denominational, had been introduced into New South Wales and V., with the advent of the partially representative legislatures that for about twelve years preceded the present self-government. National and denominational, each conducted by a separate board of management, were alike aided by the state. The institution of a partially national system, and of a single board, was carried in the Victorian legislature in 1862. That system was in effect, that all state-assisted schools must be open to the children of all religious bodies, and that four hours daily of secular teaching be imparted to every pupil. This arrangement, on experiment, was unsuccessful.

Schools still remained in connection with the several denominations; denominational school committees controlled the election of teachers, who were also permitted to impart religious instruction where desired. As a result, schools were unnecessarily multiplied in some localities, and the money of the state was wasted in their support. After various attempts to establish a system of state schools unconnected with any denomination—attempts which several of the religious bodies combined to defeat—the Victorian government at last succeeded in overcoming all difficulties, and a bill passed both Houses of the Legislature which completely establishes a national, as opposed to a denominational system of education. The total number of public schools in V. is (1880) 1533, with an attendance of 227,775; 568 private schools, with 34,824 scholars; besides 6 grammar schools, various colleges, and the Melbourne University.

Remarks to Emigrants.—Intending emigrants should understand that V. is no longer a new and scantily-peopled territory, with all the superabundant employment and means of subsistence that are readily found now-a-days on such a scene by help of the arts and implements of an advanced civilization. There are now in the colony the advantages of a settled society, having much of the amenities of home-life; but, on the other hand, the colonial vocations are tolerably filled up by the increasing population, so that the unsuitable or the inexperienced have hardly any better chance out there than at home. It is owing to considerations of this kind that the system of free or assisted emigration—a system still maintained to a limited extent by the colony—has been latterly conducted upon very strict principles; the object being that persons unsuitable to the colony may, as far as possible, be prevented from going there.

The system of granting free passages has, on the whole, been recently discouraged by the legislature and government of V., where the influx of the home poor is dreaded. Both free and assisted emigration is for the present wholly suspended. Laborers, mechanics, and artisans used to obtain assisted passages by what are known as passage warrants, issued to residents in the colony, on making the following payments to the colonial government: For each male under 15 years of age, £4; between 15 and 40, £8; above 40, £9: for each female under 15, £3; between 15 and 40, £4; above 40, £5. The warrants, available for nine months after issue, had to be forwarded to the emigration agent of the Victorian government. Owing to depression of trade, emigration, free and assisted, has been wholly or largely suspended; demand for labor is small. Female domestic servants usually have high wages. Steady-going working-men, agricultural and farm laborers, are specially serviceable in a colony like V. Self-reliance, steadiness, and good conduct are essential requisites to success in all the colonies; with these, no working-man of the special classes referred to can fail to better his position, and add to the comforts and happiness of life. There is special encouragement to female emigration. As a general rule in V. at present, wages and remuneration generally are one-third or one-fourth higher than in this country; while the chief requirements of life are, one with another, at about the same price as they are here. House-rent is rather higher, while butcher-meat is cheaper, and other necessaries about equal.

The climate is, as a whole, highly enjoyable, with its bright skies and sunshine; but to working-men, six months of the year (from the middle of October to the middle of April) will be found somewhat oppressive for great physical toil—a consideration no doubt present to the working-classes of the colony in connection with their successful introduction of an eight hours' labor system. There are now more facilities than the colony formerly enjoyed for acquiring land at a reasonable price; and the climate has been found quite suitable for the cultivation of all the cereal crops of this country, as well as the grape and other fruits, the gift of a temperature more genial than that of England.

VICTORIA, a town in Vancouver's Island, capital of the province British Columbia, in the Dominion of Canada, stands at the south-east extremity of the island. The entrance to the harbor is shoaly, narrow, and intricate, and at no state of the tide can admit vessels of over 17 feet draught. V. was originally a trading establishment or fort of the Hudson Bay Company, and has risen into importance only within recent years, when gold was first discovered in British Columbia. It is a free port; and considerable commerce is carried on. Pop. (1881) 5925. See VANCOUVER'S ISLAND.

VICTORIA, a seaport of Brazil, capital of the province of Espiritu Santo, stands on a bay of that name, 270 miles north-east of Rio de Janeiro. It has a good harbor, an active coasting-trade, and about 6000 inhabitants.

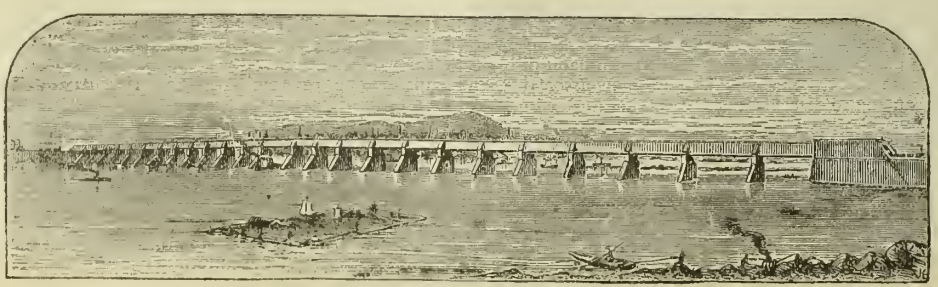
VICTORIA, a genus of plants of the natural order *Nymphæaceæ*, resembling the common water-lily, but most nearly allied to the genus *Euryale*, and distinguished from it particularly by the deciduous tips of the calyx, and the sterility of the innermost stamens. Only one species is yet known, *V. regia*. This is said to have been first observed by Hänke, about 1801, and afterwards to have been seen by Bonpland, D'Orbigny, and others. It was first described in 1832 by Pöppig, who observed it in the river Amazon; and it has since been found by Schomburgk and others in many rivers of the north-east of South America. Its leaves are orbicular, float upon the water, and attain a diameter of 5—6 feet; have the margin turned up, and about two inches high; are of a purplish color on the under side, and there exhibit a sort of wicker-work of very prominent veins, furnished with prickles. The flowers rise amongst the leaves upon prickly stalks. They are more than a foot in diameter, white, internally rose-colored, and are very fragrant. The fruit is a capsule, almost globose, with a depression on the top, about half the size of a man's head,



Victoria regia, flower and leaf.

fleshy within, and divided into numerous cells, full of round farinaceous seeds, which are an agreeable article of food. The plant is therefore called *Maïs del Agua*, or Water Maize, in some parts of South America. To the cultivation of this plant, special hothouses have been devoted in some places in Britain, and elsewhere in Europe. It has been introduced into India from seeds produced in England.

VICTORIA BRIDGE, across the St. Lawrence at Montreal,



Victoria Bridge, Montreal.


VICTORIA
NEW SOUTH WALES
MILLEWA
KARKAROOK
WEEAH
WIMMERA DISTRICT
LODDON DISTRICT
BENDIGO
RODNEY
MURRAY DISTRICT
BENAMBRA
GLADSTONE
DALHOUSIE
ANGLESEY
WONANGATTA
TAMBO
CROAJINGOLONG
DUNDAS
GRENVILLE
BOURKE
NORMANBY
HAMPDEN
MORNINGTON
GIPPSLAND
POLWARTH
HEYTESBURY
BULN-BULN
BASS STRAIT
Longitude 141 142 143 144 145 146 147 148 149 150 East from Greenwich
British Miles
Geographical Miles

on the Grand Trunk Railway of Canada. This, the greatest tubular bridge in the world, was begun in May 1854, and finished in December 1859. The engineers were Robert Stephenson and Alexander M. Ross. The dimensions and other particulars are stated in the article TUBULAR BRIDGE; and the accompanying view will help to give a conception of the vastness of the structure.

VICTORIA CROSS. See CROSS, VICTORIA.

VICTORIA LAKE, called also ALEXANDRINA or KAYINGA LAKE, a brackish lagoon in the south-east of South Australia, is separated from the sea only by a narrow belt. It receives the rivers Murray, Bremer, Angus, and Finnis, and communicates with the sea by a narrow passage that leads into Encounter Bay. It is 30 miles long, and about 12 miles broad. A sand-bar at the entrance to the lake impedes access for vessels from the sea.

VICTORIA-N'YANZA. See N'YANZA.

VICTORIA UNIVERSITY. See OWENS COLLEGE.

VICU'GNA (*Auchenia Vicugna*), a species of the same genus with the lama and alpaca, but prettier. In size, it is intermediate between the lama and the alpaca. Its neck is longer and more slender than theirs; its wool is also finer, short, and curled. It is of a rich brown color, with patches of white across the shoulders, and the inner side of the legs. The V. inhabits the most desolate parts of the Cordillera, at great elevations; and delights in a kind of grass, the Ychu (*Stipa Ychu*), which abounds there in moist places; but it seldom ventures to the rocky summits, for which its tender feet are ill adapted. It is commonly found in small herds of from 6 to 15 females with one male. When the females are quietly grazing, the male stands apart, and carefully keeps guard, giving notice of danger by a kind of whistling sound, and a quick movement of foot. When the herd takes to flight, the male covers their retreat, often pausing to observe the motions of the enemy. If he is wounded or killed, the females gather round him, and will suffer themselves to be captured or killed, rather than desert him. The V. is a very active animal, like the wild goat or the antelope. The Indians seldom kill it with firearms, but set up a circle of stakes, about a mile in circumference, into which the vicugnas are driven.—A hybrid has been produced between the V. and the alpaca, which has a black and white fleece of long wool, resembling the richest silk.

VIDOCQ, FRANÇOIS-JULES, who acquired notoriety as a detective-officer of police at Paris, was born on 23d July 1775, at Arras, where his father was a baker. On the principle of set a thief to catch a thief, his earlier life may be regarded as an almost invaluable apprenticeship to the profession in which he afterwards became distinguished. As a boy, he was employed in his father's shop, the till of which, it was found, he persistently robbed. To cure him of this evil habit, he was sent to the house of correction; but so little were his morals improved there, that he signalized his return to business by decamping with a sum of about £80. Of this money, a sharper relieved him at Ostend; and in order to keep himself in life, he engaged himself to sweep the cages of a traveling menagerie. From this menial service he was advanced to the post of tumbler and acrobat; and a further promotion was intended him to that of a supposed savage, whose performance involved the eating of raw flesh, and drinking greedily of blood. As he saw fit to decline the appointment, his further services were dispensed with; and shortly after, he returned to his father. Having entered the army, he attained the rank of corporal, and served with some credit in Belgium and elsewhere, till a wound obliged him to return home. For some years after, he seems to have lived as a scoundrel at large, occupying himself in swindling and disreputable love affairs. In 1796, he turned up in Paris, and being detected in forgery, he was sentenced to pass eight years as a galley-slave.

Before his term of durance had expired, he found means to escape, and became one of a band of highwaymen. As the story goes, his new associates, on chancing to discover that he was an escaped galley-slave, saw fit to decline his further acquaintance. This refinement of squeamishness on the part of these gentlemen of the road, seems not in itself very probable; but on whatever ground of dislike, they desired to rid themselves of M. V., and summarily did so, exacting from him a solemn oath not to betray them. M. V. took the oath very solemnly, and instantly proceeded to deliver the whole gang into the hands of the authorities. This pretty exploit seems to have suggested to him the *rôle* which he afterwards developed with such consummate success. Hieing to Paris, he offered his services to the authorities there as a spy upon the criminal classes. His advances were at first coolly received; but gradually he made his way; and shortly his services became so important that official recognition was vouchsafed him. In 1812, a 'Brigade de Sûreté' was organized, with V. as chief. Consisting at first of only 4 men, by degrees it was enlarged till it came to include 28; and its efficiency was something marvelous. Suspicions, however, grew rife that V. was himself the originator of many of the burglaries he showed himself so clever in hunting out, and even contrived to make a good thing of them. It does not appear that this charge was in any case clearly brought home to him; but M. V. being plainly the sort of person in whom any suggested blackguardism is rather more likely than not, it had every inherent probability. Guilty or not as he may have been, so strong was the popular feeling against him that, in 1825, it led to his being superseded.

After his dismissal, he became a paper-manufacturer; and in 1834, established a Trade Protection Society, the object of which was to furnish confidential information as to parties whose credit might be dubious. In 1829, he published an Autobiography, a *rédaction* of which he put forth in 1844 (Eugène Sue's famous novel having just taken the public by storm), under the title of *Les Vrais Mystères de Paris*. Finally, he died in Belgium in the year 1850.

VIE'NNA (Ger. *Wien*, Lat. *Vindobona*, afterwards *Faviana*), capital of the Austrian empire, stands on a plain at the foot of the last hills of the *Wiener Wald*, which forms the eastern extremity of the Alps. East of it extends a vast plain, as far as the eye can see, away to the Carpathians, which are visible on a clear day in the distance. On the north, the hills approach within half-a-dozen miles of the city, and extend uninterruptedly, to the west, to the Tyrolese Alps. An arm of the Danube (called a canal) passes along the north-east side of the city, and separates it from the suburb of Leopoldstadt. Into this arm flows the foul and (when not swollen by rains) insignificant stream, called the Wien, from which the city takes its name. V. consists of the old city or inner town, called the *Stadt*, with narrow and irregular streets, and of a circle of suburbs, nine in number, completely surrounding it.

Around the *Stadt*, and separating it from the suburbs, is a ring space upon which were formerly the fortifications, leveled in 1858. This space is now being rapidly covered with buildings, of which the principal form part of the Ringstrasse, a handsome boulevard, in many places 70 yards wide. Besides the internal fortifications just mentioned, there is an external ring with rampart and fosse, which is still preserved as the boundary of the city imposts. These fortifications are called the *Lines*, and at one time encircled both suburbs and city; the former are now, however, rapidly extending themselves outside. Unlike most other European cities, the old part of the city is the most fashionable. In the *Stadt* are the palaces of the emperor and of some of the principal nobility, many stately mansions, the public offices, the finest churches, most of the museums and public collections, the colleges, the exchange, and the best shops. Since the erection of the Ringstrasse and other buildings upon the site of the old glacis, however, very many of the aristocracy have gone there to live. The suburbs are laid out in wide streets, many of which, being unpaved, are extremely dusty in summer, and very muddy in winter. As a rule, the houses are let in 'flats,' almost the only exception to this being the palaces of the higher nobility; and in some cases even these consist only of the two lower stories of the building.

Among the principal squares are the *Josephsplatz* and the *Burghof* (the latter the court of the palace); the outer *Burgplatz*, which is laid out with grass and flowers, and in which stands the *Burgthor;* the *Neuer Markt*, *am Hof*, and *Freiung*. The latter three are in the heart of the city, contain many picturesque buildings, and are otherwise interesting, standing as they do in much the same relation to V. as the Grassmarket to Edinburgh. V. is the see of an archbishop; and the chief of its many churches is the cathedral of St. Stephens. This church is 354 feet long, 229 feet broad, and 80 feet high, and has a very beautiful tower, 450 feet high, erected in 1860—1864, to replace the former structure, which was removed because of its unsafe condition. Its different parts have been built at many different periods, the choir having been commenced in 1359, while the nave dates a century later. The church of the Augustines is remarkable for its monument of the Archduchess Christina of Saxe-Teschen, one of the most successful works of Canova. The most beautiful church in V., and one of the most beautiful in the whole of Germany, is the *Votiv-Kirche*, built in commemoration of the emperor's escape from assassination in 1853. It is a Gothic church, not completely finished till 1878, with two towers and spires, and covered with delicate and beautiful tracery and carving. The Imperial Royal Palace is an ancient building, consisting of various parts, erected at different times.

Adjoining the Palace, or forming part of it, are the Imperial Library (410,000 vols.—12,000 printed before 1500—and 20,000 manuscripts), the Treasury, the Cabinet of Coins and Antiquities, &c. Among the other collections of interest are the Belvedere, including the Ambras collection (pictures, sculptures, and antiquities); the Arsenal; the Liechtenstein Gallery, and Count Harrach's collection (pictures), and the Albertina (drawings and engravings), the latter containing the original study of Raphael's 'Transfiguration.' The Polytechnic Institution (for instruction in practical science, &c.) is attended by about 1000 pupils, and in

connection with it there is a capital technological museum. The University (founded 1365) has upwards of 3900 students on its roll, a staff of over 200 professors and lecturers, and a library of 212,000 vols. As a school of medicine, it is celebrated all over the continent. The principal places of public resort for the lower classes are the gardens of the palace at Schönbrunn, the *Augarten*, and the *Prater*, the latter being probably the largest park in Europe. The buildings of the great exhibition of 1873 were in it, and included a nave 2952 feet long, and a great rotunda (a permanent building). The exhibition was not a financial success. The V. Observatory was equipped in 1881 with the largest telescope hitherto made.

V. contains eight or nine theaters, of which the best three, including the magnificent opera-house, are in the *Stadt*. At the burning of the Ring Theater in 1881, 570 lives were lost. The manufacture of silk stuffs, and also shawl-weaving, are important branches of Viennese industry. The manufacture of meerschaum pipes, gloves, and all kinds of fancy leather articles, is also largely carried on. Very extensive works were begun in 1869, designed to bring the Danube closer to the city, and improve its navigation. These were completed in 1880 at a cost of more than £2,000,000, and are expected to make V. the staple place of ship-trade between east and west—as it already is the main center of railway communication. Of late it is a great grain-market. Pop. at census of 1880 of V. and suburbs proper, 726,105; but including the outlying villages (as e. g., Fünfhaus, Döbling, &c.), in which many well-to-do Viennese reside, the population is a little over a million.

VIENNA, TREATIES, &C., OF. This capital, from its central position, and from the prominent part which Austria has always taken in the wars of Modern Europe, has been oftener selected than any other city (Paris perhaps excepted) as the meeting-place of the representatives of the various European nations. The *first* treaty of V. (April 30, 1725) was a mutual guarantee of their dominions by the Emperor Charles VI. and Philip V. of Spain; besides which, the former agreed to aid in the recovery of Gibraltar from Britain, and to aid the Pretender in supplanting George I., in consideration of the latter guaranteeing the Pragmatic Sanction. The *second* treaty (March 16, 1731) was a joint guarantee of the Pragmatic Sanction by George II. of Britain and the States of Holland. The *third* (November 18, 1738) was a similar guarantee by Louis XV. of France, in consideration of the reversion of Lorraine and Bar (to be given meantime to Stanislas, the ex-king of Poland), as well as a settlement of the Polish succession dispute, and a rearrangement of the possessions of Austria, Spain, and Sardinia, in Italy. The *fourth* treaty (October 14, 1809) was concluded between France and Austria, after the battle of Wagram, and the armistice of Znaim, by which the latter agreed to resign some districts on the western border of the archduchy to Bavaria; Goritz, Friuli, Trieste, Carniola, and parts of Croatia, Carinthia, and Dalmatia, to France, these provinces to be formed into the government-general of Illyria; some districts of Upper Lusatia to the king of Saxony; Western Galicia, with Cracow and Zamocz, and a share in the salt mines of Wielicza, to the grand duchy of Warsaw; and the eastern corner of Galicia to Russia: a total loss to Austria of 58,170 sq. m., with a pop. of 3,500,000, and all her seaports.

The next, and by far the most important meeting of the representatives of European nations was the *Congress of Vienna*, which was held here after the first treaty of Paris, for the general settlement of the affairs of Europe. The congress, which first met on September 30, 1814, was composed of the Czar Alexander I. of Russia, with Count Nesselrode; the king of Prussia, with Hardenberg; Lord Castlereagh, and afterwards the Duke of Wellington, as representatives of Britain; Prince Metternich for Austria; Count Talleyrand for France; as well as representatives of Spain, Portugal, Sweden, Rome, Germany, and all the other minor powers, who were interested personally in the deliberations: the total number of those who assisted at the congress being about 500. But the representatives of the minor states, who had expected a species of European parliament, to which all would be admitted, were sadly disappointed by the preliminary resolution of the great powers to constitute two committees, one of which would deliberate on the affairs of Germany; and the other, composed only of the representatives of Austria, Prussia, Russia, and Britain, would discuss the affairs of Europe generally, decide respecting the partition of the conquered districts (formerly belonging to France and her allies), and the frontier of each European sovereignty. To this latter council, Talleyrand, by the influence of Castlereagh, who early saw the necessity of a counterpoise to the influence of Russia, and her follower, Prussia, in the conferences, was admitted (October 5); and three days after it was increased by the representatives of Spain, Sweden, and Portugal.

The first resolution of the European committee, to rearrange Europe so as to leave the parties directly interested nothing more to do than give their adhesion to the arrangements made for them, being an arrogation of sovereignty over all Europe, was loudly exclaimed against; but the congress was one of rulers and *their* representatives, and not of the nations and *their* representatives, so the indignant clamor which rose on all sides was quite unheeded. The points which were at once and unanimously settled were—the constitution of Belgium and Holland into one kingdom (*the kingdom of the Netherlands*); the annexation of Norway to Sweden; the restoration of Hanover, with a large slice of Westphalia, to the king of Great Britain; of Lombardy to Austria; and of Savoy to Piedmont. But the questions as to the disposal of Poland, Saxony, and Genoa were not so easily settled. Russia and Prussia, overweeningly vain of the prominent share they had had in crushing Napoleon, were bent on aggrandizement of the most extravagant sort; the former loudly insisting on obtaining the whole of the grand duchy of Warsaw (see POLAND); while nothing less than the whole of Saxony, and some of the trans-Rhenish provinces of Westphalia, would satisfy the latter; and both significantly hinted at the proximity of their colossal armies, with the view of awing the other powers into compliance. But Castlereagh was not the man to be so influenced; and while steadily refusing to yield an iota to such preposterous pretensions, he joined with Metternich and Talleyrand in a secret treaty, offensive and defensive, February 3, 1815; which was cordially acceded to by Hanover, Sardinia, Holland, and Bavaria. The news of this agreement soon leaked out, and produced a considerable modification in the pretensions of the northern powers.

At last it was agreed that Prussia should obtain a portion of Saxony (now Prussian Saxony), Posen, Cleves, Berg, the greater part of the left bank of the Rhine as far as the Saar, and Swedish Pomerania; and cede East Friesland, Hildesheim, &c. to Hanover, Anspach and Baireuth to Bavaria, and Lauenburg to Denmark: while, with the exception of Posen, Thorn, and those parts of the grand duchy which had been (1809) taken from Austria, Poland was to be erected into a kingdom separate from Russia, but under the rule of the czar. Austria recovered the cessions which she was forced to make in 1809, obtained also the Valteline from Switzerland, and the establishment of collateral Hapsburg lines in Tuscany and Piombino; while Maria-Louisa obtained Parma. The pope was replaced in his former position as a temporal sovereign; the ancient constitution of Switzerland re-established; and Genoa—despite the strongly-expressed aversion of its inhabitants—incorporated with Sardinia. The news of Napoleon's return from Elba somewhat hurried the conclusion of these multifarious arrangements, yet the negotiations were not interrupted; Metternich's scheme for a new confederation of the German states (the same which has continued till 1866) was unanimously agreed to, the question of mutual indemnities, rectifications of frontier, &c., being subsequently settled (July 20, 1819) at Frankfurt, by a territorial commission composed of representatives of the four great powers. The questions of the slave-trade and of the free navigation of the Rhine and its tributaries, were brought up by England, and also satisfactorily settled. Finally, a formal treaty (*the fifth treaty of Vienna*) was drawn up and signed, June 9, 1815.

VIENNA PASTE is a preparation which is extensively used as an encaustic, although it is not contained in the Pharmacopœia. A mixture, termed *Potassa caustica cum calce* (Caustic potash with lime), which is itself a caustic, and is much employed for producing issues, is first prepared by mixing equal weights of caustic potash and freshly-burned lime in a warm mortar, and rubbing them to a powder, which should at once be placed in an air-tight bottle. The caustic powder of which Vienna paste is made is obtained by similarly mixing 50 parts of the preceding compound with 60 of quick-lime. It must be kept in a well-stoppered bottle; and when required for use, the powder is made into a soft paste with a little spirit, and applied to the part it is desired to cauterize. It is much employed by some physicians in certain affections of the womb; and is one of the best applications to an indurated chancre. See SYPHILIS.

VIENNE, an interior dep. in the west of France, bounded on the N. by the deps. Maine-et-Loire and Indre-et-Loire, and on the W. by Deux-Sèvres, which intervenes between this and the maritime dep. of Vendée. Area, 2680 sq. m.; pop. (1881) 340,295. The Vienne, an affluent of the Loire, is the principal river, and all the other streams of the dep. are tributary to it. It flows from south to north, and receives the Clain, Gartempe, and Creuse—of these, the last only is navigable. The surface is flat, with a gradual-slope toward the north. The country consists almost wholly of fertile plains, fine pasture-lands, and extensive forests. The climate is soft, temperate, and healthy. Grain is cultivated in greater quantity than is required for local consumption. On an average, 13,200,000 gallons of wine are produced annually. In general, however, agriculture is in a backward state.

The mineral riches of the department consist principally of iron and manganese, and numerous quarries of building and other stones, including lithographic stones, which are finer and harder

than those of Munich. The dep. is divided into the five arrondissements of Poitiers, Châtelherault, Civray, Loudun, Montmorillon. Poitiers is capital.

VIENNE, one of the most ancient towns of France, in the dep. of Isère, on the left bank of the Rhone, 19 miles south of Lyon by railway. The river Gère passes through the town, and here joins the Rhone, after having supplied motive-power to a number of mills and factories. V. was the chief town of the Allobroges, is mentioned by Cæsar (*De Bello Gallico*, vii. 9), and by Martial, who terms it *opulenta Vienna*. At the time of the Roman emperors, it was the rival of Lyon. Besides numerous water-conduits, &c., of Roman construction, there is a temple supposed to have been dedicated to Augustus, and which is now used as a museum, and contains a number of ancient Roman remains. There are also a Roman arch, remains of a theater, and an obelisk, called L'Aiguille, 72 feet high; and the cathedral of St. Maurice, a stately Gothic edifice, with much delicate carving. Manufactures of coarse woollens are carried on; and there is a good trade in wine. Pop. (1876) 22,950. In 1312, a council was held here in which Pope Clement V. pronounced the suppression of the order of the Templars.

VIENNE, HAUTE, an interior dep. of France, bounded on the west by the deps. of Vienne, Charente, and Dordogne; area, 2130 sq. miles; pop. (1881) 349,332. It is watered by the Vienne and its tributaries—the chief of which is the Gartempe. The surface is for the most part level; but traversed by ranges of low hills, of which the Monts du Limousin, which traverse the south of the dep. from east to west, rise in their highest summit to 3000 feet. The Mont de Puy-Vieux, the highest in the dep., is 3200 feet above sea-level. The climate is cold, humid, and frequently foggy. The soil is not fertile, and agriculture is in a very backward condition. There are, however, extensive meadows, and the domestic animals are reared in great numbers. Mines of iron, lead, and copper are worked. The dep. is divided into four arrondissements—Limoges, Bellac, Rochechouart, and Saint-Yrieix; capital, Limoges.

VIE'RSEN, a prosperous and beautiful manufacturing town of Rhenish Prussia, 18 miles west of Düsseldorf. V. has extensive manufactures of woollen and flax, as also of woollen, damask, silk and velvet stuffs, and ribbons; there are also dye-works and many other industries, which give employment to thousands of workmen. The population of V. has more than doubled itself within the last few years, being in 1880, 20,997.

VIERZON-VILLE, an ancient and handsome town of France, in the dep. of Cher, 48 miles south of Orleans. V. has blast-furnaces, forges, and steel-refineries, manufactures of porcelain and earthen-ware, and a trade in cereals and wine. Pop. (1876) 8995.

VIE'TA (otherwise given VIET, VIETTE, or DE VIETTE, and by himself Latinized into VIETÆUS). FRANÇOIS, the most eminent French mathematician of the 16th c., was born at Fontenai-le-Comte, near La Rochelle, in 1540. Of his early life and education we know nothing, and almost all our acquaintance with the details, meagre as they are, of his personal history, is derived from the records of his friend, De Thou (q. v.). V. was employed throughout his whole life in the service of the state under Henry III. and Henry IV., and devoted only his hours of leisure to the study of mathematics and other subjects—affording an excellent illustrative argument against the belief that abundant leisure is essential to high eminence, and in favor of the contradictory theory that mental work of whatever sort tends to prepare the mind for any other species of thought-labor. V. was a zealous Roman Catholic, and a strenuous supporter of the doctrine of the divine right of kings. His genius and persevering industry brought him prominently into notice on various occasions. During the war against the Spaniards, the latter, to preserve as much as possible their communications with their numerous outlying possessions, and prevent the French from profiting by information from intercepted letters, adopted a species of cipher (see CRYPTOGRAPHY) of more than 500 characters, each varying from time to time in its signification. Some specimens being intercepted, were submitted to V., who after a time discovered the key to the cipher, to the great discomfiture of the Spaniards, who, incapable of accounting for the discovery otherwise, attributed it to magic; though the story that V. was summoned to Rome to defend himself before the pope against the charge of having dealings with the devil may safely be regarded as untrue.

V.'s next prominent appearance was as an assailant of the Gregorian calendar, in opposition to which he published (1600) a 'true Gregorian calendar,' which was with justice considered by his contemporaries as inferior to that which obtained the papal sanction. However, V. did not, or would not, see his error, and attacked the Jesuit Clavius, to whom the pope had intrusted the compilation of the calendar, in a bitterly abusive manner; displaying, however, such a mastery of knowledge, that one of Clavius' defenders was led to sympathize with the unfortunate Jesuit who had to withstand the assault of one who was at once a lawyer, theologian, mathematician, orator, and poet. V., however, is almost exclusively recognized by posterity as a mathematician; yet, though worthy to rank among the highest of this class, immediately after such men as Newton and Lagrange, the incessant state of politico-religious turmoil in which France was kept during his life, and the fact that all his works printed during his life were set up at his own expense, and distributed among his friends, have hitherto hindered a general recognition of his high merit. The Italian tabulators of the progress of mathematical science have thus had a good opportunity of decking out their national idols (Cardan, especially) with plumes stolen from the obscure French investigator.

The claims of V., however, are now becoming more and more generally recognized. He is indisputably entitled to be considered as the creator of modern algebra, which he established on the footing of a purely symbolical science; he applied his algebra to the extension of trigonometry, discovering the relations of multiple angles; and he extended the ancient process of extracting square and cube roots to the solution of all equations, an extension which has been since modernized and modified, and now appears as *Horner's method*. Besides, he proved his superior mathematical powers, by solving problems which had puzzled Apollonius, Regiomontanus, &c.; and was acknowledged by the mathematicians of Belgium and Italy as their master. Yet, strange to say, his own countrymen, the French, have so little knowledge of the surpassing talents and achievements of V., that, omitting all intelligent mention of his peculiar successes, they ascribe to him praises due to his Italian predecessors, and to his great English successor, Newton. Most of V.'s works were collected by Schooten, and published by the Elzevirs, at Leyden, in 1646. Two other works of his have been recently discovered, the *Harmonicon Cœleste* and the *Canon Mathematicus*, the latter the first table in which the trigonometrical functions of an angle are completely given. Of the first, two MSS. exist; while the second was printed and circulated according to V.'s usual fashion, and has long been a bibliographical curiosity; but neither has yet been published. See Knight's *Eng. Cyc.*, art. 'Vieta.'

VIGAN, LE, a small, prettily situated town in the south of France, in the dep. of Gard, 45 miles west-north-west of Nimes. It carries on a trade in wine, oil, mules, horses, and silk. Silk and cotton fabrics are manufactured; and hides are tanned, known as Vigan hides. Pop. (1876) 4340.

VIGE'VANO, a town of Northern Italy, in the province of Pavia, 15 miles south-east of the town of Novara. It stands on a rising ground on the banks of the Mora, not far from the Ticino. It manufactures silk, linen, and cotton fabrics, and has an active trade in grain and wine. Pop. 18,000.

VIGIL (Lat. *vigilia*. Fr. *vigile*, I watch), a preparatory time of devotion, which, by a very ancient Christian usage, went before the more solemn festivals, and especially Christmas, Easter, Pentecost, and the principal martyrs' days. In English, it was called 'Eve' or 'Even,' a name which is still retained in relation to several festivals, as Christmas Eve, Hallow-e'en, &c. The observance is traceable in the very earliest centuries, and was established everywhere in the 4th and 5th centuries. It is one of the usages of his time against which Vigilantius inveighs, and which Jerome vindicates in his celebrated *Letter against Vigilantius*. On the day before the great festivals, which seems from the first to have been held as a fasting-day, the people assembled in great multitudes.

The services proper to the vigil, but having a certain bearing on the coming festival, were celebrated; the night was spent chiefly in the church and in prayer, and other devotional exercises; but abuses arose out of these night-watches, which led to their suppression, as well as to the abolition of certain festivities which grew up in connection either with the vigil or with the feast itself. The observance of vigils is still retained in the Roman Catholic Church, and with it all the ecclesiastical offices, together with the fast, at least in the great vigils of Christmas, Easter, Pentecost, Saints Peter and Paul, Assumption, All-Saints, &c.; but all the other details of the celebration have gone into disuse. In the English Prayer-book, the 'vigils or evens' of the chief festivals of our Lord, of the Blessed Virgin Mary, and of the Apostles are retained in the Calendar; but they have no special services appointed for them, nor any other celebration.—See Blunt's *Annotated Common Prayer*, p. 28.

VIGNETTE (Fr. little vine, a tendril; Lat. *viticula*), a term originally applied to the flourishes in the form of vine tendrils, branches, and leaves with which the capitals in ancient manuscripts were often surrounded. Similar decorations were introduced into printed books, and all kinds of printers' ornaments, such as head and tail pieces, came to be designated as vignettes. More recently, the name has been applied to any small engraving (as on the title-page of a book), design, or even photograph, which is not circumscribed by a definite border.

VIGNY, ALFRED, COMTE DE, a French poet and novelist, was born at Loches in Touraine, March 27, 1799, and educated at Paris. After spending some time as a soldier, he married, in 1826, a wealthy Englishwoman; and two years later, withdrew from the army, in order to devote himself exclusively to literature. He died September 18, 1863. V. belongs to the Romantic school, but is free from all their extravagance of style and sentiment. No modern French poet exhibits an equal refinement and delicacy. His principal works are *Poëmes* (1822), *Poëmes Antiques et Modernes* (1824—1826), among which are his famous *Moïse*, *Dolorida*, and *Elva; Cinq-Mars* (1826), a historical romance of the time of Louis XIII., which is much admired in France, and has gone through more than a dozen editions; *Stello ou les Diables Bleus* (1832); *Servitude* and *Grandeur Militaires* (1835)—two very striking and suggestive novels; *La Maréchale d'Ancre*, and *Chatterton* (1835)—dramas of considerable merit. Besides these, he published *Consultations du Docteur Noir* (1856). A posthumous work appeared in 1864, entitled *Les Destinées Poésies Philosophiques*.

VI'GO, an ancient town and seaport on the north-west coast of Spain, beautifully situated on a bay of the same name, about 85 miles north of Oporto. Its delicious climate renders it important as a medical station; and its position on the slopes of a hill, overlooking a charming bay, and forming the center of a scene, oriental in its wealth of palms, orange-groves, flowers, and orchards, is likely to tell in its favor as a residence for the rich. Its old walls and gates; its winding, narrow streets; its houses whitewashed, or colored red or green; the craft which frequent its harbor, and the picturesque dresses of the peasants, are delightful to the artist, as well as to the ordinary observer. The country in the vicinity is exceedingly rich, and fruits, corn, wine, and oil abound. The trade of the port—which is also a harbor of refuge—is increasing. About 2500 vessels, of 300,000 tons, enter and clear the port yearly. Pop. (1877) 13,416.

The Bay of Vigo has an inland sweep of 20 miles, and is 5 miles wide at its mouth. The town has frequently been attacked by the English: by Drake in 1585 and 1589; by the Duke of Ormond, Rooke, and Stanhope in 1702; and in 1719 by Lord Cobham.

VIHARA (which, in Sanscrit, means, 'walking for pleasure or amusement') is, with the Buddhists (q. v.), the name of their temples and convents. Originally, it designated the hall or halls where the Buddha S'âkyamuni, and the priests by whom he was accompanied, used to meet; but when these halls gradually were converted into temples, the name of *Vihâra* was applied to them; and when, in time, the temples became the center of a number of habitations in which the priests belonging to the temples resided, the whole monastic establishment was comprised under the same name. Properly, therefore, the Vihâra merely designates the Buddhistic temple, and it is generally used in this restricted sense. Such Vihâras are in Ceylon permanent structures, the walls being plastered, and the roof covered with tiles, even when the dwellings of the priests are mean and temporary. Near the entrance are frequently seen figures in relievo, representing the guardian deity of the temple. Surrounding the sanctum there is usually a narrow room, in which are images and paintings; and opposite the door of entrance their is another door, protected by a screen; and when this is withdrawn, an image of Buddha is seen, which occupies nearly the whole of the apartment, with a table or altar before it, upon which flowers are placed. The walls of the Vihâra are covered with paintings, and its stories generally illustrate some legend of Buddha's life. Some Vihâras are built upon rocks; others, and amongst these the most celebrated, are caves, in part natural, with excavations carried further into the rock. The Cave-temple at Dambulla is one of the most perfect Vihâras in Ceylon (see the description of it by Forbes in the *Ceylon Almanac*. 1834). On the continent of India, the finest specimens are those at Ajunta, Ellora, Salsette, and Junir. Sometimes no land is attached to the Vihâras, but sometimes also they are rich in lands; and in the case of one of the Vihâras in Kandy, there is an area belonging to it which was once a sanctuary for malefactors.

VIJAYANAGAR, capital of the district of Vizagapatam, in the Madras Province; pop. (1871) 20,169. V. was once the capital of Southern India.

VI'KING (plural VIKINGR), a name given to the piratical Northmen who infested the coasts of the British Islands and of France in the 8th, 9th, and 10th centuries. This word is quite unconnected with 'king,' being derived from the Scandinavian *vik*, a bay; and this class of marauders were so called because their ships put off, not like the king's ships, from the lawful harbor, but from the bay. See NORMANS.

VILKOMI'R, a town of West Russia, in the government of Kovno, on the Swenta, 130 miles south-east of Riga. It was a flourishing town in the 13th c., and continued prosperous till the 17th c., when it began to decline, in consequence of the wars with Sweden, Russia (V. being at that time a Polish town), and the Cossacks. The town contains an ancient church of the 13th century. Flax is exported to Riga; but the trade is not extensive. Pop. (1880) 14,638.

VI'LLA, a term now applied to detached suburban residences with about one acre or less ground attached to them. In the time of the Romans, the villa was a cluster of buildings in the country, forming a sort of private town, and containing in one the residences of the proprietor, farmer, and servants, and all the necessary offices and other accommodation for the cattle—the gardens, pleasure-grounds, &c. These villas were sometimes of enormous size, but they do not seem to have been built on any regular architectural plan, so as to produce an effect commensurate with their extent. The villa was divided into several parts according to their uses: 1. The *Villa Urbana* was the portion in which the proprietor resided, and was laid out, as the name indicates, in a manner very similar to that of a town-house. The size and style of this part depended, of course, on the pleasure or quality of the master. It contained the eating-rooms, bed-chambers, baths, covered porticoes, walks, and terraces. 2. The *Villa Rustica* was the portion set apart for the stabling, servants, &c., and the accommodation for the cattle. Its extent depended on the size of the farm and number of cattle. 3. The *Villa Fructuaria* was for the wine, oil, and other produce. The number of servants accommodated in a villa was very great. The livery-servants, along with the gardeners for the pleasure-grounds, comedians, musicians, &c., belonged to the Villa Urbana. The *Villicus* presided over the others, including the servants for tilling the land, the herdsmen, shepherds, goatherds, swineherds, poulterers, &c. There were also frequently several artisans, kept constantly on the premises, such as smiths, carpenters, &c.

VILLA or SANTA MARIA DEL PRINCIPE. See PUERTO PRINCIPE.

VILLAFRA'NCA, a small town of Northern Italy, in the province of Verona, and 9 miles south-west of the city of that name, on the left bank of the Tartaro. It was formerly a place of great strength; but it is now notable chiefly as the place where the treaty of peace between the emperors of France and Austria, which brought the Italian war of 1859 to a close, was signed June 11th of that year. Pop. (including the surrounding hamlets) 7500.

VILLAFRA'NCA DE PANA'DÉS (of the Bakers), a dull, backward town of Spain, in the province of Tarragona, in Cataluña, about 30 miles west-south-west of Barcelona. It contains some very early palaces of the kings of Aragon, not, however, of much interest. Pop. about 5500. V., founded by Amilcar, was the earliest Carthaginian settlement in Cataluña.

VI'LLA-REA'L, a town of Valencia, Spain, in the province of Castellon, and 5 miles south of the city of that name, about 3 miles distant from the Mediterranean shore. It has wide, straight streets, laid out at right angles to one another, and contains flour and oil mills, woollen factories, and brandy distilleries. Pop. (1877) 12,887.

VI'LLA RI'CA, a city of Brazil, capital of the province of Minas Geraes, called also Ouro Preto (q. v.).

VILLARS, CHARLES-LOUIS-HECTOR, DUC DE, Marshal of France, one of the most illustrious of the great captains of Louis XIV.'s time, was born at Moulins, in the dep. of Allier, 8th May 1653. Being of a noble family, his education, with a view to the military profession, was prosecuted at the college of Juilly, and he subsequently volunteered into the army which was employed in Holland; and having attracted Louis XIV.'s attention by his daring courage and striking elegance of figure, obtained a troop of horse in 1672, served for two years under Turenne in Germany, and after the battle of Seneffe, received a regiment of cavalry, when yet in his 21st year. After a further term of service under Luxembourg and Crequi, he returned to Paris with the reputation of being one of the most promising young officers of the time. During the next ten years (1678—1688), he was employed in diplomatic service, chiefly at the court of Bavaria. In 1688, Louvois appointed him commissary-general of cavalry; and in the war which immediately followed the league of Augsburg, placed him at the head of the cavalry in Flanders. He was subsequently distinguished in the campaigns on the Rhine and in Italy.

From 1699 till 1701, he represented France at the court of Vienna, and watched with sleepless vigilance the tortuous policy of the Austrian ministers, foiling by his penetration their most promising schemes, till he came to be regarded personally with extreme dislike, was shunned by all the court (Prince Eugene excepted), and even his life threatened. On his return, he was employed in Italy under Villeroi; and after a brief period of service under Catinat, was for the first time (1702) raised to independent command, when he was sent to succor the Elector of Bavaria, who had taken up arms on the side of France. Towards the close of 1702, V. crossed the Rhine, defeated the Markgraf of Baden at Friedlingen, took Treves, Traerbach, and Nancy; and early in the following year, again crossed the Rhine, traversed

the almost impassable defiles of the Black Forest, and debouching from the mountains at Villingen, joined the Elector near Dutlingen, on the 12th of May. His bold and well-conceived scheme for carrying the war into the enemy's country, by advancing upon Vienna, while so many Austrian troops were employed on the middle Rhine, in Italy, and against Ragotski in Hungary, was foiled by the stupid obstinacy of his colleague, the Elector; and after his skill and genius had been tasked to the utmost to keep the Austro-Germans under the Markgraf of Baden and Stirum at bay, and he had been relieved by the return of his ally (who had been soundly beaten by the Tyrolese mountaineers), he reopened his line of communication westward, and leaving Marsin in command, returned in disgust to France. He was next commissioned to put down the insurrection of the Camisards (q. v.), which had been zealously fostered, for strategic reasons, by English and Dutch agents.

V.'s manly moderation and soldierly frankness fairly won over Cavalier, the ablest of the insurgent leaders; and might, with his consummate military skill, have suppressed the insurrection. However he was not allowed to manage matters for himself, and all he could do was to reduce the ferment to insignificant proportions. V. was then sent to watch over the north-eastern frontier, and took post on the heights of Fronsberg, when Marlborough advanced upon him with 110,000 men; but V. had shown such skill and strategy in the selection and fortification of his position, and such wise self-control in remaining strictly on the defensive, that the great English hero declined to risk an attack, and retreated; upon which V. burst into Alsace, captured the enemies' reserves of supplies and artillery, and advanced to Rastadt and Stuttgart. The withdrawal of some of his troops to reinforce the north French army forced him to recross the Rhine; yet, with his small army, he, in 1708, completely foiled all the attempts of Prince Eugene to penetrate into France. In 1709, he was sent to oppose Marlborough in the north; but unfortunately, at the commencement of the battle of Malplaquet (q. v.), he was severely wounded, carried off the field insensible, and rendered unfit for service till the following year; and the reopening of his wound in the autumn of 1710 forced him again to resign the command. But in 1711, he returned to his post, headed the last army France could raise, and with it fell upon the British and Dutch under Albemarle, who were intrenched at Denain (24th July, 1712), carried their intrenchments sword in hand, and captured the most of them; he then turned upon Prince Eugene, and drove him under the walls of Brussels.

This magnificent series of successes saved the national honor, and even life, of France, and brought about the peace of Rastadt (see UTRECHT), which V. signed as plenipotentiary, 6th May 1714. After the peace he became, at court, the principal adviser on military affairs and on questions of foreign policy; was a strong opponent of Law's financial measures; but through the intrigues of Fleury, lost favor at court. The outbreak of war in 1732, however, brought out the old hero from his retirement, and with the title of 'Marshal-general of the Camps and Armies of France' he went to head the French army in the Milanese. The campaigns of 1733—1734 showed that the weight of years had left V.'s military genius and spirit untouched; but the ill-behavior of his ally, the king of Sardinia, determined him to solicit his recall; and he accordingly set out for France; but falling ill at Turin, he died there, 17th June 1734. V. was the last of the great military geniuses of the French monarchy, and was wholly free from the restless anxiety for *éclat* which detracts from the merits of so many of them. As a general, he possessed in a high degree rapidity of apprehension, skill in disposition, and promptitude (without precipitancy or rashness) in action. Humanity and sincerity, joined to thorough self-reliance, may be traced through the whole of his long and eventful life; and the two latter qualities occasionally exhibited themselves so prominently at court as to cause the 'professional courtiers' of Louis XIV. to look askance upon him as a 'rude and *immodest*' person. His Memoirs have been printed in Holland, and his Autobiography by Anquetil.

VILLA'RSIA, a genus of plants of the natural order *Gentianaceæ*, the species of which are widely distributed over the world, and are either aquatic or marsh plants, with entire leaves and yellow flowers. *V. nymphæoides* is a native of England, but rare. It is more common in many parts of Europe, from Denmark to the Mediterranean, and is very abundant in Holland, often covering large tracts of the canals with its beautiful flowers and leaves. It abounds in the south of Siberia. It is easily cultivated.

VILLEFRANCHE, a town of France, in the dep. of Aveyron, is seated on the river of that name, in a valley surrounded by hills, 85 miles north-east of Toulouse by railway. It contains many interesting houses of the 15th and 16th centuries, and, in the market-place, a large collegiate church, in the pointed Gothic style of that period, and carries on important manufactures of copper wares, of gray cloths, and packing. Ironworks and foundries are in operation. Pop. (1876) 7819.

VILLEFRANCHE-SUR-SAONE, a small, industrious town of France, in the dep. of Rhone, stands on the Morgon, an affluent of the Saône, 18 miles north of Lyon, on the Paris and Marseille Railway. It is surrounded by a district studded with charming country-seats, and consists chiefly of a handsome street a mile and a quarter in length. Manufactures of cotton goods are carried on, and there is a great trade in wines, horses, cattle, hides, and cloth. Pop. (1876) 11,994.

VILLEIN. See SERF.

VILLEMAIN, ABEL FRANÇOIS, a distinguished French scholar and writer, was born at Paris, June 11, 1790, and educated at the Lycée Impérial (now the Lycée Louis-le-Grand). In 1810, he was appointed Extraordinary Professor of Rhetoric at the Lycée Charlemagne; and shortly after, Maître de Conférences de Littérature Française et de Versification Latine, at the Ecole Normale. During the years 1812—1816, three of his literary essays were crowned by the French Academy—the *Eloge de Montaigne. Avantages et Inconvénients de la Critique*, and *Eloge de Montesquieu*. In 1816, he was appointed to a chair of Modern History at the Sorbonne, as assistant to Guizot; but in the course of the same year, was transferred by Royer-Collard to the chair of Eloquence, which he held till 1826. In 1819, he published, in 2 vols., his *Histoire de Cromwell. d'après les Mémoires du Temps et les Recueils Parlementaires*—a work written in a calm, liberal, and wise spirit. Louis XVIII. took notice of the author, and V. was induced to enter on a political career. The post assigned to him was rather a delicate one, that of Chef de l'Imprimerie et de la Librairie. Under the ministry of M. Decazes, he also held the office of Maître des Requêtes to the Council of State, and in 1820 was decorated with the Legion of Honor. Two years later, appeared his translation (with preliminary essay and notes) of the *Republic* of Cicero; and in 1825, a drama entitled *Lascaris, ou les Grecs du XV. Siècle*, and an *Essai sur l'Etat des Grecs depuis la Conquête Musulmane*.

In 1827, having gradually passed over to the ranks of the liberal opposition, he was charged, along with Lacretelle et Chateaubriand, to draw up the petition addressed by the French Academy to Charles X. against the re-establishment of the censorship of the press! The result of this hardihood was the loss of his appointment as Maître des Requêtes, and in consequence, a vast increase of his popularity as a lecturer at the Sorbonne. In the beginning of 1830, he was sent to the Chamber of Deputies by the electoral college of Evreux, took his seat among the liberal party, signed the famous address of the 221, and was altogether very prominent and active in those movements which brought about the constitutional monarchy of Louis Philippe. But he was too sober, unsympathetic, philosophical a politician, too much a *Doctrinaire* of the Guizot school, to be a favorite with the excitable masses, and he only sat in the chamber for one year. In 1831, the king named him member of the Royal Council of Public Instruction, of which he became Vice-president in 1832. The same year witnessed his elevation to the peerage. V. held the portofolio of Public Instruction in the ministries of Soult (1839—1840) and Guizot (1840—1844); but his health failed under the immense labors of his department, and the impossibility of pleasing so many different parties—the Church, the University, the Reds, the Liberals, the Doctrinaires, and the king himself; and in consequence, he found it necessary to resign.

Afterward, V. wisely devoted himself to literature alone. His principal works are: *Cours de Littérature Française. Tableau du XVIII. Siècle. Discours et Mélanges Littéraires* (1823), *Nouveaux Mélanges Historiques et Littéraires* (1827), *Etudes de Littérature Ancienne et Etrangère* (1846). *Tableau de l'Eloquence Chrétienne au IV. Siécle* (2d ed. 1849), *Etudes d'Histoire Moderne* (1846). *Souvenirs Contemporains d'Histoire et de Littérature* (1856). *Choix d'Etudes sur la Littérature Contemporaine* (1857). *La Tribune Contemporaine, M. de Chateaubriand* (1857). *Essais sur le Génie de Pindare et sur la Poésie Lyrique* (1859); besides a vast number of Essais, Etudes, Discours, Notices, and Rapports, addressed to the French Academy, of which he was perpetual Secretary from 1832. V.'s elaborate *Histoire de Grégoire VII.*, nearly finished at the time of his death, was published in 1872. V. died 8th May, 1870.

VILLE'NA, a town of Spain, in the modern province of Alicante, and 37 miles north-west of the city of that name by railway. The streets are narrow and winding, and are overlooked by an old castle, which has an imposing appearance, owing chiefly to its elevated position. Around the town, the hills are clad with vines, and the country is fertile. A great fair, at which goods are sold to the value of £120,000, takes place here every autumn. Pop. (1877) 11,424.

VILLENEUVE D'AGEN, or VILLENEUVE-SUR-LOT, a town of France, in the dep. of Lot-et-Garonne, in a charming valley, 15 miles north of the town of Agen. The river Lot divides

it into two unequal parts, which communicate by a remarkably bold bridge of a single arch. The town, formerly called Gajac, was completely destroyed in the wars of the commencement of the 13th century. It was afterwards rebuilt, and then took its present name. A great trade is carried on in wines, prunes, cattle, and iron; there are manufactures of paper, cloth, table-linen, and copper-wares. Pop. (1876) 9681.

VILLENEUVE, Pierre-Charles-Jean-Baptiste-Sylvestre de, Vice-admiral of France, descended from an ancient and noble family, which has supplied an almost uninterrupted succession of distinguished ornaments to their country, was born at Valensoles, in the dep. of Basses-Alpes, December 31, 1763, entered the navy in his 15th year, and passed as captain in 1793. In 1796, he was raised to the rank of 'captain of division' (equivalent to *commodore* in the British navy), commanded the rear-division at the battle of the Nile, and after that disastrous fight, succeeded in carrying off to Malta his own vessel, the *Guillaume Tell*, and four others. In 1804, he was nominated vice-admiral; and in the following year, was appointed to the command of the Toulon squadron, with which he succeeded in reaching Cadiz, where he was joined by the Spanish fleet under Gravina. His orders being to attempt the withdrawal of the British fleet from the coasts of Europe, he bore away westwards across the Atlantic, reaching the Antilles on 14th May, and there making a number of valuable captures.

A month afterwards, hearing that the British fleet had reached Barbadoes, he at once re-embarked his troops, and returned to Europe, pursued by Nelson. On reaching the Azores, however, he encountered a British squadron, under Sir Robert Calder, and a fierce combat ensued, which lasted till dark. On the following morning, neither side cared to renew the engagement (for which V. was abused by *Le Moniteur*, and Admiral Calder was put on trial), and V., unable to reach Brest, again returned to Cadiz, where he was strictly blockaded by Nelson. The unjust severity with which he was treated by Napoleon arose from the fact, that the battle off the Azores, and the subsequent blockade of the French and Spanish fleet in Cadiz, had completely ruined Napoleon's scheme for the invasion of England; and the further indignity of being superseded, hurried the unfortunate V. into the desperate resolve of engaging Nelson before his successor could arrive at Cadiz. Besides, by a stratagem of Nelson, he was led to believe that the strength of his enemy was such as to afford him a favorable opportunity of wiping out the disgrace of his former failures, and he accordingly, in superior force, sallied out of the harbor, and engaged in the memorable conflict of Trafalgar (see Trafalgar, and Nelson). A passage in the instructions issued to his captains on October 20, sufficiently shows the irritated state of his feelings—'Every captain who is not under fire is not at his post, and a signal of recall will be a brand of dishonor to him.'

V., whose vessel, the *Bucentaure*, was completely dismasted, was forced to strike his flag, and was made prisoner, and conveyed to England, whence he returned to France in April 1806. Instead of rendering himself at Paris, he stopped at Rennes, with the view of ascertaining the kind of reception he was likely to meet with from the emperor. The result of his inquiries was unfavorable; and on the morning of April 22, he was found dead in bed, with six knife-wounds in his heart. He had died by his own hand.

VI'LNO (often written Vilna), a government of West Russia, bounded on the W. by Poland, from which it is separated by the Niemen; and on the E. by the government of Vitebsk, from which it is separated by the Western Dwina, and by that of Minsk. Area, 16,320 sq. m.; pop. (1880) 1,171,400, mostly Lithuanians, Slavonians, Jews, and Tartars. Only 18 per cent. of the whole pop. are Poles. The rivers are the Vilia, Beresina, affluents of the Niemen, and the Disna, which flows north into the Dwina. The surface is flat; the highest part being only 1100 feet above sea-level. The soil, in some places very fertile, consists for the most part of clay and sand. Marshes abound, and there are 400 small lakes. The woods which cover the marshes are the great source of the wealth of the government. The principal trees are fir and pine, and the timber is floated down the Niemen and Dwina for export, and used in the interior for shipbuilding, &c. The climate is mild. There are a good many manufactories in the government; but agriculture is the principal occupation of the inhabitants, and fairs are numerous and important.

VILNO, an important city of West Russia, capital of the province of the same name, picturesquely situated on the Vilia, 473 miles south-west of St. Petersburg. Besides its cathedral, it is remarkable for the number of its religious edifices, among which are a mosque, several synagogues, and Lutheran meeting-houses. It formerly contained a university, founded in 1576, but abolished in 1832. Among existing institutions, the chief are the observatory, medical society, museum of antiquities, and theater. The principal articles of trade are timber and corn. Manufactures are not important. Pop. (1880) 88,693. V. was made the capital of the Grand Duke of Lithuania in 1323.

VIMIEIRA, a small town in the west of the Portuguese province of Estremadura, where Wellington defeated the French under Junot, 21st August 1808.

VINAGO, a genus of *Columbidæ*, the most marked section of that family, having a comparatively stout solid bill, laterally compressed; with a hard, hooked, and inflated tip; the tarsi short, the feet large, and formed for perching or grasping. The species, of which not many are known, are natives of the tropical parts of Asia and Africa. They inhabit forests, and are shy and timid birds.

VINARO'Z, a town of Spain, in the province of Castellon de la Plana, on the coast of the Mediterranean, 83 miles north-north-east of Valencia. Ship-building is carried on, and there are active fisheries. The bay is open and unsafe. Pop. 9793.

VI'NCA. See Periwinkle.

VINCENNES, a commune and market-town of France, in the dep. of Seine, five miles east-south-east of the Louvre in Paris. In reality the town is merely a great fortress and barracks, and is famous for its arsenal, and for its school for the practice of shooting. At the latter, the Chasseurs de Vincennes, and all the best marksmen of the army, are trained. Pop. (1872) 11,031; (1876) 18,243.

V. owes its historical importance to its castle and park. The château, the main object of interest in the town, is rectangular in shape, and dates from the middle of the 14th century. It was surrounded by nine towers, which were in existence down to the year 1808, but of which only one, known as the Donjon de Vincennes, 170 feet high, and with walls 17 feet thick, remains. The original building dates from the reign of Louis VII., and had its origin in a hunting-lodge, erected here by that sovereign in 1137. Philippe-Auguste enlarged it, and stocked its woods with wild animals, sent to him by the king of England. Here Queen Jeanne (wife of Philippe le Bel), Louis le Hutin, and Charles le Bel, ended their days. Philippe de Valois caused the old mansion to be demolished, and laid the foundations of the more modern château, which, from the middle of the 14th c. till the time of Louis XV., was a royal residence, and the birthplace and place of death of many princely personages. After this time, it was used as a prison, and among the famous men who have languished within its donjon, may be mentioned Henry IV., the Prince of Condé, Cardinal de Retz, Mirabeau—who here wrote his translation of Tibullus—and the Duc d'Enghien, who was shot in the moat of the castle by order of Bonaparte. There are extensive barracks, known as the New Fort, built 1848—1852, and a Salle d'Armes, with a large collection of all sorts of weapons. In the center of the Bois de Vincennes, a large tract has been cleared as an exercise-ground for troops, and for rifle and artillery practice. Other parts of the Bois, which presents much fine scenery, have been embellished with artificial sheets of water, rivulets, and agreeable walks.

VINCENNES, a city of Indiana, U. S., America, on the left bank of the river Wabash, on the Ohio and Mississippi, and Evansville and Crawfordsville Railways, 110 miles south-west of Indianapolis. It is the entrepôt of a rich agricultural country, has a well-endowed university, Roman Catholic bishopric, seminary, and academy, two semi-weekly and three weekly newspapers, and considerable manufactures. A French trading-post was established here in 1710, and a colony in 1735, which lived peacefully with the Indians. Until 1813, it was the capital of the North-west Territory. Pop. (1870) 5440; (1880) 7680.

VI'NCENT, St., a British island of the West Indies, belongs to the Windward Group, and lies about 28 miles south of St. Lucia, and 100 miles west of Barbadoes. Lat. 13° 10′ N., long. 61° 5′ W. It is 18½ miles long, 11 miles broad, has an area of 131 sq. m., and contained (census of 1881) 40,496 inhabitants, of whom a few were white, about a fifth part were colored, and all the rest black. A chain of mountains traverses the island from north to south, and throws out lateral branches, between which are ravines which widen into valleys as they approach the sea-shore. Evidences of volcanic action are everywhere visible on the island—strata are upheaved and disturbed, and huge masses of rock have been displaced. In the interior is a volcanic mountain, 3000 feet high, the crater of which is half a mile in diameter. The climate is hot, the temperature ranging from 75° to 87°. The annual rainfall is about 76 inches. No valuable minerals have as yet been discovered. The chief products are sugar, arrowroot, rum, cotton, molasses; the average annual value of exports in 1875–80 was £177,637—of imports, chiefly linen, cotton, and woollen manufactures, manures, flour and wheat, fish dried or salted, pork salted or cured, hardware and cutlery, leather and leather manufactures, timber, butter, and mules, was £159,000. Nearly 700 vessels enter and clear the ports annually. Religion and morality are at a low ebb—more than half the children are reported as illegitimate. There are above 30 schools, attended by over 2000 children.

The revenue, derived chiefly from export duties, was in 1880, £32,034; the expenditure, £32,890, of which a considerable sum was employed in the completion of public works, &c. The government consists of a lieutenant-governor, a legislative council, and 12 elective members of assembly. The capital is Kingston (q. v.), and the other one or two small towns or villages are of little note. In 1861, the importation of coolies from India was commenced, 500 of them having been brought to the island in that year. Shocks of earthquake are frequent; hurricanes occur at intervals, and the violent rains occasionally damage the crops and roads.

VINCE'NTIAN CONGREGATION, so called from its founder, the Roman Catholic saint, Vincent de Paul, is an association of secular priests, who, although not in the strict sense a religious order, are bound by vows, and are especially devoted to the duty of preaching and hearing confessions among the people, particularly the poor. Another object of the V. C. is to undertake the direction of episcopal seminaries and other colleges for the education of ecclesiastics, as also to direct the annual devotional exercises of the secular clergy, called Ecclesiastical Retreat. See PAUL, VINCENT DE. At the latest recorded enumeration which has come under our notice, the Congregation numbered above 700 members, in France, Italy, Poland, the Levant, and Algeria. The members are numerous also in America, and branches exist in Ireland and Scotland. The name Vincentian is sometimes given also to the Sisterhoods (of which there are several, and of which that of Charity is the most remarkable), which were founded by Vincent de Paul, and even to the Charitable Lay Association, better known as the Society of St. Vincent de Paul, which has extensive ramifications in almost all the countries in communion with the church of Rome, and which has been the occasion of certain recent restrictive measures in France. See BROTHERS AND SISTERS OF CHARITY; PAUL, VINCENT DE.

VI'NDHYA MOUNTAINS. See INDIA.

VINE, a term sometimes used to designate any climbing plant, especially if shrubby, but also more particularly applied to the species of the genus *Vitis*, of the natural order *Vitaceæ*. This genus has *pentamerous* flowers (5-toothed calyx, 5 petals, 5 stamens), and has the petals united into a kind of hood and deciduous. The most important species is the GRAPE VINE (*V. vinifera*), from the fruit of which wine and raisins are made. The name grape is from the French *grappe*, a bunch of grapes; from the same root as *gripe* or *grab*, to grasp.

The grape vine has large, angular, lobed, toothed, and more or less hairy leaves. The stems are numerous and branching, very long, and of rapid growth, with many tumid joints, the outer bark readily splitting and peeling off, the woody tissue abounding with vessels of large size, from which, at the seasons of active vegetation, if the branch is wounded or cut across, the sap pours in prodigious quantity. The fruit-stalks, which are much branched, are opposite to the upper leaves, or in their stead are tendrils. The flowers are small, greenish white, and fragrant.



Vine (*Vitis vinifera*), showing the flowers and their parts, the leaves, and the fruit.

The fruit is a round or oval berry, 2-celled and 4-seeded, varying much in size and color—in the small Corinth or Currant Grape, about ¼th of an inch in diameter; in the largest varieties, more than half an inch; green, yellow, red, purple, and sometimes variegated; but the color is entirely in the outer skin, the juice being always colorless; and whilst the pulp of the grape is wholesome, nutritious, and gently laxative, the skin is astringent and indigestible. Some of the ovules are often abortive, or even all of them in the fruit of old vines of some varieties, as in the seedless Ascalon or Sultana raisins.

The vine attains a large size, the stem being sometimes 18 inches in diameter, so that the wood, which is very hard and durable, has been employed for making furniture, statues, &c. It attains also a very great age, continuing fruitful for at least three or four hundred years.

The grape is one of the most valuable of fruits, not only because of its use in the manufacture of wine, and as the source also from which brandy, vinegar, and tartaric acid are obtained, but because, both in a fresh and dried state, it forms not a mere article of luxury, but a great part of the food of the inhabitants of some countries. Dried grapes, under the names of *raisins* and *currants*, are a considerable article of commerce. Fresh grapes are commonly eaten with bread in Syria, and some other countries in which they abound. The usefulness of the grape is increased by its keeping fresh for many weeks in a cool airy place. Some varieties are more easily kept than others.

More than 1500 varieties are described in works on the culture of the grape; and this subject, under the name *Ampelography* (Gr. *ampelos*, a vine), has been elevated by some recent German writers almost to the rank of a distinct branch of science. The quality of the grape is extremely liable to be affected by circumstances of soil and climate, and this is particularly to be observed in the wine produced from it, the difference between the produce of two vineyards in the same neighborhood being often very remarkable.

The vine dislikes a damp soil, but will thrive in almost any open soil with good drainage. In rich deep soils, it grows luxuriantly, and produces abundance of large fruit; but on shallow, dry soils, the fruit, though less abundant, is of finer flavor. The vineyards most celebrated for the excellence of their wines are not generally of rich soil. The steep slopes of hills are often planted with the vine, and are sometimes terraced for this purpose; and nothing can be more suitable to situations where patches of good soil are mingled with bare rocks, nor anything more beautiful than the rocks covered with luxuriant foliage and rich fruit. This mode of cultivation on steep rocky slopes was anciently very prevalent in Judæa.

It is doubted of what country the grape-vine is a native, nor is it known at what time, certainly very remote, its cultivation was first introduced into the south of Europe. It is now found wild in some parts of Europe, but is rather naturalized than truly native. It seems probable that it is indigenous in the hilly countries on the south of the Caspian Sea, where it is very abundant and luxuriant, climbing to the tops of the loftiest trees, and producing large bunches of delicious fruit. But it is doubted if *Vitis Indica*, a native of the north of India, abounding in some parts of the Himalaya, is really a different species. The wild grapes of these mountains are round and purple, and very agreeable. It is doubted also by some if any of the wild grapes of America are really distinct; some of which, however, are much more different in their characters and qualities from the common form of the cultivated plant. Of these American grapes, the FOX GRAPE (*V. Labrusca*) is the most similar to the cultivated grape. It is common throughout great part of North America, and is found as far north as Quebec. The berries are large, deep blue, with thick skin and tough pulp, but make good wine, and have been found capable of much improvement by cultivation; their color also varying to red and white. The CHICKEN GRAPE (*V. æstivalis*), not found north of lat. 42°, has smaller and more agreeable berries, which are regularly brought to the Philadelphia market. Very similar to this is *V. sinuata*, a native of Virginia and Carolina, from the fruit of which good wine is made.—The BULLACE GRAPE (*V. rotundifolia*), found only as far north as lat. 39°, has larger grapes than any other American species, and of agreeable flavor.—There is also a species (*V. cordifolia* or *vulpina*) with small nauseous berries, and one (*V. riparia*) found abundantly on gravelly banks of rivers in the western states, which has exquisitely fragrant flowers. But the habit and leaves of all these differ very little from those of the common vine. Nor does the WATER WITHE of Jamaica, so called from the great quantity of sap which its shoots pour out when cut (*V. Caribbæa*), differ in very marked botanical characters; although its small black berries, which it produces in immense quantity, are acid and austere.

The cultivation of the grape and the making of wine are of the most remote antiquity, as appears from the Scripture history of Noah, and from many passages of the most ancient authors. The mythological fable of the marches of Bacchus relates to the extension of the culture of the vine from Asia into Europe. The earliest accounts we have of the manner of cultivating the vine are by the Roman authors Virgil and Columella. The vine was probably introduced into the south of France as early as into Italy; it is said to have been brought to Marseille by the Phocæans, about 600 B.C., and its cultivation was early co-extensive with civilization in all the countries near the Mediterranean. In Italy, so much of the land was occupied by vineyards, that the Emperor Domitian, fearing a scarcity of corn, issued a restrictive or prohibitory edict, 81 A.D., which was afterwards long continued in force, through fear that the abundance of fine wine

might tempt the barbarians of the north to invade the country. The vine was introduced into the south of Germany about the 3d c. B.C. Augustus preferred the Rhætian wine to all other. The first vineyards on the Rhine and Moselle were planted by the Emperor Probus in 281 A.D. Under the Merovingians, the culture of the vine extended greatly both in France and Germany. Charlemagne derived a very considerable revenue from the vineyards even of the northern parts of his empire. The Huns who remained in a number of settlements on the Rhine, after the expedition of Attila into Gaul, 451 A.D., brought thither the arts of cultivating the grape, and of making wine, from Pannonia; and Hunnish grapes and Hunnish wine were long in particular repute. In the middle ages, the monks were the first to plant vineyards and to make wine in many parts of Europe.

The cultivation of the vine was introduced into England by the Romans. At the time of the Norman Conquest, there seem to have been vineyards in the south and south-west of England, and although they afterwards disappeared, successful attempts were occasionally made to re-establish them; and one at Arundel Castle in Sussex yielded, about the middle of last century, large quantities of wine. Of late years, the cultivation of the vine has much increased in the south of England, in gardens, on the walls of suburban villas and of cottages, but chiefly for the sake of the fresh fruit, although wine of pretty good quality is also made in small quantities for domestic use.

The vine does not, in ordinary seasons, ripen its fruit well in Great Britain further north than Yorkshire, although grapes have occasionally ripened in the open air in Scotland. It is, however, a hardy plant, in so far as the endurance of severe winter-frosts is concerned; but it requires for the ripening of its wood, as well as of its fruit, a considerable summer-heat continued for several months. Thus, it does not succeed in parts of Britain in which the mean temperature of the year is higher than that of countries where good wine is made. A very moist climate is also unsuitable to it; and therefore it is not extensively cultivated in the north-west of France, although there are many productive vineyards in the north-east. In the most northern regions to which its cultivation extends, the vine is protected in various ways during winter; in some places, by laying down its branches, and covering them with some depth of earth. It produces abundant fruit in warm climates, such as India, but the juice passes too rapidly into acetous fermentation to be used for making wine, although in many of the mountainous districts of India it might probably be cultivated for this purpose with success. Shiraz, in Persia, is one of the warmest climates celebrated for the production of good wine.

In Europe, the cultivation of the vine forms an important branch of rural economy as far north as Coblenz on the Rhine; but in some countries, particularly in Greece and the Ionian Islands, raisins form the chief part of the produce of the vineyards.

The cultivation of the vine was early introduced by the Spanish and Portuguese into the Azores, the Madeira and Canary Isles, and America. The first vines were carried to the Cape of Good Hope by the Dutch in 1650; but whilst the wines of Madeira and those of the limited district of Constantia at the Cape of Good Hope have long enjoyed a high celebrity, and those of Canary and Teneriffe have been imported in considerable quantities into Europe, it is only of late that much attention has begun to be paid to the cultivation of the grape in the other parts of Cape Colony, or in any part of America. It is now, however, prosecuted with some energy in Ohio, Missouri, and some other states of North America, and very good wines are produced. It has also been introduced into Australia, where good wines are made, although not yet to a large extent.

The cultivation of the vine varies much in different countries. Success seems chiefly to depend on a good sunny exposure, liberal but not coarse manuring, and constant attention. New varieties are raised from seed, but the ordinary modes of propagation are by layers and cuttings. Fine varieties are sometimes budded or grafted on less valuable ones.

In the vineries of Britain, the vines are carefully trained, in various ways, so as most completely to cover the walls and trellises, and to turn the whole available space to the utmost account; whilst superfluous shoots are displaced by pruning, so that the strength of the plant may be directed to the fruit-bearing branches, and that there may be no undue luxuriance of foliage to prevent sufficient access of light and air. The luxuriant growth of the plant renders the frequent application of the pruning-knife necessary during summer. The fruit being produced on shoots of the current year, the pruning is managed with a view to the abundance of these shoots, the greater part of which, when they have served their purpose, are cut away, such only being left as are required for the extension of the space profitably occupied by the plant. The bunches of grapes are also generally thinned out with great care, in order that finer fruit may be produced. By such means, and the aid of artificial heat, grapes are produced equal to those of the most favored climates, and the vine attains to a large size and a great age. The famous vine at Hampton Court has a stem more than a foot in circumference, one branch measuring 114 feet in length, and has produced in one season 2200 bunches of grapes, weighing on an averege one pound each, or in all nearly a ton.

In the warmer countries in which the vine is cultivated, as in Italy, it is generally allowed to grow very freely, attaching itself to trees or espaliers; but in more northern regions, it is commonly much pruned down, so that, instead of luxuriance and beauty, the vineyards exhibit a stiff and formal regularity. In some places, the vines are attached to poles; in others, they are pruned so close and kept so low as merely to form bushes which require no support. This mode of cultivation is sometimes adopted also in comparatively warm climates, as in some of the vineyards of the south of France, and in those of Constantia, at the Cape of Good Hope.

Only a few of the varieties of grape cultivated in Britain are at all suitable for the open air. By a judicious selection of varieties, as well as by variously regulating the application of heat, the grape season in vineries is greatly prolonged.

Grapes are sent to market in Britain in large quantities from the numerous vineries; they are also imported from Portugal, Spain, France, and Holland, generally packed in sawdust, but the close packing and the sawdust are injurious to their flavor.

Great ravages have been made of late years on vines in many countries by the *vine disease*, or *vine mildew* (*Oidium Tuckeri;* see OIDIUM), and especially by the *Phylloxera vastatrix* (q. v.).

The juice of ripe grapes contains a considerable quantity of *grape-sugar* (see SUGAR), small quantities of a glutinous substance, and of extractive, bitartrate of potash, tartrate of lime, a little malic acid, and other ingredients, suspended or dissolved in water. The rapidity with which it passes into a state of fermentation after being expressed from the fruit, is remarkable.

For the making of wine, the wine-trade, the qualities and uses of wine, the different kinds of wine, &c., see WINE. Concerning the other commercial products of the grape, see BRANDY, VINEGAR, TARTARIC ACID, RAISINS, and CURRANTS.

VINEGAR is that form of ACETIC ACID (q. v.) which is generally preferred for culinary purposes, and which is made by the fermentation of vegetable substances. In Great Britain, it is manufactured on a large scale by the fermentation of malt; on the continent of Europe, it is as largely made from low wines which have turned sour. Malt, or British vinegar, as it is sometimes called, is made by brewing a weak wort from malt exactly as for Beer (q. v.). To 100 gallons of this, at a temperature of 70°, are added 4 gallons of yeast, and well stirred through for 8 or 10 minutes. This mixture is then allowed to ferment actively for two days, and is then transferred to the stoving-room; here it is distributed into a number of tubs, which, when filled, are covered over with coarse canvas. This room is dark, and is heated by stoves, and the heat is constantly sustained for weeks until the conversion of the wort into vinegar is complete.

The process of acetification is accelerated by introducing into the casks with the wort either the residuary fruit used in making domestic wine, or the foot-stalks and skins of grapes. This *rape*, as it is called, acts as a kind of ferment. Other processes are used by different manufacturers for the purpose of producing it quicker; but the minute descriptions necessary to render them clear would be out of place here. Much vinegar is also made of beer which has become sour; it is, however, very inferior in quality, and wants the agreeable flavor of malt vinegar prepared by the above process, which is due to the presence of acetic and other ethers.

A rather insipid kind of vinegar is made by means of the Vinegar-plant (q. v.). The vinegar-plant itself may be produced thus: A solution of a quarter of a pound of sugar and half a pound of treacle in three quarts of water is first simmered, then poured into a jar, covered up, and kept in a warm place for six weeks. The liquid becomes vinegar, and on the top there has been formed a scum-like fungus, which is the vinegar-plant; and by adding a piece of this to a similar solution, the process of conversion into vinegar now takes place in much less time. During the process, the plant thickens by the formation of a new layer on its under surface; and by peeling off this layer, and using it in a fresh operation, the plant may be propagated indefinitely.

The greatest manufacture of *wine vinegar* in Europe is at Orleans, in France. Here the wines are sent from all parts when unfit for drinking, and are converted into vinegar. In the manufacture, a large number of casks are used, with openings into each of only two inches diameter. Into each one are poured 100 pints of vinegar boiling hot; and to this, after eight days, are added 10 pints of sour wine, and this is repeated every 8 days until the cask is full; another 15 days completes the process, and the vinegar is ready for use. Beech-shavings are much used in vinegar-making, as they are found to assist in clarifying the liquor by attracting the

lees, which settle upon them, and leave the liquor clear, in which state it acetifies more rapidly.

'According to Ure, a good vinegar may be prepared by adding to each gallon of a syrup composed of 1¼ lb. of sugar and 1 gallon of water, a quarter of a pint of yeast. If kept for three days at a temperature of 75° or 80°, it will be sufficiently acidified to allow of being drawn off into the refining-cask, where one ounce of bruised raisins and one ounce of crude tartar are to be added to each gallon of liquor. When the sweet taste has quite disappeared, it should be drawn off into bottles, and corked down tightly. It is stated that such vinegar will contain 5 per cent. of pure acetic acid.' —Miller's *Organic Chemistry*, 2d ed. p. 339.

Vinegar prepared by these methods contains a large amount of foreign matters, which can be got rid of by simple distillation; the acid liquid which comes over constituting what is known in pharmacy as *distilled vinegar*. What is sold commercially as distilled vinegar is simply acetic acid distilled from wood (see PYROLIGNEOUS ACID), and diluted with five times its volume of water. This constitutes also the vinegar used by pickle-manufacturers; it is quite as wholesome as common vinegar, but wants its agreeable flavor; its preservative powers are, however, much greater, and its price very much less, if fairly charged. Vinegar containing 5 per cent. of the pure acid is the strongest that is ever produced, and is termed *proof vinegar*. There are four kinds manufactured, which are known in trade by the numbers 18, 20, 22, and 24, the last being the best quality. The strength of any specimen is best ascertained by determining the quantity of anhydrous carbonate of soda which a given weight of it will neutralize, it being recollected that 100 grains of carbonate of soda correspond to 96·2 grains of anhydrous acid. The ammonia test, according to Neligan, serves to distinguish French from English vinegar: with the former, the color is purplish; with the latter, there is either no change, or it is brownish. There is generally a slight turbidity, which is due to a trace of lime.

As a condiment, vinegar is an ingredient of a large number of sances, and of all ketchups and pickles; and although it cannot be regarded as an essential article of food, ts applications in cookery are numberless. Young ladies, with an undue tendency to corpulency, sometimes drink vinegar freely with the view of improving the figure; but as vinegar only causes thinness by injuring the digestion, it is obviously not worth while that they should run the risk of exchanging slight fulness of habit for chronic dyspepsia.

Vinegar is used in medicine as a cooling astringent, and may be employed with much benefit if taken freely, when largely diluted with water, in hæmoptysis, in hæmatemesis, and in the colliquative sweating of hectic fever. Dr. Neligan states that in severe hiccough, he has often seen benefit derived from a dose of a wine-glassful of vinegar. In cases of poisoning with the alkalies or their carbonates, it is one of the best antidotes. It may also be employed locally in various ways—as, for example, to check hæmorrhage from the nose, womb, &c. In intestinal hæmorrhage, an enema containing vinegar and cold water may be used with success, especially if the lower part of the intestine be the seat of the bleeding.

Sponged in a diluted state (one part to three of cold or tepid water) over the neck, chest, &c., it affords great comfort and considerable relief in cases of colliquative sweating. In its character of a refrigerant rather than as an astringent, its local action on the skin is attended with much benefit in the treatment of most febrile and inflammatory diseases; it should be freely applied, as in colliquative sweats, to the surface of the body, face, and extremities; and thus employed, has a very tranquillizing effect, and often induces sleep. The heat and pain commonly experienced in sprains are often relieved by the local application of brown paper soaked in diluted vinegar, and changed when the feeling of heat returns. It is an important addition to astringent gargles in cases of relaxed uvula and tonsils; and is the best application to the eyes in cases in which lime has got within the eyelids. The ordinary dose is from 2 to 4 drachms; and when taken as a drink, 3 ounces may be mixed with a pint and a half of water, and taken in the course of the day.

The term *Chili vinegar* is applied to a preparation obtained by infusing half an ounce of cayenne pepper in a quart of French vinegar for ten days, and straining. It is commonly added to gargles in the proportion of 1 ounce to 8 or 9 ounces of infusion of roses, in cases of relaxed sore throat.

Aromatic Vinegar, known also as *Vinegar of the Four Thieves*, *Marseille Vinegar*, and *Camphorated Acetic Acid*, consists of strong acetic acid, holding in solution camphor and the oils of cloves, lavender, rosemary, and lemons. It is very fragrant and volatile, and must be kept in well-stoppered bottles. It was formerly regarded as a valuable prophylactic of all infectious diseases, but is now only used as an external stimulant, the vapor being applied by a smelling-bottle to the nostrils in cases of fainting.

VINEGAR-PLANT (*Penicillium glaucum*), a fungus of the suborder *Hyphomycetes*, but somewhat resembling those known by the name of MOULD (q. v.). It forms a flocculent mass or web, which is tough and crust-like or leathery, and when examined by the microscope, is seen to consist of a *mycelium* of branched threads, with the branches somewhat tangled, and the spores disposed in patches about the pencil-shaped ends of fertile threads. It is found on decaying bodies and in fluids undergoing the acetous fermentation, which it greatly promotes, and which, indeed, it very readily occasions, a small piece placed in sugar and water soon changing it into vinegar. Advantage is sometimes taken of this property for making vinegar.

VINET, ALEXANDRE-RODOLPHE, Swiss divine and author, was born at Lausanne, June 17, 1797, and received his education in his native city as a student of the Protestant Church, of which he was ordained a minister in 1819. From an early age, he showed a passionate fondness for the study of French literature, which he cultivated with so much success, that at the age of 20 he was appointed Professor of French language and literature in the gymnasium of Basel. This position he held till 1837, when he removed to Lausanne, to fill the chair of Practical Theology in the Academy of that city, which chair, however, he resigned in 1840, when he seceded from the national church, on account of the new constitution imposed upon it in that year. Notwithstanding his resignation, he appears to have continued his lectures either in the Academy or privately; and in 1844 again connected himself with that institution as Substitute-professor of French Literature. V. took a leading part in the formation of a constitution for the Free Church of Vand, formed by those who seceded from the national church in 1845, this secession having been in a great measure the result of the influence of his own writings and teachings in favor of the separation of church and state. He died 18th May 1847.

V. was an eloquent and earnest preacher, clear and brilliant, rather than profound in thought; and although highly evangelical and orthodox, advocated the utmost liberty and toleration of opinion and practice in matters of religion. He wrote largely both on literature and religion, and most of his works have been translated into English. His works on French literature show that he was thoroughly acquainted with its history, and possessed the critical faculty in no mean degree; as a philosophico-religious writer, he is very popular among the educated religious public both in England and America. His principal works are: *Chrestomathie Française* (3 vols. 1829); *Histoire de la Littérature Française au XVIII. Siècle; Etudes sur la Littérature Française du XIX. Siècle*, 3 vols.; *Mémoire en Faveur de la Liberté des Cultes* (1826); *Discours sur quelques Sujets Religieux* (1831), and *Nouveaux Discours*, &c. (1841)—from which two last-mentioned works selections have been translated into English, and published under the title of *Vital Christianity; Etudes sur Blaise Pascal, Etudes Evangéliques*, and *Nouvelles Etudes Evangéliques*, which have been rendered into English as *Gospel Studies*; &c.

VI'NIC ACIDS, an important group of acids, whose mode of formation may be thus described. When a mixture of concentrated sulphuric acid with any of the alcohols is heated to about 212°, chemical action takes place, and the result is the formation of a new coupled or conjugated acid, in which the elements of one molecule of the alcohol and one of sulphuric acid (taken, according to recent views, as S_2O_6) are present. In these compounds, the existence of sulphuric acid can no longer be detected by the addition of baryta; the new acids forming soluble baryta-salts. As examples of these acids may be mentioned sulpho-methylic acid, HO,C_2H_3O,S_2O_6, and sulpho-ethylic acid, HO,C_4H_5O,S_2O_6, which has been already described under its old name of *Sulphovinic Acid*.

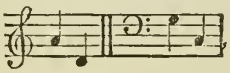
VI'NLAND—i. e., WINELAND—the name given to the chief settlement of the early Norwegians in North America. It is undoubtedly represented in modern times by part of Massachusetts and Rhode Island. The first that saw it was Bjarne Herjulfson, who was driven thither by a storm in the summer of 986 A.D., when making a voyage from Iceland to Greenland, of which country, his father, Herjulf and Eric the Red, were the earliest colonists. But Bjarne did not touch the land, which was first visited by Leif the Lucky, a son of Eric the Red, about 1000 A.D. The latter built a number of wooden houses, which were called *Leifsbudir* (Leif's bothies?).

A German of the name of Tyrker, who accompanied him, noticed the grape growing there, as in his native country, and hence Leif called the region 'Vinland.' Two years after, Leif's brother, Thorwald, arrived, and in the summer of 1003, led an expedition along the coast of New England, southwards, but was killed the year following in an encounter with the natives. The most famous of the Norwegian explorers, however, was Thorfinn Karlsefne, an Icelander, who had married Gudrid, widow of Thorstein, a son of Eric the Red, and who in 1007 sailed from Greenland to V. with a crew of 160 men, where he remained for three years, and then returned, after which no further attempts at colonization were made. Rafn (q. v.), in his *Antiquitates Americanæ*, has published the most complete collection of the evidence

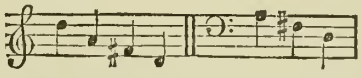
which proves the pre-Columbian colonization of America. See Wilhelmi's *Island, Hvitramannaland. Grönland und Vinland* (Heidelberg, 1842). Both Rafn and Finn Magnusen are excessively anxious to show that Columbus derived his first hints of a new world from the accounts of these old Icelandic expeditions. Their *amor patriæ* perhaps leads them too far, but, on the other hand, it is well to bear in mind that Finn Magnusen, in one of the early numbers of the *Nordisk Tidsskrift for Oldkyndighed*, has conclusively established the fact that Columbus did visit Iceland in 1477, 15 years before he undertook his great expedition across the Atlantic; and it is not at all improbable that he may have heard, while there, something of the long-abandoned Vinland, and so had his adventurous thoughts first turned in that direction.

VINNI'TZA, a town of West Russia, in the province of Podolia, stands on both banks of the Bug, 100 miles east-north-east of Kaminetz. It was founded in the 14th c., and has suffered much from the invasions of Tartars and Cossacks. There are very few factories, and the trade, which is not extensive, is carried on exclusively by the Jews. Pop. (1867) 10,694; (1880) 18,780.

VIOL (Mid. Lat. *vitula;* Ital. *viola*, derivation uncertain), a musical instrument played with a bow, no longer in use, which was the immediate precursor of the violin. It is to be seen represented on monuments as far back as the close of the 11th century. The belly and back were flat; there were larger bends in the sides than in the violin; and frets, like those of the guitar, were placed on the neck of the instrument, to show where the fingers of the left hand should be put to produce the desired notes. There was great variety in the number of strings: in Germany, three, four, and five were all common; in Italy, there were usually six. The strings were tuned by fourths and thirds. There were four sizes of viol in use for treble, alto, tenor, and bass respectively, and they were often played together in concerted music. The smaller viols were called *viol da braccio*, from being held with the arm; the larger, *viol da gamba*, from being placed between the legs. The treble viol was rather larger than the modern violin. The viol da gamba, or bass viol, held its place longer than the smaller viols, but was eventually superseded by the violoncello.

VIO'LA, ALTO VIOLA, or TENOR VIOLIN, a larger description of violin, to which the part between the second violin and bass is generally assigned. It has four gut strings, the two lower covered with silvered copper wire. They are tuned by fifths, thus,  exactly an octave above the violoncello. The compass is from  to  or higher, and the music is generally written on the alto clef.

VIO'LA D'AMO'RÈ, an obsolete instrument of the viol tribe, revived a few years ago with some success by M. Urhan at Paris. It had five or seven strings of catgut, which were placed and played as in other bow-instruments; but below them, and passing underneath the bridge, were five or seven other strings of metal tuned in unison with them, which vibrated sympathetically when the former were played; giving to the music a mysterious resonant character. The compass was at least three octaves and a half. The strings of M. Urhan's viola d'amore were tuned in thirds and fourths, thus:



VIOLA'CEÆ, a natural order of exogenous plants, of which about 300 species are known, natives both of temperate and tropical countries, those belonging to the former being generally herbaceous, and those belonging to the latter generally shrubby. They have simple leaves with persistent stipules. The calyx consists of five persistent sepals, usually elongated at the base, the corolla of five hypogynous petals, unequal in the suborder *Violeæ*, and equal in the sub-order *Alsodeæ*. There are five stamens inserted in a hypogynous disc; the filaments prolonged beyond the anthers. The ovary is one-celled, generally with many ovules, the style single, with an oblique stigma. The fruit is a three-valved capsule, with many seeds. The best known species are the Violets (q. v.), noted for their beauty and fragrance. Emetic and purgative properties prevail in the order, and some of the South American species, particularly of the genus *Ionidium*, yield valuable medicines. See IPECACUANHA and CUICHUNCHULLI. Yet the leaves of the Lobolobo (*Conohoria* or *Alsodeia lobolobo*) are used in Brazil as spinach.

VIOLENT PROFITS, in the Law of Scotland, mean the income or rent enjoyed by one who forcibly or unwarrantably detains land to which he has no title. Such profits are held to be the full profits which the landlord could have made either by possessing the lands himself or by letting them.

VI'OLET (*Viola*), a genus of herbaceous plants, mostly perennial, of the natural order *Violaceæ*. They have a short stem, or are stemless, having in the latter case a short root-stock (rhizome); the leaves are alternate, and have long stalks; the flowers have five petals, different in form and size, the lowest having a spur behind. Nearly 200 species have been described, natives chiefly of northern temperate countries. Several species are much cultivated in gardens, some, as *V. tricolor*, on account of their beautiful flowers; others as *V. odorata*, on account of their fragrance. *V. tricolor*, the PANSY, PANSY V., or HEART'S EASE, is very



1, Hairy Violet (*Viola hirta*); 2, Heart's Ease (*Viola tricolor*).

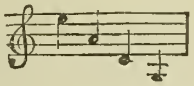
abundant in fields, meadows, woods, &c., in Britain and in most parts of Europe, and the north of Asia; it is also found in North America, although it has probably been introduced there from the old world. It is a very variable plant, its flowers differing much in size and color, but is readily distinguished by its large lyrato-pinnatifid stipules. The stem is somewhat triangular, branching, and diffused. In some of its most common forms, this plant is a mere despised weed, with small flowers; other wild forms have much larger flowers; and to it are referred the large and beautiful garden pansies, the varieties of which are innumerable.

The Pansy (Fr. *pensée*, probably from the drooping attitude of the flower, suggestive of thoughtfulness) is one of the finest of florists' flowers, and no flower has been more improved by cultivation. Another species has of late years been introduced into cultivation, *V. Altaica*, a native of Siberia, and by itself, or by hybridization with *V. tricolor*, has become the parent of many garden pansies. In a wild state, it has oval leaves, and large yellow or purple flowers. The finest garden pansies are not preserved or propagated without great difficulty, and require most careful cultivation, without which they quickly relapse to their wild forms. Florists demand that a pansy shall have a round, flat, and very smooth edge, the petals thick and velvety, the three lower petals alike in their ground color, the lines or pencillings in the center bright and distinct, the two upper petals—which always differ in color from the others—perfectly uniform, the flower measuring at least an inch and a half across.—The SWEET-SCENTED V. (*V. odorata*) is common in grassy places in England, and throughout Europe, and the north of Asia. The flowers are either of a deep blue color or more rarely white. Several other species, with pale blue flowers, and destitute of smell, are common in meadows and woody glades in Britain and other parts of Europe.—The DOG V. (*V. canina*) is one of the most common ornaments of hedgebanks.—North America has a number of species, one of which, *V. blanda*, is sweet-scented. The Himalayas produce a number of species very similar to those of Europe. The roots of several species of V. were formerly used in medicine. They contain a bitter alkaloid, *Violine*, which acts as an emetic and purgative. The petals of the sweet-scented V. are used for the preparation of *Juice* or *Syrup of Violets*, which is used as a gentle purgative for children, and also as a chemical test, being reddened by acids, and rendered green by alkalies. The bruised leaves of *V. tricolor* are sometimes used as a remedy for ringworm.—The DOG'S TOOTH V. (*Erythronium dens canis*) has no connection with this genus, but is a very beautiful flower of the natural order *Liliaceæ*.

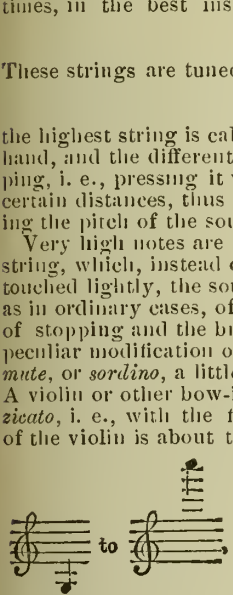
VIOLET STONES, the name given to certain stones found upon high mountains, as in Thuringia, upon the Harz Mountains and the Riesengebirge, which, in consequence of being covered with what is called *Violet Moss*, emit a smell like that of violets. They retain this smell for a long time, and it is increased by moistening

them.—The VIOLET MOSS (*Byssus Iolithus*), which some botanists have been inclined to rank with lichens, and others with fungi, consists of simple articulated threads, and spreads over the stones in the form of a delicate incrustation, which at first is reddish brown, but in a more advanced stage, yellowish green. It was formerly in use as a popular remedy for feverish cutaneous eruptions.

VI'OLIN (diminutive from *viol*), a stringed musical instrument played with the bow. Like other bow-instruments now in use, it consists of a wooden sonorous chest, formed of two slightly arched surfaces, known as the back and belly, united by sides or ribs, and with a curve or hollow on each side in the middle of the length—a neck or fingerboard attached to the chest, and strings, fastened at one end to the belly by a tailpiece or projection of wood, and at the other to the head or extremity of the neck, where they can be tightened or loosened at pleasure by turning-pins. The strings thus passing over the belly are raised up from it by a bridge; and on the belly there are two sound-holes opposite each other, of a form resembling the letter *f*, or rather the long *f*. The sounds are produced by drawing a bow across the strings, the upper surface of the bridge being convexly curved, so as to enable the bow to be drawn along each string separately, without coming in contact with the rest. The modern violin has four strings of gut, the lowest covered with fine silvered copper wire, or sometimes, in the best instruments, with silver or even gold wire.

These strings are tuned in fifths, thus,  , and the highest string is called the first. The bow is held in the right hand, and the different sounds of each string are obtained by stopping, i. e., pressing it with the finger against the fingerboard at certain distances, thus shortening the vibrating portion, and raising the pitch of the sound.

Very high notes are produced by the Harmonics (q. v.) of the string, which, instead of being pressed against the fingerboard, is touched lightly, the sound resulting from the vibration being, not as in ordinary cases, of the part of the string between the point of stopping and the bridge, but of a harmonic section of it. A peculiar modification of tone is produced by the application of the *mute*, or *sordino*, a little wooden instrument placed on the bridge. A violin or other bow-instrument may occasionally be played *pizzicato*, i. e., with the fingers, as a harp or guitar. The compass of the violin is about three octaves and a half, from

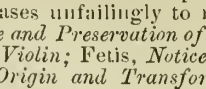


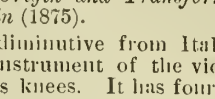
with all the intermediate semitones; but the highest notes are apt to be harsh and squeaking. Though chiefly an instrument of melody, it is to a limited extent capable of harmony by double stops—chords of two notes may be struck together, and three or four notes may be played in arpeggio. Few instruments can compare with the violin in power of expression and execution. It has an unlimited command over a very wide range of sounds, to which any degree of piano and forte, of staccato and legato, can be imparted. In orchestral music, there are always two different violin parts for treble and alto, known as first and second violin; and the same is generally the case when the violin is used in concerted music, the usual arrangement of stringed quartett music being for two violins, viola, and violoncello.

Recent writers trace the origin of the violin to the Indian *Ravanastron*, yet played by the poor Buddhist monks who go begging from door to door, and traditionally believed to have been the invention of Ravana, king of Ceylon, 5000 B.C. From the Ravanastron sprang the *Goudok* of Russia, and the *Crwth* of Wales—the latter in use before the 6th c.—both of which seem to have differed from later instruments of the same tribe in having the upper surface of the bridge flat, so that all the strings had inevitably to be sounded at once. The Viol (q. v.) was the more immediate precursor of the violin and of its relatives of deeper pitch, the violoncello and double bass. The earliest violins seem to have been those of Gasparo di Salo in Lombardy, 1560—1610. During the 17th c., the family of the Amati at Cremona, including Andrew, his sons Jerome and Antonio, and Nicolo, son to Jerome, produced violins the wonder of succeeding times, whose tone and quality more recent makers have in vain sought to equal. Antonio Stradivari, also of Cremona, pupil of Nicolo, if possible surpassed the Amati, and for a time the repute of Cremona was kept up by the families of the Guarneri and Ruggieri. Next to the Cremonese violins, in the estimation of connoisseurs, stand those of the Tyrolese makers, Jakob Stainer, and Matthias Klotz and his sons.

Experience has shown that the minutest details of form and proportion, and the material of which each separate part is made, are matters of vital importance to the quality of the violin. The great makers seem by a succession of delicate experiments and observations to have attained to acoustical qualities of high perfection, which their careful workmanship and extreme dexterity enabled them in all cases unfailingly to reproduce.—See Otto's *Treatise on the Structure and Preservation of the Violin;* Sandys and Forster, *History of the Violin;* Fetis, *Notice of Antonio Stradivari, with Researches on the Origin and Transformations of Bow-instruments;* Hart, *The Violin* (1875).

VIOLONCE'LLO (diminutive from Ital. *violone*, large viol or double bass), a large instrument of the violin class, held by the performer between his knees. It has four gut strings, the lowest of them covered with silvered copper wire, and is tuned

thus in fifths:  Its compasss

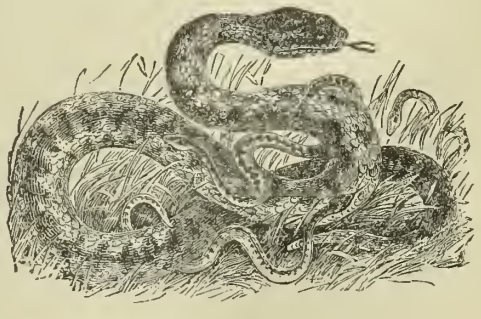
extends from  to . Its signature

is usually the bass clef, the tenor or treble clef being used for the higher notes.

VIOTTI, GIOVANNI BATTISTA, an eminent violin-player, born at Fontanetto in Piedmont, in 1753, and chiefly educated under Pugnani at Turin. After holding for a short time the appointment of first-violinist in the royal chapel at Turin, he relinquished that office, in order to travel in Europe with Pugnani. In Berlin, St. Petersburg, Paris, and London, his playing created a *furore*. He first visited London in 1792, and was engaged there at Salomon's concerts, and for a time as leader of the orchestra in the King's Theater. A groundless charge raised against him of being a Revolutionary agent, drove him from England; but after living for a time in retirement at Hamburg, he returned to London, entered into speculations which ruined his fortunes, and died there in 1824. His compositions include violin concerts and quartetts for violin, tenor, and violoncello, violin duets and solos, and a few pianoforte compositions. His playing was characterized by a vigor of style and purity, as well as brilliancy and elegance, previously unknown; and he has been considered the father of the modern violin school.

VIPER (*Vipera*), a name common to the members of the family *Viperidæ* (q. v. for the characters common to all the vipers). The only V. found in Britain is the Common V. or Adder (*Pelias berus*), found throughout Europe from the north of Russia to the Mediterranean, and in many parts of England and Scotland, but not in Ireland. The latter seldom attains a length of much more than two feet. The head is depressed, widening behind the eyes; the gap as long as the head.

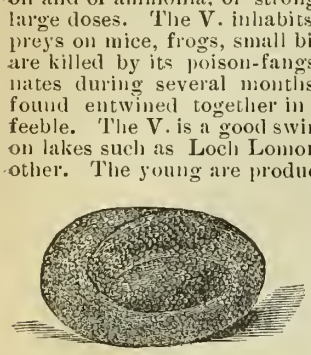
Like the rest of the family, it has a pair of mobile fangs in the upper jaw. The neck is smaller than the back of the head. From the neck, the thickness increases to near the middle of the entire length, and then diminishes to the vent. The tail tapers rapidly to a point. It is one of the few vipers having head shields. It has two diverging marks between and rather behind the eyes, a spot on each side of the hinder part of the head, a row of confluent rhomboidal spots running zigzag along the upper surface, the whole length of the body and tail, and a row of small irregular, almost black, triangular spots on each side. The under parts are of a lead color. The characteristic markings are almost invariable; but the ground color varies considerably, from nearly olive, rich deep brown, or brownish yellow, to almost black. Thus, in some parts of England, a 'Black V.' is occasionally met with; its ground color a rich black, and the markings of a more intense black than the rest.



Common Viper or Adder (*Pelias berus*).

There is also the 'red,' or the 'blue-bellied,' or an almost white viper, with black markings; diversities which have led some naturalists too hastily to describe the snakes to which they belong

as distinct species, but *Pelias berus* is the only venomous serpent found in Britain. Its bite is attended with pain, and serious consequences; but in Britain is seldom fatal, although it is so in warmer countries. The remedies employed are generally the external application of hot olive oil, and the internal use of olive oil and of ammonia, or strong stimulants such as brandy taken in large doses. The V. inhabits heaths, dry woods, and dry banks; preys on mice, frogs, small birds, and other small animals, which are killed by its poison-fangs, and swallowed entire. It hybernates during several months of the year, when vipers may be found entwined together in a torpid state; the poison is then feeble. The V. is a good swimmer, and may occasionally be seen on lakes such as Loch Lomond, crossing from one island to another. The young are produced in early summer, from twelve to twenty or more at a birth. The V. is ovo-viviparous, the eggs bursting in the act of parturition, or immediately after; the investing membrane is so thin and slight as to be easily torn. The young V. is coiled up so closely in the egg as to appear almost a solid mass, but the moment it is set free it is active, and ready to throw itself into an attitude of defence. The pregnant female may be often seen stretched full length in the sunshine, borrowing from external warmth that which is insufficient in herself to incubate her eggs.



Young Viper's Position in the Egg.

It has often been alleged that in times of danger the young of the viper seek refuge in their mother's open mouth, and find temporary protection in her œsophagus; nor is the supposition unreasonable, as serpents can support life for a considerable time without breathing. The subject has been discussed, time after time, in publications devoted to natural history, and trustworthy witnesses are said to have produced evidence in corroboration of the curious habit. Eminent naturalists have been confirmed in their belief, though in England it is generally denied, and scepticism has checked investigation. In America, on the contrary, investigation has been encouraged, and ophiologists of eminence have accepted the fact. Their evidence goes to prove that the habit of giving refuge to the young is common there not only with viperine snakes, but with several non-venomous species that are viviparous.

The name V. (Lat. *Vipera*) is manifestly a contraction of *Vivipera* for *Vivipara*. The name Adder arose from writing *an adder*, for *a nadder*. The A.S. is *nædre*, Old Eng. *naddere*, *neddere*, or *addere*, Scot. *nether*. It is unconnected with *attor*, poison. Pliny, Galen, and other ancient writers, ascribe great medicinal virtues to broth made of vipers, and to the flesh of the animal. Vipers entwined together in hybernation were supposed to produce the *Ovum Anguinum*, to which virtues were attributed; and *snakestones* as charms were at one time common in Britain. They were either marbles, or glass beads of various forms, supposed to cure vipers' bites, and to be otherwise useful.

VIPE'RIDÆ, a family of snakes that, with a second family, *Crotalidæ* (q. v.), constitutes *Viperina*, the third sub-order of *Ophidia*. The general viperine characteristics are the wide, angular, depressed head, causing the neck to appear small in comparison; a short, thick body; and a tail tapering suddenly to a point. In some of the largest vipers, the short, unmistakable tail is only two inches in length. The head is mostly covered with scales, rarely plates, or only a few about the eyes and lips, or with extremely fine plates. The scales are carinated, often rough, even spinous. The ventral shields are broad, and the sub-caudal plates in two rows. The nostrils are large, and in some species they close with a valve.

This highly venomous family of serpents are furnished with a pair of long, curved fangs. In this order the upper maxillary, bearing two isolated fangs firmly fixed to it, is reduced to a mere wedge of bone, which is movably articulated, and by especial muscles rotates or rocks to and fro, and the fang with it. The action is volitional as a whole. The viperine snakes are often said to have 'movable fangs,' though the fangs themselves do not move independently, but only with the bone to which they are attached. Thus, when at rest, the fang, protected by a membranous sheath, lies supine along the jaw; but when in use, springs down by the rotation of the maxillary bone, just as a scythe might point downwards or horizontally by the movement of the handle. The fang has a canal in its interior, connected with a poison-gland, the contents of which are ejected into the wound made by the fang in the act of biting. Behind the pair of functional fangs, others, in a rudimentary stage, are found, and may even create a wound, though, being as yet unconnected with the poison duct, they do not convey venom into the wound. The lower jaw has numerous solid teeth of the ordinary form. Formerly, the vipers were confounded with colubrine snakes; and even at the present day the authorities differ in the arrangement of *genera* and *species*, on account of the forms running so much into each other.

Dumeril gives six genera and seventeen species; Wallace, three genera and twenty-two species; and Gray, nine genera and twenty species. Those of the family best known are the 'River Jack' of West Africa, the Horned Viper or Cerastes (q. v.) of Northern Africa and the west of Asia, the Puff Adder (q. v.) of Africa, the Death Adder of Australia, Russell's Viper and the Carpet Snake of India. The V., as above mentioned, are for the most part distinguished by their broad, flat, angular head; thick, heavy body; short tapering tale; rough, carinated scales; and a generally hideous physiognomy, which seems to express their noxious qualities. Nevertheless some of them possess a handsome exterior, and are adorned with dark, rich colorings and patterns. The *Daboia* of India is one of these, and being of a less clumsy form, has been named *Vipera elegans*. The true vipers, or those which have not the nasal fosse, are most largely represented in Africa, which has about twelve species. Europe has three; India two; and South America only one very small but intensely poisonous species, the Peruvian adder (*Echidna ocellata*), not much known. The anomalous Death Adder (*Acanthophis antarctica*) of North Australia, with its unmistakably venomous look, is included among the vipers; notwithstanding it has a pair of *fixed* fangs like the *Elapidæ*. The largest and deadliest species are found in tropical countries. They inhabit dry, sandy deserts, and are of a retiring sluggish nature. See LACHESIS, ASP, PUFF ADDER, RATTLESNAKE, &c.

VIPER'S BU'GLOSS (*Echium*), a genus of plants of the natural order *Borragineæ*, having a calyx with five deep segments, an almost bell-shaped corolla, with dilated throat, and irregular limb, very long unequal filaments, and a bifid style. The species are large herbaceous plants or shrubs, rough with tubercles and hairs. Their flowers are often very beautiful. The COMMON V. B. (*E. vulgare*), a large annual plant, is a native of Britain and of most parts of Europe, growing in dry places, not unfrequently in corn-



Viper's Bugloss (*Echium vulgare*).

fields. Its flowers are at first reddish, and afterwards blue. It derives its name, V. B., from spots on its stem, which somewhat resemble those of the viper; and the property of healing viper's bites was therefore ascribed to it.

Other herbaceous species are found in the south of Europe, North and South America, and other parts of the world. Shrubby species are found chiefly in the Canary Islands and in South Africa.

VIRCHOW, RUDOLF, pathologist and publicist, was born in 1821 at Cöslin, in Pomerania. He was a pupil of the great physiologist, Johann Müller; graduated in medicine in 1843; and became, in 1847, prosector to the university of Berlin. The same year, he was commissioned by the government to investigate the cause and cure of typhus in Silesia; and also, in conjunction with Reinhardt, founded the Annals of Pathological Anatomy and of Clinical Medicine. The political commotions of 1848 dragged him, in common with many other votaries of science, into the revolutionary vortex. He established a journal entitled the *Medical Reformer*, and also a democratic club, where he soon distinguished himself as an orator. He was, in consequence, elected a member of the National Assembly, but was not admitted because he was, in a parliamentary sense, a minor. With the conservative reaction, V. had his journal suppressed, and lost his post, but was elected to the chair of Pathological Anatomy in Würzburg. His lectures at that university were widely popular for the novel views which he struck out, particularly in cellular pathology. His reputation grew so great that he was recalled by Manteuffel, in 1856, to Berlin, where he re-occupied the chair of Pathological Anatomy, and rendered it the most famous of its kind in Europe.

In 1859, when the liberal cause revived, he became member of

the municipal council of Berlin, where he distinguished himself as a reformer of the arbitrary police system then rampant; and soon after, was chosen deputy by the electoral college of Saarbrück, and by two of the Berlin colleges. He soon rose to the leadership of the Opposition, and proved a most effective antagonist of the encroachments made in the name of the royal prerogative. He took the lead, in January 1863, in carrying the address in which the ministry were accused of having violated the constitution. Such was the energy of his opposition, that in June 1865 he was challenged to a duel by Count Bismarck. In 1878 he retired from parliamentary life, in order to devote himself exclusively to science, after having been for years a prominent member of the advanced liberals in the Reichstag. Among his works are his inaugural thesis, *De Rheumate Corneæ* (1843); *The Colloid Tumors of the Ovaries, and on Cancer* (1847); *Cholera* (1848—1849); *Flexions of the Uterus, Scrofula, Tuberculosis, Typhoid Fever* (1850); *Cellular Pathology* (1850); *Amyloid Degeneration* (1853); *Morbus Spedalska* (a disease peculiar to the Norwegian coasts, 1859); *Trichiniasis* (1860); *Tumors* (1862); *Cellular Pathology in its foundation on Physiological and Pathological Histology* (1871); a notable article *On the Standpoints of Scientific Medicine* (1878). During the wars of 1866 and 1870—1871, V. took an active interest in the sanitary arrangements for the troops in the field. He was elected Honorary Member of the Royal Medical Society of London in 1856, and in 1859, Corresponding Member of the Medical Society of Paris.

VIRE, an ancient and pretty town of Normandy, France, in the dep. of Calvados, on the Vire, 35 miles S.W. of Caen. It stands on a rock, is built of granite, and is surrounded by hills, between which are the celebrated valleys of Vire.—*Vaux de Vire* (see VAUDEVILLE). Pop. (1872) 6366.

VIRGI'LIUS (or, as it is more accurately spelt, VERGILIUS) MA'RO, PUBLIUS, after Homer, the greatest epic poet of antiquity, was born in the consulship of Crassus and Pompey, on the 15th of October 70 B.C., at Andes, a village not far from Mantua. It is probable that his father was the proprietor of a small estate which was farmed by himself. V. was liberally educated, and is believed to have studied successively at Cremona and Mediolanum (Milan). In philosophy he was instructed by Syron, an Epicurean, and one of his fellow-students was that Varus to whom his sixth Eclogue is dedicated. Greek he learned at Neapolis (Naples) from the grammarian Parthenius. If we are correct in supposing that, in the first Eclogue, V. relates his own experience in the person of Tityrus, he first visited Rome 41 B.C., in his 30th year, for the purpose of reclaiming his lands, which were occupied by the soldiery of Octavianus, at the close of the war against the republicans.

At Rome, he was introduced to Octavianus, through the influence of Pollio, or of some other patron, and further formed the acquaintance of his great protector, Mæcenas. He continued to compose his Eclogues—the tenth and last of which is dedicated to Gallus, and referred to the poet's 33d or 34th year. At the instance of Mæcenas, he commenced his *Georgics* in his 34th year, according to the grammarians, who also assign seven years as the time he spent in the composition of the work, which was carried on principally at Naples. The *Æneid* was his last performance, and must have occupied many of the latter years of his life. He went in 19 B.C. to Greece, where he meant to subject his great poem to a thorough process of revision and refinement; and his voyage to Athens was made by Horace the occasion of the ode (Book i. 3) commencing with 'Sic te diva potens Cypri.' At Athens, V. met Augustus on his triumphal return from the East, and the poet was induced to go back to Rome in his company. He had only got as far as Megara, however, when he was seized with illness, which became worse on his voyage to Italy. On landing at Brundisium, or, according to another account, at Tarentum, he was unequal to the fatigue of traveling; and after lingering for a few days, he died, in the 52d year of his age, 19 B.C.

In compliance with his dying wish, his body was removed to Naples, and buried at the second mile-stone from that city, on the Puteolan Way. Pliny the Elder and Aulus Gellius are among the writers who say that on his deathbed V. desired his epic poem to be burned, rather than that it should see the light in its imperfect state; but that the injunctions of Augustus to his executors, or, according to others, the interposition of his friends Tucca and Varius, who persuaded him to bequeath it to them on the understanding that it should remain unaltered, were the means of preserving it. This incident is quite in keeping with all that we know of V.'s modesty of character. The liberality of his patrons had endowed him with considerable property. He had a house on the Esquiline, near the gardens of Mæcenas, where he lived with an elegant simplicity, while he allowed the public free access to his excellent library. He was tall of stature, dark of complexion, and had the appearance of a farmer. His most finished poem is the *Georgics*, in which the various departments of agricultural concern are described with great clearness, and illustrated by episodes of the finest poetry. His *Æneid* shows rather what he might have been than what he was as an epic poet. Unfinished as it is, however, its merits have always secured him a place in the front rank of epic writers; while, more than any similar work of antiquity, it has furnished a model to the epic and narrative poets of modern Italy.

He has been edited and translated by scholars of nearly every country and period. The best English translation is that of the *Æneid* by William Morris (1875), which is on the whole superior to Dryden's, before unequalled. Conington's *Æneid* is in some features highly successful. The best editions are those of Heyne, Wagner, Forbiger, and Conington.

VIRGIL, the Magician, is the character in which the great Roman poet presented himself to the popular imagination of the middle ages. The origin of this singular delusion may be thus explained. From a very early period—almost, we may say, from the age in which he flourished—V. was acknowledged to be the prince of Latin poets. His poems threw all others into the shade, and this, not so much because they exhibited a finer and more original genius, as because their style was perfect, the subject of his *magnum opus* thoroughly national, and his immense historical and antiquarian lore devoted to the glorification of the Roman people. From him the grammarians selected the examples of their rules, and even composed treatises on special questions suggested by his poems. The rhetoricians, too, found there material for their themes and declamations, and the later poets imitated his phraseology.

Very soon the idea sprung up that in his verses there lay hidden quite a peculiar wisdom and mystic meaning. Thus it happened, that as early as the 3d and 4th centuries, even Christian authors (e. g., Minutius Felix, Lactantius, and Augustine) had contracted the habit of regarding him reverentially, a feeling which in its turn induced them to use him for polemical, or at least theological purposes. Hence they sought to prove the beginning of the fourth Eclogue a Messianic prediction, and would have it that V. foresaw the day of Christ. This view rooted itself so deeply, that V. and the Sibyl (q. v.) were actually introduced into the liturgy of the church, along with the Messianic prophecies of the Old Testament, and in the 'mysteries' of the middle ages, are frequently cited as bearing witness to a coming Messiah. Furthermore, when the first ages of polemical theology arrived, biblical critics and controversialists did not hesitate to quote the verses of V. in elucidation of passages of Scripture, and in confirmation of their views. Later still, some of the scholastics endeavored to give a 'moral' significance to the whole *Æneid;* and an epitome of sacred history even was manufactured out of its contents (see CENTO). Another use, or rather *mis-use* of the verse of V. had already begun during the Roman Empire, and affords additional evidence of the superstitious reverence that was gradually encircling the name of the poet: we allude to the custom of trying to discover one's fortune by selecting lines at random from his epic. See SORTES BIBLICÆ, SORTES VIRGILIANÆ. Ultimately, as may be seen from the *Divina Commedia* of Dante, V. came to be considered as a representative of pure enlightened reason; a highly gifted genius standing midway between paganism and Christianity.

We have remarked that this deep, half-religious veneration for V. displayed itself at a very early period. Soon after his death, statues were erected to his memory, even in the domestic chapels of the emperors; the anniversary of his birth was held sacred; pregnant women and poets made pilgrimages to his tomb, and hence it became inevitable that all sorts of myths should spring up and attach themselves to his history; but the predominant conception in the middle ages was that of a wise, pure, and patriotic teacher, endowed with magic power and lore—quite a different kind of being from the evilly disposed and dreaded 'sorcerer' of popular fancy. The Virgilian myths established themselves more especially in connection with the places where he was born, where he chiefly lived, and where he died—Mantua, Rome, and Naples; and there they even yet survive in some measure on the lips of the people. But, curiously enough, it was not from the Italians, but foreigners, that they first obtained literary consideration.

The oldest document bearing on the subject of which we have any knowledge, is the *Otia Imperialia* of the Englishman, Gervase of Tilbury, who collected his stories from the mouths of the Neapolitan populace. A fuller account is to be found in the *Chronicle* of Arnold of Lübeck, who got his information from Conrad, Bishop of Hildesheim, Chancellor of the Emperor Henry VI. These were followed by their contemporaries, Helinandus, whose legendary history of V. is embodied in the 6th book of Vincentius Bellovacensis' *Speculum Historiale*, and the English monk, Alexander Neckam, in his *De Naturis Rerum*, the best parts of which (relating to V.) are preserved in the repeatedly published *Vitæ Philosophorum* of Gualterus Burlæus. From these four main sources, the later Virgilian myth-mongers have chiefly borrowed; of whom the two chiefly deserving notice are Buona-

mente Aliprando (author of a Chronicle of Mantua in *terza rima*, about the beginning of the 15th c.), and the so-called Pseudo-Villani (author of *Le Croniche dell' inclita città di Napoli*) Naples, 1526). Particular stories and allusions are found pretty thickly scattered through the whole literature of the middle ages after the 13th century. The first complete collection, however, of the Virgilian myths was the French 'people's book,' entitled *Faictz Marueuilleux de Virgille*, published in the beginning of the 16th c., by Jehan Trepperel at Paris, translations of which soon after appeared in Dutch and English. Even the distant Icelanders had heard of the great magician, and there still exists in MS. an Icelandic *Virgilius-Saga*.

The greater part of the Virgilian myths collected in the 'people's books' are of various ages and origin, and have come down to us in different forms. Some have decidedly been shaped after Eastern models, but the majority are of Latin and Italian growth. See Zappert, *V.'s Fortleben im Mittelalter* (Vienna, 1851); Siebenhaar, *De Fabulis quæ Media Ætate de Virgilio circumfere bantur* (Berl. 1837); and Édélestand du Méril, *De Virgile l'Enchanteur* in his *Mélanges Archéologiques et Littéraires* (Par. 1850).

VIRGINALS, a keyed instrument of former times. As described by Dr. Burney, it resembled in form a small pianoforte, with a compass of four octaves, furnished with a quill and jack like those of the spinet, and a single string to each note. Queen Elizabeth is said to have been a skillful performer on the virginals; but the instrument cannot, as popularly supposed, have been named in honor of the Virgin Queen, having been so called before her majesty's time.

VIRGINIA, one of the thirteen original United States of America, lies in lat. 36° 31′—39° 27′ N., and long. 75° 13′—83° 37′ W.; bounded on the N. by Pennsylvania, Maryland and West Virginia, E. by Maryland and the Atlantic, S. by North Carolina and Tennessee, and W. by Kentucky and West Virginia. Area, 38,352 sq. m., or 24,545,280 acres. It is divided into 99 counties. The chief towns are Richmond (the capital), Petersburg, Norfolk, Stanton, Waynesborough, Alexandria, Portsmouth, Lynchburgh, and Fredericksburg. Chesapeake Bay, which divides the south-eastern portion of the state, affords deep and spacious harbors. The chief rivers are the Potomac, forming the north-eastern boundary; the James, York, Chickahominy, Rappahannock, Rapidan, Appomattox, Shenandoah, and the Nottaway and Roanoke, which empty into Albemarle Sound in North Carolina. Eastern V. is level or rolling land, rising gradually from the ocean and Chesapeake Bay. The western portion is hilly and mountainous; while through the center from north-east to south-west run three ranges of the great Appalachian system of mountains: (1) a low range on the east, commencing with the Bull Run Mountains, near the Potomac; (2) the Blue Ridge, more elevated, through which the Potomac passes at Harper's Ferry, and which forms the eastern boundary of the Shenandoah Valley; (3) the great North Mountain and the Alleghany, which form for many miles the North-western boundary of V.

The highest peak in the state is Balsam Mountain (5700 feet) in the Blue Mountains. Other peaks rise to 4000. The Valley of Virginia, or of the Shenandoah, is from 1200 to 1500 feet above the sea. The eastern coast is composed of tertiary sands, clays, and marls; further inland, strata of the miocene groups emerge from beneath these, and abut against granite, gneiss, and other metamorphic rocks, at the line of the lowest falls of the principal rivers, the head of navigation, and sites of the chief towns. In the metamorphic belt are gold mines, copper, iron, &c. There are two upper secondary belts parallel to the Blue Ridge, crossing the James above Richmond, with rich coal deposits. The valley is of the Lower Silurian, with rich limestones, hematite iron, and a fertile soil. On the western borders are mineral springs (hot and cold), sulphur, salt, gypsum, lead, &c. The western coal region, cut through by large rivers, is one of the finest in the world. There are also deposits of fine marble, porcelain clay, fire-brick clay, fine granite, soap-stone, slate, &c. Among the curiosities are the Natural Bridge in Rockbridge county; Weir's Cave in Augusta county; Blowing Cave, which sends out a blast of cold air in summer, and draws in air in winter; flowing and ebbing springs; the Natural Tunnel, 70 feet high; and the Hawke's Nest, a pillar 1000 feet high.

The climate of the east and south-east is hot with malaria in the swampy river-bottoms, producing bilious and remittent fevers; the higher regions are cold in winter, but a large portion of V. is pleasant and healthful. The soil of the eastern portion is light and good, but much exhausted by repeated tobacco-crops. The valley is rich, producing wheat, Indian corn, tobacco, and various fruits. The chief products are tobacco, flour, cotton, wool, coal, lumber, oysters, market-vegetables, and game. The internal commerce is carried on by the James River, several canals, and (1880) 1900 miles of railway. In 1880 the state debt was $31,800,000, and in 1878 the taxable real property was assessed at $246,391,193. There is at Richmond a normal school, and a colored normal industrial school at Hampton. A system of free public schools, under the control of a board of education, a state superintendent, county superintendents, and district trustees, has been established in V., but its effective operation has been rather tardy. In 1870, trustees were appointed in ten out of the ninety-nine counties, and a number of free schools were established. There are state institutions for blind, and deaf and dumb. The insane asylum is the oldest in the United States. The government is republican, with a governor and two houses of the legislature, elected by the suffrages of every male citizen voting *viva voce*.

V., whose shores were first explored by Sebastian Cabot, 1498, and again under the auspices of Sir Walter Raleigh in the reign of Queen Elizabeth, in whose honor it was named, was first settled by an English colony, under the charter of the London Company, at Jamestown, on the James River, May 13, 1607—a colony consisting of gentlemen of fortune, and persons of no occupation, no families, twelve laborers, and very few mechanics. The friendly Indians sold them land and provisions; but the diseases of a damp climate swept off half the settlers the first autumn. The energy of Captain John Smith saved the colony from destruction; and in 1609, it was reinforced with 500 persons, including 20 women and children, who were reduced by sickness and starvation to 60. They had embarked, to abandon the settlement, when Lord Delaware came with emigrants and supplies. The marriage of John Rolfe to Pocahontas (q. v.) secured the friendship of the Indians. In 1619, 90 respectable young women were sent out from England, and sold to the planters for 100 lbs. of tobacco each; also 100 convicts, to supply labor; and a Dutch trader also sold them 20 negroes. In 1622, the colony was reduced by wars and massacres from 4000 to 2500; but in 1624 it became a crown colony, and increased, so that, in 1649, there were 15,000 English with 300 'good negro servants,' and 20 churches. The great production of tobacco caused such a fall in price, that half the crop was burned.

In 1671, the population was 40,000, including 2000 black slaves and 6000 English convicts and redemptioners, of whom 1500 a year were imported. The now prosperous colony consisted of 48 parishes, but had, Governor Sir William Berkley thanks God, no free schools or printing, which he hopes they may keep free of for a hundred years, and says: 'God keep us from both!' In 1754, the colonial militia took part in the French war; and Major George Washington was in General Braddock's expedition. In 1769, Thomas Jefferson, a member of the House of Burgesses which had been established in 1619, asserted for the colony the right of self-taxation, denying the right of parliament to tax the colonies. In 1773, Patrick Henry, Thomas Jefferson, and Richard Henry Lee were appointed a committee to confer with the other colonies, and urged upon their delegates the Declaration of Independence. V., the earliest settled, largest, and most populous of the thirteen original states, called the Old Dominion, has been called the Mother of Presidents, four out of the five before 1825 having been Virginians. She was the first to propose the confederacy and the constitution. In 1861, April 17, the legislature of V. passed the ordinance of Secession. The Confederate government was invited to Richmond, which became the center of military operations. V. was restored to her place in the family of states on 26th January 1870. See UNITED STATES. The pop. of V., in 1800, was 886,200, of which the slaves were 345,796; 1820, 1,065,379—slaves, 425,153; 1860, 1,596,318—slaves, 490,865; 1870, 1,225,177; 1880, 1,512,806 (colored, 632,067).

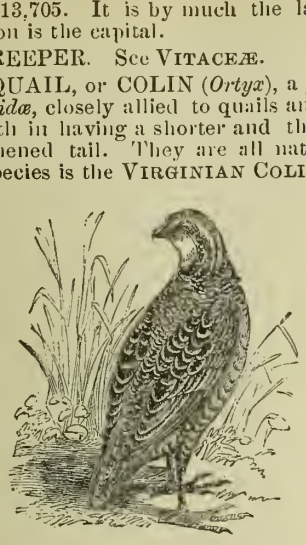
VIRGINIA, WEST, a new state, separated from the above, and included in its boundaries and statistics, was admitted into the Union by act of Congress, approved December 31, 1862, but of disputed constitutionality, and taking effect June 20, 1863. The new state, separated from Virginia during the War of Secession, comprises 54 counties, lying west of the Alleghanies, having an area estimated at 23,000 sq. m. Capital (since 1875) and largest town, Wheeling. Abundance of waterpower, minerals, and timber give W. V. great advantage for manufacturing. W. V. has no state debt; in 1880 the amount of property in the state was assessed at $128,560,000. Pop. (1870) 442,014; (1880) 618,457 (25,920 colored).

VIRGINIA, UNIVERSITY OF, an institution of learning at Charlottsville, Albemarle county, Virginia, U. S., 4 miles from Monticello, the seat of Jefferson, by whom it was planned and organized. It was chartered by the state in 1819, and opened in 1825. It is governed by a rector and nine visitors. It has schools of ancient languages and history; modern languages, history, and literature; mathematics, natural philosophy; law; medicine; &c. The state pupils are free. Each student must attend three schools, and each school confers its own degrees. Those who have degrees in two or three schools receive the degree of Bachelor of Arts; those who take degrees in six schools receive that of Master of Arts. There were, in 1875—1876, 330 students. Library, 36,000 vols.

VIRGINIA, a city of Nevada, U. S., which has grown into importance with a rapidity that few even among American towns can parallel. Settled after 1860, it had in 1870 a population of 7048, and in 1880, 13,705. It is by much the largest city in the state, though Carson is the capital.

VIRGINIAN CREEPER. See VITACEÆ.

VIRGI'NIAN QUAIL, or COLIN (*Ortyx*), a genus of birds of the family *Tetraonidæ*, closely allied to quails and partridges, but differing from both in having a shorter and thicker bill, and a rather more lengthened tail. They are all natives of America. The best-known species is the VIRGINIAN COLIN (*O. Virginiana*),



Virginian Quail (*Ortyx Virginiana*).

which is abundant in most parts of North America, and in some parts is commonly known by the name of Quail, in others by that of Partridge. In size, it is intermediate between the common quail and the common partridge of Britain. The prevalent color of the plumage is brownish red, the under parts whitish; but all parts are more or less mottled with different colors. The feathers of the head are capable of being erected into a sort of crest. The call of the male is popularly regarded as resembling the words, *Ah, Bob White!*

The coveys of the V. Q. often approach houses in winter, and mingle with domestic poultry. Great numbers are killed by guns and taken in snares; and in the western and southern states many hundreds are often caught in a day by parties of men on horseback, who drive the coveys into a great cylindrical net. This bird is easily domesticated, and seems well fitted for the poultry-yard. It has been introduced into some parts of Europe, and may almost be regarded as naturalized, although still rare in England.—There are several other species of the genus in Mexico, California, and the north-west of America, of which one, the CALIFORNIAN COLIN (*O. Californica*), is remarkable for its long and beautiful black crest.

VI'RGIN ISLANDS, a group of islands in the West Indies, partly belonging to Denmark, partly to Britain, directly east of Puerto Rico. The islands and islets are about 50 in number, but of these, only a few are of any considerable size or importance. The total area is about 250 square miles, and the population is near 45,000. Three of the islands, St. Thomas (q. v.), St. Croix (q. v.), and St. John, belong to Denmark, having a total area of 140 sq. miles, and a pop. of 34,000.

Spain claims Vieque and Culebra (together 65 sq. miles), the former of which has 3500 inhabitants, and the latter is uninhabited. The others are British; total area, 64 sq. miles; pop. (1881) 5287, of whom only about 150 are whites. The chief of the British Islands are Tortola, Virgin-Gorda, and Anegada. The revenue of the British possessions, forming a district of the colony of the Leeward Islands, is about £2000 per annum. The exports have an average value of near £5000, and the imports of £3000 or £4000. The characteristic physical features are rugged heights and precipitous coast-lines, marked by numerous bays, havens, and creeks. Extensive tracts of land, possessed by the emancipated blacks, are covered with guinea-grass, which forms good pasturage for cows, sheep, and goats. A valuable mine of copper has been worked at Virgin-Gorda; and other valuable minerals have been found. Cotton, sugar, ginger, and indigo are the principal products.

VIRGIN MARY. See MARY.

VIRGIN'S BOWER. See CLEMATIS.

VIRIATHUS, a Lusitanian (i. e., Portuguese) patriot, who energetically strove to prevent his country from falling under the dominion of the Romans. He flourished in the 2d c. B.C. Originally a shepherd, he afterwards became a guerrilla chief, and appears to have supported himself (like many of the Lusitanian borderers) by predatory excursions into the neighboring Spanish territory. This mode of life brought him into collision with Rome, and in the year 151 B.C., the proprætor, Ser. Galba, was ordered to invade the country, and reduce the Lusitanians to subjection. By an act of detestable treachery, Galba succeeded in destroying a large body of the natives; but the few who escaped (among whom was V.) were inspired with the most implacable animosity towards the Romans, and immediately proceeded to rouse the patriotic passions of their countrymen. V. soon rose into prominence. At first, he kept mainly to the mountains, and contented himself with harassing the enemy by sudden and fierce descents, but in 147 (having been formally chosen leader in a season of great peril, he gave battle to Vetilius, the Roman proprætor, near Tribola (a town of Lusitania, south of the Tagus), and inflicted on him a severe defeat. In the course of the next two years he repeatedly came off victorious in conflict with Roman armies; until in 144, the consul, Q. Fabius Æmilianus, encountered him in Andalusia with a large army of 15,000 foot and 2000 horse, and V. was driven back into his native fastnesses. But the Spanish tribes themselves now broke out in insurrection against their foreign masters; and after 143, the Romans had both a Numantine and a Lusitanian war to wage.

The general sent against V. was the proprætor, Q. Pompeius, who, after a slight temporary success, was utterly crushed at the 'Hill of Venus,' and forced to take refuge at Corduba (in Andalusia), while the conqueror wasted all the country round the Guadalquivir. Next year (142), the Romans were more fortunate. Q. Fabius Servilianus, consul, conducted the war, and succeeded in driving V. once more out of Spain, and in annihilating several guerrilla bands; but in 141, a terrible reverse befel him near Grisane, when the whole of his army was hopelessly surrounded in a mountain-pass, and the story of the Caudine Forks (q. v.) was repeated, by its unconditional surrender. V., like Cains Pontius, showed a noble magnanimity in his hour of supreme triumph: he allowed his captives to go away free and unhurt, on condition of Servilianus allowing the Lusitanians to retain their independence, and accepting their alliance. His terms were accepted, and the Portuguese patriot seemed to have triumphed over his colossal adversary; but in 140, the consul, Q. Servilius Cæpio (brother of Servilianus), having received the command in Further Spain, suddenly and treacherously resumed the war against V., and fearing lest he should not succeed in fair fighting, bribed some Lusitanian envoys (who had been sent to him by V. with offers of peace) to murder their master, which they did while he lay sleeping in his tent.

The death of this heroic chief was practically the ruin of Lusitanian independence; for though the followers of V. elected another leader in his place, and strove to carry on the war, they could scarcely maintain themselves in the field for the rest of the year, and were then glad to acknowledge the supremacy of the Romans.

VI'RTUAL VELO'CITY. See WORK.

VI'RUS (the Latin word for a *poisonous liquid*) is a term used in medicine to signify those mysterious poisonous agencies which produce Zymotic Diseases (q. v.), such as smallpox, measles, scarlatina, the various forms of continued fever, ague, hooping-cough, cholera, syphilis, glanders, hydrophobia, &c. While each of these morbid poisons (as they are frequently called) has a definite and specific action, they collectively obey certain laws. For example (1.), their actions are variously limited, some affecting only one organ or system of organs, while others involve two or more organs or systems of organs. Thus, in bronchocele or goitre, we have an example of a poison acting only on the thyroid gland, while in hooping-cough and hydrophobia, all the organs supplied by the pneumogastrics Nerves (q. v.) are affected, and, in paludal or malarian poison most of the organs. (2.) Morbid poisons, like medicines and ordinary poisons, have their period of latency, which, however, here is usually much prolonged. While a medicine, e. g., is seldom longer than a few hours in exhibiting its effects, the poisons of scarlatina, measles, and smallpox remain latent in the system for at least seven, ten, and sixteen days respectively; while that of paludal fever and hydrophobia may be dormant for a year or upwards. (3.) When several tissues or organs are acted on, the actions may be simultaneous, but are more commonly consecutive, a considerable interval often elapsing between the attacks. (4.) Another law of morbid poisons is, that two may co-exist in the same person; for example, smallpox and cow-pox have often been seen at the same time in the same person. In this case, each disease runs its course unaffected by the other; but most commonly, when two co-exist, one lies latent while the other runs its course. Thus, a case of intermittent fever may suddenly subside, and smallpox make its appearance; on recovery from this disease, the intermittent fever may return.

Amongst the peculiarities presented by morbid poisons, the following points must be noticed: (1.) In experiments made on the inoculation of the smallpox virus by Dr. Fordyce, it was found that extremely diluted poison, if it acted at all, produced the same effects when introduced into the system as the concentrated virus.

Hence it may be inferred that the intensity of the disease is not proportional to the amount of virus received into the system. (2.) Women in childbed may not only engender a special poison of this class—that of puerperal fever—but are highly susceptible of these poisons, and almost always succumb to their action. (3). Another peculiar law of morbid poisons, and one wholly unknown in medicinal substances, is, as Dr. Aitken remarks, 'the faculty which the human body possesses of generating to an enormous extent a poison of the same nature as that by which the disease was originally produced. A quantity of smallpox matter not so big as a pin's head will produce many thousand pustules, each containing fifty times as much pestilent matter as was originally inserted; and the miasmata secreted by one child laboring under hooping-cough are sufficient to infect a whole city.' A remarkable illustration of the development of syphilitic poison from a single infant over a whole province is given in the article SYPHILIS. (4). A still more remarkable fact is, that many of these morbid poisons possess the property of never occurring more than once in the life of the same individual. This is the case with scarlatina, measles, smallpox, hooping-cough, and (to a less extent) typhoid and typhus fevers. (5.) This class of poisons is powerfully influenced by climate, and probably by the nature of the soil. Thus, the severe forms of typhus so common in this country, are hardly known in warmer climates, and the influence of cold weather on cholera and plague are well known.—For further information on this subject, the reader is referred to Dr. Robert Williams *On Morbid Poisons;* and to the chapter on Zymotic Diseases, in the first volume of Aitken's *Science and Practice of Medicine*, from which we have drawn most of the preceding remarks.

VISCONTI, a Lombard family which rose to sovereign rank in Northern Italy in the 13th c., and was equally distinguished by the share it took in the political contests of the Middle Ages, and by the services which it rendered to literature and science. The name V. is derived from the Latin *vice-comites*, and at first was merely the title of an office, but it gradually became a family surname, though when it came to be applied to this family authentic history fails to explain. The family descended, according to tradition, from Desiderius, the last king of the Lombards, and belonged to the feudal nobility of Northern Lombardy, having large estates near Lakes Como and Maggiore. The first who appears prominently in history is OTTONE, who became, in 1078, visconnt of the archbishopric of Milan. The great Lombard families having, in course of time, split up into a multitude of lines, each in possession of a petty sovereignty, the V. on this account rose into comparative importance, more especially when, in 1262, another OTTONE was appointed archbishop of Milan by Pope Urban IV. This appointment being considered by the people an infringement of the rights of the chapter, was opposed by them; and their leader, Martino della Torre, and his successors, kept possession of the property of the see, and forced the archbishop to exile himself for 15 years.

At last, the exiled Ottone advanced at the head of a body of exiles and emigrants upon Milan, defeated and captured his rival in a bloody and desperate conflict near Desio (January 21, 1277), and entered the city amidst the acclamations of the people, who hailed him as archbishop and perpetual lord of Milan. But he was not permitted to enjoy his newly-acquired dignities undisturbed, for during the eleven years of his temporal sovereignty, he was engaged in almost uninterrupted warfare with the Torriani; and the contest was continued by his grand-nephew, MATTEO, who was chosen 'captain of the people' in 1288. Ottone continuing in the archbishopric till his death in 1295. Matteo proved himself a prudent and temperate ruler, and his influential position was recognized by the Emperor Adolf, who created him imperial vicar in Lombardy. Expelled by the Torriani and their allies in 1302, he was restored in 1311 by the aid of the Emperor Henry VII., and reappointed imperial vicar in consideration of the payment of 40,000 florins; and Pavia, Allesandria, Tortona, Cremona, Bergamo, Lodi, &c., having been forced to acknowledge his authority, the family became more powerful than ever.

Unfortunately, however, a quarrel arose with Pope John XXII. regarding the appointment to the Milan archiepiscopate; and Matteo, obstinately refusing to yield to the papal pretensions, was condemned as a confirmed heretic, and himself and his descendants stigmatized as perpetually infamous (March 14, 1322). The people, despite their profound esteem and affection for their ruler, were horror-struck at this solemn denunciation; and the feeling that so many of his friends were falling away from him so preyed on Matteo's mind, that he died in June 1322, three months after his excommunication. His son GALEAZZO I. was chosen his successor, and immediately the pope proclaimed a religious crusade against the heretical V., and the 'holy army' under Raymond of Cardona advanced, in 1323, on Milan, committing the most horrible ravages during its march. But though the V. could not directly oppose such an overwhelming force, Galeazzo's brother Marco, an able and experienced warrior, hovered round the disorderly host, cutting off detached parties; and the Emperor Lewis (of Bavaria) having sent a body of troops to aid the V., the crusaders were driven back, totally defeated at Vavrio on the Adda (1324), and the remnant, with their leader Cardona, captured.

Soon after, Galeazzo, by the intrigues of his ambitious brother Marco, was perpetually exiled, yet his eldest son, Azzo V., succeeded him, while Pope Nicolas confirmed the third son, Giovanni, in the archiepiscopate—events which led Pope John XXII., for the sake of maintaining some authority over Milan, to recall the excommunication he had pronounced against the Visconti. Azzo was the greatest prince of the race, and ruled Milan wisely and well; devoting his attention to the improvement and embellishment of the city, in which labor he was aided by the painter Giotto (q. v.) from Florence, and the sculptor Balducci from Pisa. As great in war as in peace, he extended his sway over almost the whole of Lombardy; and on his death in August 1339, 3000 citizens of Milan voluntarily assumed the garb of mourning. The council-general of Milan elected his two uncles, the archbishop GIOVANNI and LUCCHINO, as joint rulers in his stead; and on the latter, who was an able, resolute, and unscrupulous prince, wholly devolved the cares of the temporal sovereignty. Under his sway, Montferrat was added to the dominions of the V.; Pisa became tributary; a regular police was established; all offenders were punished with impartial severity; and a summary judgeship of appeals (*exgravator*), open only to foreigners to prevent party bias, was established. But the vices of suspicion, lust, and revenge threw a deep gloom over Lucchino's eminent qualities, led him into the commission of many cruel and tyrannical acts, and indirectly caused his own death by poison in January 1349.

From this time, the mild and peaceful archbishop reigned alone, availing himself of the assistance of his nephews in the more arduous tasks of government. He purchased Bologna for 200,000 florins in 1350; in 1353, accepted the lordship of Genoa, which had been almost crushed by its rival, Venice; and taking up the quarrel of his new subjects, equipped a fleet which, under Paganino Doria, gained a complete victory over the Venetians. He was the generous patron and friend of Petrarch, and the last good prince of the V. family. His three nephews conjointly succeeded him in October 1354; but in 1355, the eldest had died of poison, and his dominions were shared between the other two, GALEAZZO and BARNABO. Both princes were men of pre-eminent ability, but irreclaimably vicious, the latter being a very monster of cruelty. Bologna, which belonged to Barnabo, fell into the hands of the pope, who excommunicated Barnabo for attempting to recover it; but the V. prince laughed at the holy father's curse, and swore that he would be both pope and emperor in his own dominions. Innocent VI. then sent legates to him to propose terms, but the young savage compelled the unfortunate messengers to tear their master's bulls to fragments, and swallow them piece by piece.

One of the legates, on becoming pope as Urban V., took revenge by proclaiming a crusade against Barnabo, which was joined by all the principal Italian princes; the Romagna and the borders of Lombardy were desolated by a long desultory strife; and though Barnabo was ultimately forced to accept a sum of money in place of Bologna, he took a humorous revenge on his ecclesiastical antagonists by compelling the clergy in his dominions to pay all the expenses of the war. One act of his, however, may be mentioned with commendation: he issued an edict forbidding even the mention of the names 'Guelf' and 'Ghibelline' under pain of having the tongue cut out; and his well-known stern adherence to such promises put an end to this long and mischievous controversy. His brother Galeazzo, who had established his residence at Pavia, was the 'Mæcenas' of his time: he steadily befriended Petrarch; founded, under his direction, the University of Pavia; and collected a considerable library. The invention known as 'Galeazzo's Lent,' a system of torture calculated to prolong the victim's life for 40 days, stamps him with the family character of cruelty. On Galeazzo's death, his son, GIAN-GALEAZZO, succeeded (1378) him in Pavia and its dependencies; and by treacherously seizing and imprisoning his uncle Barnabo of Milan, became sole ruler of Lombardy. He had all the great qualities and most of the vices of his race, and openly aspired to the sovereignty of Italy; conquering Padua, Verona, Vicenza; extending his dominions to the gates of Florence, which he also attacked; and purchasing from the Emperor Wenceslas the absolute sovereignty of his dominions, with the title of *Duke of Milan*, for 100,000 gold florins.

This enrtailment of the empire, however, displeased Germany, but the Palatine Ruprecht, who invaded Lombardy, received such a lesson from the condottieri of Alberico da Barbiano at Brescia, as caused him to gladly seek the north side of the Alps. Florence, the only remaining obstacle to the accomplishment of the V.'s ambitious scheme, was on the point of surrendering, when Gian died of the plague in 1402. He was a great patron of letters and

science, gathered eminent men of all classes around him, reorganized the university of Piacenza, established a magnificent library, constructed the famous bridge over the Ticino at Pavia, and commenced the erection of the cathedral of Milan. His daughter Valentina married Louis, the younger brother of Charles VI. of France, and became grandmother of Louis XII., who upon this relationship founded his claims to the Milanese. His sons, GIAMMARIA V. (Giovanni-Maria) and FILIPPO-MARIA V., reigned in succession; but the former, who was was cowardly, suspicious, and of a cruelty partaking of insanity, was, in the interests of his subjects, stabbed to death May 16, 1412; and the younger brother, equally timorous and suspicious, and of only average cruelty, became sole ruler. The Venetians on the east, the Marquis of Montferrat on the west, and the pope on the south, were rapidly curtailing his dominions, when, by a happy stroke of policy, he espoused Beatrice di Tenda, the widow of a condottieri leader, and thus obtained the services of a veteran band of soldiers. His fortunate choice of Carmagnola (q. v.) as his general led to the restoration of the former boundary-line of his dominions; and on his quarrel with the soldier who had served him so well, he was sagacious enough to supply his place by others as nearly equal in ability as could be obtained.

In 1441, he engaged the services of Francesco Sforza, to whom he gave his natural daughter Bianca in marriage; and on his death in 1447, the V. family was succeeded by that of Sforza (q. v.) in the lordship of the Milanese. Collateral branches of the V. still exist in Lombardy.—See Lilla's *Famiglie Celebri Italiane*, Verri's *Storia di Milano* and Muratori's *Annali d' Itali a*.

VISCONTI, a family of archæologists and architects, the first of whom to rise to prominence was GIOVANNI BATTISTA V., a native of Sarzana, who settled at Rome, and after making for himself a great name as an archæologist, succeeded Winckelmann as prefect of the antiquities of Rome. He was employed by Clement XIV. and Pius VI. to collect works of ancient art for the Museum of the Vatican ('Museo Pio Clementino,' as, from its two principal benefactors, it was called); and afterwards, in 1778, commenced the writing of the letter-press which was intended to accompany the series of engravings of that splendid collection. He died in 1784.—ENNIO-QUIRINO V., eldest son of the former, was born at Rome, November 1, 1751, and was educated by his father, who intended him for the church. This profession, however, he afterwards refused to adopt, and was for a time disowned by his father. But at last, in 1778, the old man was glad to call his son to his aid, and together they prepared the first volume of the engravings of the *Museo Pio Clementino*. In 1784, he edited alone the second volume of the same series; he was also appointed conservator of the Capitoline Museum.

The series of engravings of the *Museo* was regularly issued, the seventh and last volume being published in 1807. When Rome fell into the hands of the French, V. became a member of the provisional government, and afterwards one of the five consuls; but in November 1799, the arrival of the Neapolitan army forced him to emigrate to France, and from this time he settled at Paris. His great reputation as an archæologist having been long recognized among the learned men of the French capital, he was made an administrator of the Louvre, and Professor of Archæology; and drew up a catalogue of the works of art in the new museum (many of the items being his old familiar acquaintances of the Vatican), which, from the frequent raids of Napoleon on foreign collections, required to be frequently re-edited and enlarged. In 1804, he was requested by the emperor to select and publish a series of portraits of the distinguished men of ancient Greece and Rome; and this, probably the greatest of his works, appeared in two parts, *Iconographie Grecque* (3 vols. 4to, 1808) and *Iconographie Romaine* (1 vol. 4to, 1817). Contemporaneously, V. issued from time to time papers and dissertations on particular objects of ancient art. In 1815, he came to London by express desire of the British government, to fix a fair price for the Elgin Marbles (q. v.), and on his return wrote a Memoir explanatory of these sculptures. His last work was to complete his *Illustrazioni di Monumenti scelti Borghesiani* (Rome, 1821). He died after a long illness, February 1818, and his death was a source of grief to the learned throughout Europe, many of whom came from great distances to attend his funeral.

Besides his immense antiquarian knowledge, V. possessed an extensive acquaintance with the history, languages, mythology, and manners of the classic age. A complete collection of his works was commenced at Milan in 1818, but has not been completed. See *Antologia* of Florence, No. 18; Tipaldo's *Biografia degli Italiani illustri;* and Maffei's *Storia della Letteratura Italiana.*—His younger brother, FILIPPO AURELIO, was also an eminent archæologist, and was president of the commission of antiquities and fine arts at Rome from 1809 to 1814. He edited the *Museo Chiaramonti*, a sequel to the *Museo Pio Clementino*, and published several other works; but his chief attention was bestowed upon numismatology. He died at Rome in 1830.—LOUIS JOACHIM V., the son of Ennio Quirino, was born at Rome in 1797, and after a careful education at Paris, was apprenticed to an architect. His progress in his profession was rapid, as he was appointed an inspector of public buildings as soon as his apprenticeship had expired, and shortly afterwards became one of the architects and surveyors of Paris, and architect of the Bibliothèque Royale in 1825. His works include various public monuments in honor of eminent Frenchmen, some of the first fountains of Paris, the tomb of Napoleon I., and various hotels and private residences, the chief of all being the plans for the completion of the Louvre on a most magnificent scale. V. died at Paris, 29th December 1853.—The nephew of the preceding, PIERRE-HERCULES V., is a celebrated archæologist, and Professor of Archæology in the National Academy of France, at Rome.

VI'SCOUNT (Lat. *vice*, in place of, and *comes*, earl), originally the officer who acted as deputy to the earl, the earl being the king's immediate officer within his county. When the title of earl, originally personal, became hereditary, which took place in England under William the Conqueror, a deputy had necessarily to be appointed in all cases where he was a minor, or otherwise incapacitated from discharging the duties of his office. This deputy gradually became a permanent officer, otherwise known as the Sheriff, whose Latin designation continued to be *vicecomes*. The hereditary title of viscount is a degree of nobility unconnected with office. It was first granted in England to John Beaumont, created a peer by the title of Viscount Beaumont in 1440. A viscount is now the fourth degree of nobility in the United Kingdom. His coronet consists of a chased circlet of gold, round which are ranged an indefinite number of pearls, nine of them being most generally shown, smaller than those of a baron's coronet, and in contact with each other. The mantle is scarlet, and has two doublings and a half of ermine. A viscount is styled 'Right Honorable;' his wife is a viscountess; his eldest son has no courtesy title of peerage; but all his sons and daughters are styled 'Honorable.'



Viscount's Coronet.

VI'SCUM. See MISTLETOE.

VISE (*Escalier à Vis*), a spiral or corkscrew staircase, the steps of which wind round and rest on a perpendicular pillar, called the Newel (q. v.). In the Norman style, the steps rested on a spiral arch; but in later times, the steps were formed of single stones, stretching from the newel to the wall. This kind of staircase was that most generally used in medieval buildings.

VI'SEU, an episcopal city of Portugal, in the province of Beira, stands in a wide, fruit-producing plain, at the height of 1300 feet above sea-level, 50 miles north-east of Coimbra. Its cathedral is a striking flamboyant edifice, and contains a number of excellent pictures by Gran Vasco, the Portuguese Fra Angelico. In the vicinity is the Roman camp, called Cava de Viriato. The town, which is one of the oldest in the country, contains other Roman as well as Gothic and Moorish remains. A large fair is held here. Pop. (1878) 7242.

VI'SHNI-VOLOTCHE'K, a town of Russia, in the government of Tver, about 230 miles south-east of St. Petersburg by railway. It is situated on the Tzna, on the Vishni-Volotchek water-route constructed by Peter the Great, and connecting the navigation of the Baltic and Caspian Seas, by means of the Volga, &c. There is a very extensive transit-trade. An immense quantity of corn passes through the town every year. Pop. (1880) 38,250.

VISHN'U is the second god of the Hindu triad, but is considered by his worshipers to be the supreme deity of the Hindu pantheon. See TRIMURTI and VAISHN'AVAS. The word is derived, by *S'ankara* (q. v.), in his commentary on the thousand names of V., and by other commentators after him, from *vish*, encompass, or *vis'*, penetrate; when, according to them, it would imply the deity who encompasses or penetrates the whole universe, both as regards its exterior appearance and its inward essence. A similar etymology is assigned to the word by *Yâska* (q. v.) in his gloss on the R'igveda; but as in this Veda, V. does not yet embody the notions connected with him at the epic and Purânic period of Hinduism (see INDIA, sec. *Religion*), Yâska does not impart to the name the implied sense given to it by the commentators just mentioned. In the R'igveda, V. is a representation of the sun, who 'strides through the seven regions of the earth,' and 'in three ways plants his step' (or, as Yâska explains, plants his steps so as to become threefold). And, according to one predecessor of Yâska, these three steps mean the manifestation of the sun at its place of rising, on the meridian, and at its place of setting; or, according to another, its manifestation on earth, in the intermediate space, and in heaven; when—as a later commentator observes—in the first of these manifestations, V. represents fire; in the second, lightning; and in the third, the solar light.

From this position which V. holds in the R'igveda (see VEDA), it results that he was not regarded there as supreme, or even as

equal, to other deities, who, at the Vedic period, occupied a foremost rank. He is extolled in several hymns as having 'established the heavens and the earth,' as 'being beyond mortal comprehension,' and so forth; but he is there also described as having derived his power of striding over the world from *Indra* (q. v.), and as celebrating the praises of this god. He is frequently invoked together with the latter, but apparently always as inferior to him; and often, too, he occurs in company with a number of other gods, such as Varun'a, the Maruts, Rudra, Vâyu, the luminous deities called *Adityas*, and others, without any distinction being drawn in their respective rank. Fewer hymns, moreover, are separately devoted to his praise than to that of Agni, Indra, or other prominent gods of the Vedic period; and it deserves notice, too, that at that period he was not yet included amongst the Adityas, for only at the epic period, when the number of these deities, originally varying from six to eight, was raised to twelve, V. was included in it—he then being named as the foremost of these luminous offsprings of Aditi, or space.

Although some of the Brâhman'as of the Vedas (q. v.) already show the progress which the solar V. had made in the imagination of the people, and although they contain the germ of several legends, which, at a later time, became fully developed, the really mythological character of this god, as the basis of the divine worship now paid him by a large class of the Hindu population, belongs to the epic poems—the *Râmâyan'a* and *Mahâbhârata* (q. v.) —and to the *Purân'as* (q. v.). In the Mahâbhârata, V. is often identified with the supreme spirit; but while in some portions of this poem—the different parts of which belong to different epochs of Hindu antiquity—he is thus regarded as the most exalted deity; he is again, in others, represented as paying homage to S'iva (q. v.), the third person of the Trimûrti, and as acknowledging the superiority of this god over himself. Taking, therefore, the Mahâbhârata as a whole, he does not occupy, in this epos, the exclusive supremacy which is assigned to him in the Râmâyan'a, and still more in those Purân'as especially devoted to his praise.

The large circle of myths relating to V., in the epic poems and Purân'as, is distinguished by a feature which, though not quite absent from the mythological history of S'iva, especially characterizes that of Vishn'u. It arose from the idea, that whenever a great disorder, physical or moral, disturbed the world, V. descended 'in a small portion of his essence' to set it right, to restore the law, and thus to preserve creation. Such descents of the god are called his *Avatâras* (from *ava* and *tr'î*, descend); and they consist in V.'s being supposed to have either assumed the form of some wonderful animal or superhuman being, or to have been born of human parents, in a human form, always, of course, possessed of miraculous properties. Some of these Avatâras are of an entirely cosmical character; others, however, are probably based on historical events, the leading personage of which was gradually endowed with divine attributes, until he was regarded as the incarnation of the deity itself. With the exception of the last, all these Avatâras belong to the past; the last, however, is yet to come. Their number is generally given as ten, and their names in the following order: 1. The fish-; 2. The tortoise-; 3. The boar-; 4. The man-lion-; 5. The dwarf-; 6. The Paras'u-Râma-; 7. The Râmachandra, or, briefly, Râma-; 8. The Kr'ishn'a and Balarâma-; 9. The Buddha-; and 10. The Kalki- or Kalkin-Avatâra. This number and enumeration of Avatâras, however, was not at all times the same.

The Mahâbhârata, though also mentioning ten, names successively the Hansa-, tortoise-, fish-, boar-, man-lion-, dwarf-, Paras'u-Râma-, Râma-, Sâtvata-, and Kalkin-Avatâras. The Bhâgavata-Purân'a speaks of twenty-two Avatâras of V., which, for instance, also comprise Pr'ithu (q. v.), Dhanvantari, the god of medicine, and Kapila, the reputed founder of the Sânkhya (q. v.) philosophy. Other works have twenty-four Avatâras, or even call them numberless; but the generally-received Avatâras are those ten mentioned before, an idea of which may be afforded by the following brief account.

1. The *Matsya-* or *fish-Avatâra*.—When, at the end of the last mundane age, the Bhâgavata-Purân'a relates, Brahman, the first god of the Trimûrti, had fallen asleep, a powerful demon, *Hayagrîva*, stole the Vedas which had issued from the mouth of Brahman, and lay by his side. About that time, a royal saint, *Satyavrata*, had by his penance attained the rank of a Mann, and V., who had witnessed the deed of Hayagrîva, and intended to slay him, assumed for this purpose the form of a very small fish, and glided into the hands of the saint when the latter made his daily ablutions in the river. Manu, about to release the little fish, was addressed and asked by it not to expose it to the danger that might arise to it from the larger fish in the river, but to place it in his water-jar. The saint complied with its wish; but in one night the fish grew so large, that at its request he had to transfer it to a pond. Yet soon the pond also becoming insufficient to contain the fish, Manu had to choose a larger pond for its abode; and, after successive other changes, he took it to the ocean.

Satyavrata now understood that the fish was no other than *Nârâyan'a* or V., and, after he had paid his adoration to the god, the latter revealed to him the imminence of a deluge which would destroy the world, and told him that a large vessel would appear to him, in which he was to embark together with the seven Rishis, taking with him all the plants and all the seeds of created things. Manu obeyed the behest of the god: and when the water covered the surface of the earth, V. again appeared to him in the shape of a golden fish with a single horn, 10,000 miles long; and to this horn Manu attached the vessel, by means of V.'s serpent serving as a cord. While thus floating in the vessel, Manu was instructed by the fish-god in the philosophical doctrines and the science of the supreme spirit; and after the deluge had subsided, the fish-god killed Hayagrîva, restored the Vedas to Brahman, and taught them to the Manu Satyavrata, who in the present mundane age was born under the name of *S'râddhadeva*, as the son of Vivasvat.

A fuller account of this Avatâra is given in the *Matsya-Purân'a*, where the instruction imparted to Manu by the fish-god includes all the usual detail contained in a Purân'a (q. v.), that relating to creation, the patriarchs, progenitors, regal dynasties, the duties of the different orders, and so forth. In the Mahâbhârata, where the same legend occurs, but without either that portion concerning Hayagrîva, or the instruction imparted by the fish, there is, besides minor variations, that important difference between its story and that of the Purânas, that the fish is not a personification of V., but of Brahman, and that the deluge occurs in the present mundane age, under the reign itself of the Manu, who is the son of Vivasvat.—The origin of this Avatâra is probably a kindred legend, which occurs in the *S'atapathabrâhman'a*, of the White Yajurveda (see VEDA); but there the fish does not represent any special deity, and the purpose of the legend itself is merely to account for the performance of certain sacrificial ceremonies.

2. The *Kûrma-* or *tortoise-Avatâra*.—When, of old, the gods felt their powers impaired, and were desirous of obtaining *Amr'ita*, the beverage of immortality, V. directed them to churn, together with the demons, the milk-sea, by taking the mountain *Mandara* for their staff, and his serpent *Vâsuki* for their cord, the gods to stand at the tail, and the demons at the head of the serpent; while he himself consented to support the mountain on his back, after having assumed the shape of a gigantic tortoise. The result of this churning of the sea of milk, was, besides the ultimate recovery of the Amr'ita, the appearance of a variety of miraculous things and beings; but it also led to a violent contest between the gods and demons, in which the latter were defeated. See RAHU. —The idea of the lord of creation assuming the shape of a tortoise, and that of sacrificial liquids, especially clarified butter, becoming tortoise-shaped (*Kûrma*, the word for tortoise, meaning literally, 'badly or slowly going'), occurs also in the Yajurveda; but the legend on which the tortoise-Avatâra of V. is based seems to belong entirely to the post-Vedic period of Hindnism.

3. The *Varâha-* or *boar-Avatâra*.—It is supposed to have taken place when, at the period of creation, the earth was immersed in water, and V., in order to raise it up, assumed the form of a gigantic boar. In the earlier recension of the *Râmâyan'a*, and the *Linga-Purân'a*, it was Brahman, the creator of the universe, who transformed himself into a boar for rescuing the earth from its imperiled position; and in the *Black Yajurveda*, where this idea is first met with, it is likewise said that the lord of creation upheld the earth, assuming the form of a boar. At a later period, however, this Avatâra is generally attributed to Vishn'u. Between both conceptions there is, however, also this great difference, that in the former the transformation of the deity into a boar has apparently a purely cosmical character, whereas in the latter 'it allegorically represents the extrication of the world from a deluge of iniquity, by the rites of religion.' (Wilson's translation of the *Vishn'u Purân'a*, second ed., by F. Hall, vol. i. p. 59, note.) For the boar, as an incarnation of V., is the type of the ritual of the Vedas. He is described as the sacrifice personified; his feet being the Vedas; his tusks, the sacrificial post to which the victim is tied; his teeth, the sacrificial offerings; his month, the altar; his tongue, the fire; his hairs, the sacrificial grass; his eyes, days and night; his head, the place of Brahman; his mane, the hymns of the Vedas; his nostrils, all the oblations; his snout, the ladle of oblation; his voice, the chanting of the Sâmaveda; his body, the hall of sacrifice; his joints, the different ceremonies; and his ears as having the properties of voluntary and obligatory rites (*Vishn'u-P.*, vol. i. p. 63); and similar descriptions of the boar occur in the Harivan's'a (q. v.) and elsewhere; besides those relating to the immense size and wonderful appearance of the mysterious animal. In the *Bhâgavata-Purân'a*, another legend is also connected with this incarnation of V., still more distinctly proving that, at the Purân'ic period, it was viewed in a purely religious light. According to this legend, *Jaya* and *Vijaya*, two doorkeepers of V., once offended some Munis who claimed admission to the paradise of V., and in consequence were doomed to lose their position in V.'s heaven, and to be reborn on earth. They became thus the sons of *Kas'yapa* and *Diti*, under the names of *Hiran'yakas'ipu* and *Hiran'yâksha*. The former subdued the

three worlds, and the latter went straight to heaven, to conquer also the gods. Thus threatened in their existence, the gods implored the assistance of V.; and V., who at that period was the mysterious or primitive boar, slew Hiran'yâksha.

A similar contest between V. as boar and numerous demons, the progeny of Diti, always ending in the defeat of the latter, is also described in the *Mokshadharma*, one of the later portions of the Mahâbhârata; and from this and similar descriptions, it follows that the boar-Avatâra had gradually lost its original character, and assumed that common to the remaining Avatâras of representing the deity as become incarnate, for the purpose of remedying moral or religious wrong, or of destroying influences hostile to the pretensions of the Brâhmanic caste.

4. The *Nr'isinha-* or *man-lion-Avatâra.*—*Hiran'yakas'ipu*, the brother of the demon Hiran'yâksha just mentioned, had resolved to become a sovereign of the three worlds, and exempt from death and decay. To attain this end, he practised severe austerities, and ultimately received from Brahman, as the desired reward, a promise that he should become a supreme ruler, and death should not accrue to him from any created being, neither within his abode nor without, neither by day nor by night, neither in heaven nor on earth, nor by any kind of weapon. Possessed of the grant of this boon, he now gave course to the hatred he had conceived against V. for having killed his brother Hiran'yâksha. He oppressed all the gods, robbed them of their shares in the sacrifices, and threatened their destruction. But he had a son, *Prahrâda* or *Prahlâda*, who, through his religious studies and pious conduct, had become a devout worshiper of Vish'nu. When Hiran'yakas'ipu became aware of his son's partiality for this god, he first endeavored to impart to him his own hostile feelings against V., but failing in this, resolved to kill him. All the means, however, he employed to this end remained vain; and when at last, Hiran'yakas'ipu, about to cut off the head of his son, sneeringly asked him why V., who, as he asserted, was everywhere, should not be present also in a pillar in the hall, which he struck with his fist, V. suddenly made his appearance in the shape of a being neither man nor animal, in that of a man-lion of fearful aspect and size; and after a violent struggle with the demon, killed him in tearing his heart out with his finger-nails. Prahlâda was then installed by him as sovereign over the demons, and, at the end of a pious reign, obtained final liberation.

5. The *Vâmana-* or *dwarf-Avatâra.*—Prahlâda's son was *Virochana*, and his son was *Bali*. The latter, after having conquered Indra (q. v.), ruled over the three worlds, and filled the gods with dismay for their future prosperity. They had, in consequence, recourse to V.; and when, at one time, Bali was celebrating a grand sacrifice, V., assuming the shape of a dwarf, humbly approached the demon king. Pleased with the devout and unpretending appearance of the little Brâhman, Bali asked him to demand a boon, however costly it might be. The dwarf, however, merely asked for so much ground as he could measure with three paces. The king smilingly granted so modest a request, though his family priest *Us'anas*, suspecting the true nature of the dwarf, strongly dissuaded him from doing so. But when the dwarf had obtained what he asked for, he strode with one pace over the earth, with a second over the intermediate space (the atmosphere), and with a third over the sky, thus leaving for Bali only the subterranean regions, which he assigned him for his future abode. The demons endeavored to frustrate this result, after V. had taken his first two strides, but they were overcome by the followers of V.; and Bali, when resigning himself to his fate, in reply to a reproach addressed to him by the dwarf for trying to break his promise, uttered—according to the Bhâgavata-Purân'a—the following words, which may serve as one of many instances to show how sacred a promise was held by the Hindus when once given, and even though artfully obtained: 'If, renowned chief of the gods, you consider the word which I uttered to be deceitful, I now do what is sincere, and can be no deception—place your third step on my head. Fallen from my position, I fear not the infernal regions, or binding in bonds, or misfortune difficult to escape, or loss of wealth, or your restraint, so much as I am afflicted by a bad name.' (See J. Muir's *Original Sanscrit Texts*, vol. iv. p. 128). For his righteousness, he was then rewarded by V. with the promise, that after a temporary residence in one of the most delightful places of Pâtala (q. v.), he should be born as the Indra, in the reign of the eighth Manu. In this incarnation as dwarf, V. is considered to have been a son of the same Kas'yapa who is also the father of Hiran'yakas'ipu and Hiran'yâksha; but while their mother is Diti, the dwarf's mother is Aditi (space); and since she previously had brought forth Indra, V. is sometimes called Upendra, or the younger or later Indra. As a son of Aditi, V. becomes one of the Adityas (see before).—The Vedic conception of the three strides of V., as mentioned in the beginning of this article, is doubtless the basis of the idea whence this Avatâra arose.

6. The *Paras'u-Râma-Avatâra*, or V.'s incarnation as Râma, the son of Jamadagni, armed with an axe (*paras'u*). *Arjuna*, a son of *Kr'itavîrya*, and king of the Haihayas, had obtained, as a reward for his piety, a thousand arms, and the sovereignty over the earth. The gods, frightened at his power, had recourse to V., and the latter resolved to be born as a son of Jamadagni, that he might slay him. Jamadagni was the son of *R'ichîka*, of the race of Bhr'igu, a pious sage who had married *Ren'ukâ*, the daughter of king *Prasenajit*, and had obtained five sons by her, the last of whom was *Râma*, or V. incarnate in this form. Ren'ukâ having once, for some supposed impropriety, incurred the anger of her husband, was, at his bidding, killed by her son Râma, but at the request of the latter, again restored to life; and her first four sons were likewise saved from the consequence of the wrath of Jamadagni by the intercession of their brother Râma. After this event had happened, or, as one account goes, previously to it, Arjuna came to the hermitage of Jamadagni, and was there hospitably received by the saint, who could treat him and his followers sumptuously, as he possessed a fabulous cow of plenty, that not merely supplied him with the milk and butter required for his sacrificial offerings, but with everything else he wished for. Struck by the precious qualities of this cow, and in spite of the kind treatment he had met with, Arjuna carried off with him the cow and her calf.

When Râma, who, on this occasion, had been absent from home, returned to the hermitage, and learned what had happened, he took up his axe (or, as the Mahâbhârata says, his bow), and slew Arjuna, together with his army. The sons of the latter, to revenge their father's death, after some time, attacked the hermitage, and succeeded in killing Jamadagni. Thereupon, Râma made a vow to extirpate the whole Kshattriya or military race; and not satisfied with destroying the sons of Arjuna, he killed every Kshattriya whom he encountered afterwards. In this manner, the legend concludes, 'he cleared thrice seven times the earth of the Kshattriya caste'—killing the men of so many generations as fast as they grew to adolescence—'and filled with their blood the five large lakes of Samantapanchaka, from which he offered libations to the race of Bhr'igu.' He then performed a solemn sacrifice, and distributed the land and many riches amongst the ministering priests. The Mahâbhârata, which on two occasions relates this legend, in one place enumerates the Kshattriyas who escaped the destruction of their caste, and from whom the lines of the kings hereafter were continued; this account, however, is inconsistent with Purânic lists, in which the royal lineages are uninterrupted. There can be little doubt that a real historical conflict between the Brâhman'as and Kshattriyas underlies the conception of this Avatâra; one which has its parallel in the history of Vasisht'ha and Vis'wâmitra (q. v.).

7. The *Râmachandra-* or, briefly, *Râma-Avatâra.*—*Râvan'a*, a king of *Lankâ*, or Ceylon, a monster with ten heads and twenty arms, had, by dint of austerities, obtained from Brahman the promise that neither gods nor demons should be able to take his life. In consequence, he oppressed the whole universe: the sun dared not shine hot, or the fire burn, or the wind blow, where he stood, and the ocean, when it saw him, became motionless. The gods, thus seeing the world and their own existence endangered, implored Brahman to protect them; and he, remembering that the demon, when asking for the boon he had granted him, omitted to include men among the beings that should not hurt him, advised the gods to pray to V. to become incarnate. This they did, and V. granted their prayer. At that time, *Das'aratha*, a king of Ayodhyâ, of the solar line of Hindu kings, performed the great horse-sacrifice in order to obtain sons; for though he had three wives, *Kaus'alyâ*, *Sumitrâ*, and *Kaikeyî*, he was without male progeny.

This sacrifice became successful, for, when on the point of completion, a supernatural being appeared to him with a divine beverage, one-half of which he was to give to Kaus'alyâ, one-fourth to Sumitrâ, and the remaining fourth to Kaikeyî. And as this nectar which he gave them contained the divine essence of V., *Râma*, the son whom Kaus'alyâ brought forth, became one-half, the twins *Lakshman'a* and *S'atrughna*, born by Sumitrâ, together one-fourth, and *Bharata*, the son of Kaikeyî, another fourth, of the substance of Vishn'u. While Râma and his brothers were still boys, the sage *Vis'wâmitra* (q. v.) came to the court of Das'aratha, requesting him that he should allow Râma to proceed to his hermitage, in order to destroy there the Râkshasas, or fiends, who infested it, and disturbed his sacrificial rites. Though reluctantly, Das'aratha gave his consent to his departure; and Râma, accompanied by his brother Lakshman'a—who, throughout his brother's career, remained his faithful companion and ally—started on his first eventful journey; for it was marked by a number of wonderful exploits which he performed in killing the demons, and which already then revealed his divine mission.

Having fulfilled the desire of Viswâmitra, he proceeded to Mithilâ, where King *Janaka* held a great assembly of kings, having promised to give in marriage his daughter *Sîtâ* (q. v.) to the prince who would be able to bend the bow with which S'iva (q. v.) once conquered the gods at the sacrifice of Daksha, and which now was in his trust. Yet so large and heavy was this bow, that not even the strongest of them could so much as move it. But when

Râma arrived, and the bow was shown him, he lifted it up and bent it, as it were in sport, and ultimately even broke it in the middle. Sîtâ became thus the wife of Râma; while Janaka gave *Urmilâ* to Lakshman'a, *Mân'd'avî* to Bharata, and *S'rutakîrtti* to S'atrughna. On his way home, Râma met *Paras'urâma* (see the sixth Avtâra), who, having heard of his namesake's bow-feat at the court of Janaka, challenged him to bend also the bow of V., which he had received from his father, Jamadagni, and if he could do so, to a single combat. Râma, displeased with the doubt of Paras'nrâma in his strength, immediately seized the bow, bent it, and would have killed the son of Jamadagni, had he not respected his quality as a Brâhman: still, he destroyed the worlds which the latter had acquired by his penance, and thus excluded him from heaven. (This account given of the meeting of the two Râmas, in the Râmâyan'a, would seem to show that at the time when this poem was composed, the *Paras'urâma* was not yet conceived as an incarnation of V., since he is represented in it as jealous of the defeat which S'iva's bow had suffered at the hands of the son of Das'aratha.)

After this event, Bharata, and his brother S'atrughna, were sent by their father on a visit to Bharata's maternal uncle, *As'wapati;* and Das'aratha, who was old, and desired to retire from the world, made all preparations for installing his eldest son, Râma, as heir-apparent to the throne of Ayodhyâ. But in this design he was frustrated; for, through the intrigues of *Mantharâ*, the hunchbacked nurse of Bharata, and his queen Kaikeyî, he was, in a weak moment, prevailed upon to grant any wish which the latter would ask of him; and Kaikeyî, availing herself of Das'aratha's rashly-given promise, demanded of him the installation of her own son, Bharata, as heir-apparent, and the banishment to the forest of Râma for a period of fourteen years. A promise once uttered being irrevocable, and Râma having resolved not to cause a word given by his father to remain vain, neither the wishes of the people of Ayodhyâ nor those of Bharata and S'atrughna, who meanwhile had returned, and were enraged at what had occurred, could shake his determination to submit to his exile. Das'aratha died in consequence heart-broken, and Bharata assumed, till the return of Râma, the government of Ayodhyâ.

The long exile of Râma which now followed, and was shared in by his brother Lakshman'a, became, then, the source of the wonderful events which should hereafter lead to the destruction of the demon Râvan'a. They began with a series of conflicts which he had to sustain with the Râkshasas, who infested his forest abode, and which invariably, of course, ended in the destruction of these beings. One of these conflicts, however, was especially pregnant with the destiny he had come to fulfil. Râvan'a's sister, *S'ûrpan'akhâ* (lit., a female whose finger-nails were like winnowing baskets), was one of those demons who haunted the woods. She fell in love with Râma, but was repelled by him; and when, in a fit of jealousy, she attacked Sîtâ, Lakshman'a cut off her ears and nose. Enraged at this treatment, she repaired to her brother Râvan'a, and in order better to stimulate his revenge, she also excited in him a passion for Sîtâ. Râvan'a therefore started off for the forest Dan'd'aka, where Râma lived; and, aided by another demon, Marîcha, who transformed himself into a golden-colored deer, and thus enticed both brothers away from the hermitage, to chase after it, succeeded in carrying off Sîtâ to his capital.

By means of some other supernatural events then happening, Râma discovered the fate of his wife; and the remainder of his exile is now filled up with his preparing for war with Râvan'a, conquering, and destroying him, and recovering Sîtâ, whose honor had remained untarnished during her long and severe trials when kept as a prisoner in the harem of Râvan'a. Some of the incidents of this struggle are of special interest, inasmuch as they are the basis of traditions still prevalent in India. They chiefly relate to the allies of Râma, who were no other than miraculous bears and monkeys, and by their magic powers mainly brought about the defeat of Râvan'a and his armies, while also helping him to communicate with Sîtâ during her captivity. All these bears and monkeys were of divine origin, produced at the behest of Brahman by the gods for the express purpose of becoming the allies of Râma. Thus, the bear-king, *Jâmbuvat*, issued from the mouth of Brahman himself; *Bâli* was a son of Indra; *Sugrîva* of the Sun; *Târa*, of Vr'ihaspati; *Gandhamâdana*, of Kuvera; *Nala*, of Vis'wakarman; *Nîla*, of Fire; *Sushen'a*, of Varun'a; *S'arabha*, of Parjanya; and the most renowned of all, *Hanumat*, was a son of Wind. See the article HANUMAN, where several of his feats are mentioned.

They overbridged the sea, to carry their armies to Ceylon—whence the line of rocks in the channel is still called *Râmasetu*, or Râma's Bridge—in the English maps, Adam's Bridge; they brought large rocks from the Himâlaya to support the bridge—whence the numerous rocks scattered all over India are supposed to have arisen as they dropped down on their transport to the sea; and they performed similar other feasts, still commemorated in festivals performed in honor of Hanumat and his tribe. As is the case in other Avatâras of V., there is also in the Râma-Avatâra a personage who, though nearly related to the fiend doomed to destruction, acknowledges the divine nature of the incarnate god, and dissuades his friends from opposing him. In this Avatâra, such a personage is *Vibhîshan'a*, the uncle of Râvan'a, whose counsel, however, is disregarded. Similarly disposed is also *Kumbhakarn'a*, the brother of Râvan'a, who likewise understands that Râma is V.; but, as he yields to the orders of his brother, his fate is death.



Agni. Sîtâ. Hanumat. Râma.

Fig. 1.—Sîtâ is seen undergoing the fire ordeal, to satisfy the world of her chaste escape from the power of Ravan'a, comforted by the presence of Agni, the God of Fire.—From Moor's *Hindu Pantheon.*

Vibhîshan'a, however, in reward of his proper conduct, is, after Râvan'a's death, placed on the throne of Ceylon. When, at the end of this fierce war, the time fixed for Râma's exile had expired, he returned to Ayodhyâ with Sîtâ, whose purity had previously been tested by an ordeal of fire, and there received back from Bharata the sovereign power which, in the meantime, the latter had exercised in his stead; and at the end of a long and glorious reign, he became reunited with the splendor of Vishn'u. The story of this incarnation is briefly told in an episode of the Mahâbhârata (q. v.), and in several Purân'as; with the fullest detail, however, in the *Râmâyan'a* (q. v.). A copious abstract of the latter is given in the poem *Bhat't'ikâvya*. See SANSCRIT LITERATURE. The English reader may consult, for some further detail, an 'Analysis of the Râmâyan'a,' in Professor Monier Williams's *Indian Epic Poetry* (Lond. 1863).

8. The *Kr'ishn'a-Avatâra* and *Balarâma-Avatâra*.—The former of these two, which are generally treated as one, is the most interesting incarnation of V., both on account of the opportunity which it affords to trace, in Hindu antiquity, the gradual transformation of mortal heroes into representatives of a god; and on

account of the numerous legends connected with it, as well as the influence which it exercised on the Vaishn'ava cult (see VAISHN'AVAS). In the Mahâbhârata (as Dr. Muir has shown in the fourth volume of his excellent work, *Original Sanscrit Texts*), Kr'ishn'a —which literally means, 'the black or dark one'—is sometimes represented as rendering homage to S'iva (q. v.), and therefore acknowledging his own inferiority to that deity, or as recommending the worship of Umâ (q. v.), the consort of S'iva, and as receiving boons from both these deities. In some passages, again, he bears merely the character of a hero endowed with extraordinary powers, and, in some, his divine nature is even disputed or denied by his adversaries, though they are ultimately punished for this unbelief. As the intimate ally of the Pân'du prince, Arjuna (see PAN'DAVAS), he claims, especially in the philosophical episode, the Bhagavadgîtâ, the rank of the supreme deity; but there are other passages, again, in the Mahâbhârata, in which the same claim of S'iva is admitted, and an attempt is made at compromising their rival claims by declaring both deities one and the same. Sometimes, moreover, Kr'ishn'a is, in this epos, declared to represent merely a very small portion—'a portion of a portion,' as it is called—of the divine essence of Vishn'u.

In the Mahâbhârata, therefore, which is silent also regarding many adventures in Kr'ishn'a's life, fully detailed in the Purân'as, the worship of V. in this incarnation was by no means so generally admitted or settled as it is in many Purân'as of the Vishn'uit sect; nor was there, at the epic period, that consistency in the conception of a Kr'ishn'a-Avatâra which is traceable in the later works.—The principal legends relating to Kr'ishn'a, as he appears in the Harivans'a and the Purân'as, are the following: A demon king, *Kansa* of Mathurâ, of the race of Yadu, and therefore of the lunar line of kings, who, in a former birth, had been the demon *Kâlanemi*, had deposed and imprisoned his father *Ugrasena*, and oppressed with his iniquitous hosts, the Earth; and Earth having laid her complaints before an assembly of the gods on Mount Meru, Brahman prayed to V. to relieve the world of its distress. When he had ended his prayer, V. plucked off two hairs, one white, and one black, and promised the gods that these two hairs should become impersonated as *Balarâma* and *Kr'ishn'a*, sons of Devakî, to fullfil their wishes. Now, Devakî, who, in a former life, had been Aditi (space personified), was a wife of Vasudeva, who was of the race of Yadu, and a relative of Kansa; but as Kansa had been warned by a voice in heaven that their eighth child would be an incarnation of V., he placed both husband and wife in confinement, after having obtained, though, from Vasudeva the promise that he would deliver to him every child Devakî would bring forth.

Six children of hers were accordingly given up to Kansa, and destroyed; but when Balarâma, the seventh, was about to come into the world, V. appeared to *Yoganidrâ*, a form of Umâ (q. v.), and directed her to transfer Balarâma before the time of his birth to *Rohin'î*, another wife of Vasudeva, and spread the report that Devakî had miscarried; enjoining her also to become incarnate as a child of Yas'odâ, the wife of an old cowherd Nanda, at the same time that he would become incarnate, as Kr'ishn'a, in the eighth conception of Devakî; for at the time of their simultaneous birth, he added, Vasudeva, aided by him, would bring the infant Kr'ishn'a to the bed of Yas'odâ, and her to that of Devakî. In this manner *Balarâma* and *Kr'ishn'a* were saved, though the infant Durgâ, as soon as born, was dashed by Kansa against a stone, and suffered a temporary death. Kansa having become aware that his design had been frustrated, now ordered the destruction of all young children wherever they might be found, but considering it useless to keep Devakî and Vasudeva any longer in prison, liberated them. Vasudeva, apprehensive of the safety of Balarâma, then took him to Nanda, to be brought up together with Kr'ishn'a; and thus began the earthly career of these two Avatâras of V., in which Balarâma always figures as the friend and ally of his more important brother, Kr'ishn'a.

The first miraculous act of the latter consisted in causing the death of a female demon, *Putanâ*, who suckled, and meant to destroy, him. Then, as a little boy, he overturned a heavy wagon of the cowherds, and pulled down the trunks of two large trees—to the amazement of the cowherds, who did not yet suspect his divine nature, and becoming afraid to remain any longer in Vraja, the place where these events happened, repaired to Vr'indâvan'a. There Balarâma and Kr'ishn'a remained until they had attained seven years of age. At this time, Kr'ishn'a killed a serpent-monster Kâlîya, in the Yamunâ river, and then returned to Vraja. The next exploit of the brothers, more particularly however, of Balarâma, consisted in the destruction of two demons, *Dhenuka* and *Pralamba*, who infested the forests; but that which followed, especially established the fame of Kr'ishn'a, and is one still commemorated in their festivals by the worshipers of this god. When sporting in Vraja, he once found all the cowherds busily engaged in preparing for a sacrifice to be offered to Indra (q. v.). Seeing this, he dissuaded them from worshiping this god, and directed them to address their prayers and offerings to the mountain *Govardhana*. Indra, however, offended by these proceedings, sent a heavy storm, which inundated the country, and threatened to destroy the cattle. Thereupon, Kr'ishn'a plucked up the mountain Govardhana from its base, and held it up as a large umbrella over the cowpens, to shelter the herdsmen and their cattle from the storm.

For seven days and nights they were thus protected by the elevation of the mountain; and Indra, at last convinced of the irresistible might of Kr'ishn'a, came to Govardhana, and worshiped him, obtaining on this occasion the promise that Kr'ishn'a would befriend the Pân'd'u prince, Arjuna, in his conflict with the Kurus (see MAHABHARATA). The episode in the life of Kr'ishn'a which now ensued, and is filled up with the pleasures and sports he enjoyed amongst the Gopîs, or cowherdesses, is that commemorated in the Râsa Yâtrâ, an annual festival celebrated in various parts of India in the month of Kârttika (October—November), and dwelt upon in many poetical works. Of these cowherdesses, later poets especially mention *Râdhâ;* and she is sometimes also represented as the divine or mystical love to which Kr'ishn'a returns at the end of his more worldly amours (see the article JAYADEVA). After some more miraculous deeds, Krishn'a and Balarâma repaired to Mathurâ, where Kansa, in the hope of effecting their death, had invited them to assist at a solemn rite of the lustration of arms, and to engage in a trial of strength with his chief boxers, *Chân'ûra* and *Mush'tika*.

Akrûra, sent by Kansa to convey to them his invitation, had already revealed to them the purpose for which he was despatched; but undaunted by his words, they accomplished their journey, during which they performed several other wonderful deeds, and, arrived at Mathurâ, accepted the challenge of Kansa. The contest ended not only in the death of the two boxers, but in that of Kansa also. Krish'n'a now released *Ugrasena*, Kansa's father, from the confinement in which he was kept, and restored him to the throne of Mathurâ. A number of other miraculous feats now followed in the career of Kr'ishn'a. The principal are his conquering *Jarâsandha*, the father-in-law of Kansa, who came to revenge the death of the latter, and *Kâlayavana*, a king of the Yavanas, who also overran Mathurâ with his armies; and his founding the city of Dwârakâ. At the end of these wars he made a short stay at Vraja, then returned to Dwârakâ, and there married Revatî, by whom he had two sons. But he also carried off violently *Rukmin'î*, the daughter of a king of Vidarbha, who had been betrothed to *S'is'upâla* (q. v.), and had to wage a hot contest with the latter and his allies, before he conquered them. His next war was that with *Naraka*, a demon-king of Prâgjyotisha, who had robbed Aditi of her earrings, and ultimately was put to death by him.

He then repaired to Indra's heaven, to restore to Aditi her earrings; but carrying off a wonderful tree from Indra's garden, got into a conflict with this god; ultimately, however, he was allowed by him to take the tree to Dwârakâ. There he married 16,100 maidens, whom he had rescued from Naraka. Other wars followed, in one of which Kr'ishn'a also fought with S'iva, when siding with his enemy Bân'a, who was a son of Bali. The most important, however, of all these contests is the great war between the Kurus and Pân'd'us, in which Kr'ishn'a was the ally of the latter. According to the *Vishn'u-Purân'a*, Kr'ishn'a's earthly career was brought to its close by an event which has nothing in it of the miraculous, and is more consistent with the end of a mortal hero than with that of an incarnate god. He was accidentally shot in the sole by a hunter, who thought that he was aiming at a deer. The hunter, it is true, is called *Jarâ*, which is a word in the feminine gender, and means 'old age,' or 'decay;' but even if a mere allegory, the story of his end 'from old age,' or an arrow, barely tallies with the character assigned him in the Purân'as, and is therefore sometimes also omitted in the accounts of this Avatâra. —For Balarâma, see also the legend in the article YAMUNA.

9. The *Buddha-Avatâra*, or V.'s epiphany as Buddha.—It is originally foreign to the cycle of the Avatâras of V., and therefore only briefly alluded to in some Puran'âs. Where this is done the intention must have been to effect a compromise between Brahmaism and Buddhism, by trying to represent the latter religion as not irreconcilably antagonistic to the former. See BUDDHISM.

10. The *Kalki-* or *Kalkin-Avatâra*.—It is yet to come, 'when the practices taught by the Vedas and the institutes of the law, shall have ceased, and the close of the Kali or present age shall be nigh.' V. will then be born 'in the family of *Vishn'uyas'as* (possessing the glory of Vishn'u), an eminent Brahman of Sambhala village, endowed with the eight superhuman faculties. He will then destroy all the barbarians and thieves, and all whose minds are devoted to iniquity.'—*Vishn'u-Purân'a*.

V.'s wife is *S'rî*, or *Lakshmî* (q. v.), and his paradise *Vaikunt'ha*. When represented, he is of a dark hue, with four hands, in which he holds a conch-shell, blown in battle, the *Panchajanya;* a disc, the *Sudars'ana*, an emblem of sovereign power; a mace, the *Kaumodakî*, as a symbol of punishment; and either a lotus, as a type of creative power, or a sword, the *Nandaka*. On his breast

shines the jewel *Kaustubha*. He is variously represented: sometimes, as *Nârâyan'a** (see the first Avatâra), when floating on the primeval waters, and resting on *S'esha*, his serpent of infinity—the god Brahman coming out of a lotus that arises from his navel, and Lakshmî being seated at his feet; or riding on *Garud'a*, a being half bird and half man; or seated on a throne, and holding Lakshmî on his lap; or, if he is represented in one of his incarnate forms, as fish, boar, man-lion, &c., he has a human shape, ending in a fish, or a human body with a boar's head, or with a lion's head; or he appears as a dwarf, or (as Paras'urâma) armed with an axe; or (as Balarâma) holding a plough-share.

As Kr'ishn'a, he is generally represented either in a juvenile form, or as an adult, in a dancing posture, and playing on the flute. As Kalki, he has a sword in his hand, and is kneeling before a winged horse. The leading personages or events connected with these Avatâras are likewise frequently associated with the representation of the god: thus, in the representation of the fourth Avatâra, Hiran'yakas'ipu, as being torn open by the man-lion; or, in that of the sixth, the demon Arjuna, fighting with Paras'urama; or, in that of the seventh, the ten-headed Râvan'a, battling with Râmachandra; or Hanumat and the monkey chiefs, paying adoration to the latter; while his brothers stand at his sides, and Sîtâ is sitting on his lap; or, in the eighth Avatâra, the mountain Govardhana, when uplifted by Kr'ishn'a and the Gopîs sporting with him. V. is praised under thousand names, which are enumerated in the *Mahâbhârata*, and have been commented upon by S'ankara and other authors.—For other myths relating to V., the general reader may consult H. H. Wilson's translation of the *Vishn'u-Purân'a*, which has been recently re-edited by Fitzedward Hall (five volumes, with index, Lond. 1864–76); the first nine books of *LeBhâgavata-Purân'a*, traduit et publié par Engène Burnouf, vols. i.—iii. (Paris, 1840—1847); *Harivans'a*, traduit par A. Langlois, vols. i., ii. (Paris, 1834—1835); Lassen's *Indische Alterthumskunde*. vol. i. (2d edition, Leipzig, 1866), vols. ii.—iv. (Bonn and Leipzig 1852—1861); and the first and fourth volumes of John Muir's *Original Sanscrit Texts* (Lond. 1858, 1863); see also the representations of V. in Edward Moor's *Hindu Pantheon* (Lond. 1810).



Fig. 2—Vishn'u as Nârâyan'a.—From Moor's *Hindu Pantheon*.

VISHN'U-PURAN'A. See PURAN'A.

VISIBLE SPEECH, a system of alphabetic characters, each of which represents the configuration of the mouth which produces the sound. The system is the invention of Mr. Melville Bell—the well-known elocutionist, formerly Professor of Elocution in University College, London—and was published in 1867, under the title of *Visible Speech* (Trübner). Mr. Bell has since published a short shilling work—*English Visible Speech for the Million* (Trübner), which is quite enough to give a general idea of the system.

Mr. Bell, believing his system to be practically, as well as theoretically, perfect, was anxious to bring it into general use at once, and accordingly made a very generous offer to relinquish all his rights, if the expense of casting the new types, and publishing the theory of Visible Speech, were defrayed by the government. The proposal was rejected, and Mr. Bell was compelled to publish his system as an ordinary copyright.

Now that the system has been thoroughly tested by the very few who are competent to do so, we are able to give a definite and impartial opinion on its merits, and to say that the absolute perfection that Mr. Bell attributed to it does not exist—that the analysis of sound formation on which it is based is, in some instances, imperfect or erroneous, and that the symbols might, in many cases, be improved, even where there is no fundamental error of analysis to correct.—The chief defects in Mr. Bell's analysis of speech-sounds are: (1) his ignorance of the latest results of German investigations of the mechanism of the throat-sounds (whisper, the Arabic gutturals, &c.); (2) his imperfect knowledge of the *synthesis* of sounds, syllabification, word-division, &c.; (3) errors of detail, especially in the consonants, such as his including *f* under the same category as *l* ('divided' consonants), and his analysis of *th*. Other points are still doubtful, and it is certain that, as our knowledge advances, many other difficulties will appear. But it is none the less true that our very knowledge of these defects is due to the vantage-ground on which Visible Speech has itself placed us. It was an immense advance upon any phonological analysis previously attempted, and opened up once for all the way to arrive at definite results. It was, in short, a *new instrument* placed in the hand of the student of phonetics, and it must, it is clear, for many years to come, continue to be a purely scientific instrument. When finally perfected, there can be no doubt that it will come into general use, and finally supersede the present system.

Apart from the question of absolute perfection, we cannot refuse Mr. Bell's analysis our profound admiration as a great work of genius. Unaided by the resources of the German physiologists, he has completely beaten them on their own ground: where they, with all the resources of the laboratory at their command, have painfully collected a few isolated observations, he has erected a splendid edifice. And it is precisely where they utterly break down—namely in the analysis of the vowels—that his genius shines most brightly. By his discoveries of the distinction of 'narrow' and 'primary,' of the 'mixed' vowels, intermediate between the guttural and palatal ones, and of the compound character of the labial vowels, Mr. Bell has been able to select from the enormous number of shades of vowel-sound (for every movement of the tongue produces a new sound), certain definite formations, thirty-six in number, all definitely correlated, which include, with the various intermediate formations, all possible simple vowel-sounds.

The system of notation is not less a work of genius than the physiological analysis on which it is based. All the letters are formed by the combination of about thirty radical symbols, most of which are to a certain extent pictorial of the action of the organs which produce the sound. Thus a simple circle **o** represents breath issuing from the *open* throat (aspiration); while the *narrowing* of the glottis which produces vocal murmur is symbolized

* 'The waters are called *nâra*, because they were the production of *nara* (or the supreme spirit); and since they were his first, *ayana* (or place of rest, when in the form of the god Brahman), he thence is named *Nârâyan'a* (or resting on the waters).'—*Manu*, i. 10.

by ı, from which, by modifiers to indicate guttural, palatal, 'primary,' 'wide,' &c., all the vowel-symbols are formed. Contraction in the mouth is indicated by a ⊂, and the *part* of the mouth in which the contraction takes place is shown by the direction in which the symbol is turned—thus, ⊂ denotes contraction in the *back* of the mouth (Scotch and German *ch* in *loch*), ⊃ denotes lip-contraction. Complete stoppage is indicated by drawing a line across the opening, giving a symbol resembling ɒ, which turned this way would represent the sound of *p*, while ɑ would represent *k*.

The symbols for vocality, nasality, &c., are similarly incorporated into the consonant symbols. This will be enough to show the two chief features of the system: (1) its simplicity and perfect consistency; and (2) the correlation of the symbols. Thus, when the student has learned to recognize the symbol for *m* as differing from *b* only in the addition of the sign for emission through the nose, he is at once able to recognize and form for himself the symbols of *ng* and *n*, if he is already acquainted with those of *g* and *d*. Such a system is evidently of the highest value in all philological investigations which involve the study of sound-changes in different languages. It has been found that many phenomena of language, such as 'umlaut,' which, when formulated in the ordinary Roman type, require a long technical exposition to be made intelligible, explain themselves at once without further comment when transliterated into the visible speech symbols. It is from the use of visible speech by scientific philologists that we hope most, both for the progress of phonetics and general philology, and also for the improvement and ultimate practical application of visible speech itself.

A striking example is afforded by Dr. J. A. H. Murray's admirable work on the *Southern Dialects of Scotland*, in which the phonetic portion owes its clearness and exactness mainly to the use of visible speech. It has also been employed by Mr. H. Sweet in his *History of English Sounds*. Mr. A. J. Ellis, lastly, the father of scientific phonology in England, although employing a system of his own, refers constantly to visible speech, to establish the absolute value of his symbols.

The practical applications of the system to the acquirement of the pronunciation of foreign languages, to telegraphy, to the instruction of the deaf and dumb (for which it is already largely employed in America), and to general elocutionary purposes, are self-evident. It is clear that visible speech has a brilliant future before it, and it is the duty of all interested in the advancement of science and education to do all they can to disseminate a knowledge of it among all classes.

VI'SIGOTHS. See GOTHS.

VISION, the act of seeing; that faculty of the mind by means of which, through its appropriate material organ, the Eye (q. v.), we are precipient of the visible appearances of the external world. Considered in the latter signification, vision includes questions of high importance in relation to some of the most intricate problems of philosophy; but as this part of the subject has already been discussed under PERCEPTION, the present article will be restricted, as far as possible, to an exposition of the phenomena and laws of vision proper. In opposition to the bulk of mankind, who believe undoubtingly that they actually *see* the externality and solidity of the bodies around them, Bishop Berkeley maintained that these properties are not the immediate objects of sight at all, but are simply ideas derived originally from the touch, and erroneously attributed to vision, in consequence of their having been uniformly experienced concurrently with certain 'visible signs' (as, for example, color), with which alone the sense of sight is truly conversant; and this theory of vision having since received the adhesion of a great majority of the most able metaphysicians, it will be proper to give an outline of its leading propositions. In doing this, we shall at the same time interspere such remarks and counter-statements as may appear to be rendered necessary by the progress of opinion and the results of modern experimental inquiry. First, as to the externality, or outness, of objects; or, which is the same thing, their distance from the eye. This, Berkeley maintains, cannot of itself and immediately be seen. 'For distance being a line directed end-wise to the eye, it projects only one point in the fund of the eye; which point remains invariably the same, whether the distance be longer or shorter.' To this position, everywhere assumed by Berkeley to be indisputable, and by his followers admitted to be so, it may be objected, that it contains an unwarranted assumption, viz., that a ray of light is, by its very nature, incompetent to convey an impression indicative of its possessing length or extension; or, to speak more accurately, it assumes that 'apparent distance' is not at all affected by a variation in the actual length of the ray intervening between the eye and the object. Yet it seems obvious, that the facts of vision do not admit of our arguing the matter, as though the line extending from any point of an object to the eye were a mere mathematical abstraction. Every visible point sends forth diverging rays, which form a cone whose base is on the pupil of the eye; and to the eye, the place of this visible point is at the intersection, real or virtual, of the rays in question: real, when the radiant point is viewed directly; virtual, when the rays, either by refraction or reflection, are diverted from their original path before reaching the eye. To take a case of refraction: if we notice the distance of a shilling lying at the bottom of an empty vessel, we shall observe, upon filling the latter with water, a manifest diminution in the apparent distance of the shilling, the reason being that the rays, on their emergence from the water, are bent outwards, so that the point of their virtual intersection is brought nearer to the eye.

In reflection, the place of a visible point is, in like manner, referred to the point of virtual intersection of the cone of rays incident upon the pupil; and by multiplied reflections, the apparent distance of a point actually adjacent to the eye, may be increased to an almost indefinite degree. It is forcibly contended by Berkeley that these facts, involving, as they do, geometrical considerations known only to few, and by none consciously realized in the act of vision, cannot be concerned in our appreciation of distance by the visive faculty. Yet these, and numberless similar experiments, render it evident that both 'apparent distance' and 'apparent place' are closely dependent upon these geometrical conditions; and, therefore, without assuming that vision is performed by the aid of connate or instinctive geometry (a notion justly condemned by Berkeley), it yet seems highly probable that these lines and angles are the exponents and invariable concomitants of an actual operation of light upon the eye, specific in its character, and by reason of its necessarily varying, *pari passu*, with every change in the distance of the point of intersection of the visual rays, fitted to convey to us an intuitive perception of varying distance.

In the article EYE (q. v.), it has been shown (as, indeed, necessarily follows from optical principles) that the eye does actually undergo specific modifications, depending for their amount on the distance of the object; and there therefore seems an intrinsic probability that these distantial variations in the organ of sight are correlated to those facts of our consciousness which we denominate variations of visible (not tangible) distance; and as, furthermore, it may be demonstrated by optical experiments that the 'apparent distance' of a visible point is directly modified, to our perception, by a simple change in the mutual inclination of its diverging rays, it seems an inevitable conclusion, that that agency of light which suggests to our minds differences of distance is competent to suggest distance itself.

Berkeley was quite aware of the necessary connection which subsists between the distance of an object and the divergency of the rays it emits, though it may be doubted whether he adequately weighed the importance of the train of consequences evoked within the eye itself by this variable divergency of incidence; but he affirms that the mind is not by these means helped to a conception of distance except in so far as by experience we have found that increased divergency, carried to the extent of producing 'confused vision,' is constantly associated with diminished distance. And in proof that this association is merely accidental, Berkeley cites a curious optical experiment, which shows that where the incident rays are caused slightly to converge, instead of their suggesting, as one would be led to expect, that the object is at an enormous distance, the result is altogether different; viz., at first, when the eye is close to the lens, and vision distinct, the object is seen at its true distance, but afterwards, as the eye is gradually withdrawn, and vision becomes continually more 'confused,' the object appears to be enlarged in all its dimensions, and to approach nearer and nearer, until it vanishes in mere confusion from the view.

'This phenomenon,' he says, 'entirely subverts the opinion of those who will have us judge of distance by lines and angles, on which supposition it is altogether inexplicable.' To which it may be replied, that the hypothesis being that the mind judges (mediately) by 'the various divergency of rays,' it cannot fairly be tested by experimenting with rays that are convergent, and that necessarily produce conditions of vision the reverse of those normally prevalent. But, besides, it is now certain that the explanation given by Berkeley is not the true one; for it has been shown, by Professor Wheatstone, that when the dimensions of a retinal picture are continuously increased (as is the case in the above experiment), the object appears to approach in the most evident manner.

From the doctrine of Berkeley, that the sight is not immediately perceptive of distance, it necessarily follows that the parts of a solid object will not be seen as some of them more remote than others, but as if situated all in one and the same plane. This opinion has accordingly been maintained by more recent writers; yet its unsoundness seems manifest; for, if objects be originally seen, not as solid objects, but as perspective representations on a plane, then this plane must be seen either at no distance (which is absurd), or at the same distance for all objects (for which no reason and no evidence can be assigned); or at distances varying

with the distances of the objects; but as the last two and only tenable suppositions assume the visual perception of distance, which is the very principle sought to be invalidated, the theory is thus shown to be futile and self-contradictory.

If it be admitted that, by the constitution of the organ of sight in relation to light, we are perceptive of distance at all, it is in the highest degree probable, judging not only from analogy, but from the proved distantial affections of the eye, that we perceive by the sight degrees of distance; and a perception of the latter implies, it has been shown, a perception of trinal dimensions. Now, although it is strenuously maintained by the adherents of Berkeley that this is not a primitive attribute of vision, it is not denied by any, that in the exercise of our mature sight, we do undoubtedly perceive the outness, the distance, and the trinal extension of visible objects; but, say they, these very qualities, not being modifications of light or colors, are only in appearance directly perceived by the eye; they are, in fact, the product of tactual experience, but by long and invariable association with the phenomena proper to sight, are now instantaneously suggested by them, in a manner so intimate that the two sets of perceptions have become, to our consciousness, indissolubly one. This, in effect, is to affirm that we cannot see an object to be possessed of trinal dimensions, until its occupancy of space is assured to us by the touch; whereas, we venture to maintain, that we see objects to occupy space, and that what we owe to experience is a knowledge that the major part of these visible appearances have, underlying them, that which, on our making a proper disposition of our bodies, will produce in us tactual sensations.

We advisedly say the major part, because there are many objects in nature, such, for instance, as wreaths of smoke and vapor, which, though to the sight visibly possessed of trinal dimensions, are totally imperceptible to the touch. And this suggests the remark, that a great diversity of opinion has arisen out of the ambiguous meaning of the word 'solidity,' by which those who agree with Berkeley always signify, not mere occupancy of space, which, as we have shown, may be associated with a total absence of tangible qualities, but 'resistant extension' in three dimensions, which, beyond all doubt, is solely cognizable by the touch. It is, of course, in the former sense alone that we vindicate to the sight an immediate perception of 'solidity;' and we do not use the term 'occupancy of space' at all in the sense of mechanical exclusion, an idea manifestly derived from touch, but only as affirming the immediately perceived trinal extension of visible objects. It may also be here remarked, that there are many substances of extreme hardness, and therefore in the highest degree perceptible to the touch, which, though set in a strong light, remain quite invisible; as, for example, the sheets of plate-glass used by Professor Pepper in producing his 'ghost-illusions.' Indeed, strictly speaking, all *perfectly* transparent substances, and all *perfectly* reflecting (polished) surfaces, are invisible.

Again, there are many appearances in nature, into our perception of which there enters no element of tactual experience, even as it respects variety of surface (color, of course, being excluded from this consideration); as, for example, the waves of the sea, spread out in long undulating lines, or breaking in foam upon the shore; and all those objects which, by their minuteness and the delicate diversifications of their shape and outline, elude the cognizance of the touch. These facts are adduced simply to illustrate the complete distinction and independence which subsists between the two sets of sensations, originating, respectively, with the sight and the touch—a point strongly enforced by Berkeley himself, who did not hesitate to affirm, not only that our habit of referring the two sets of sensations to the same objects is the mere effect of our having experienced them together, but that the two sets of ideas thus 'intromitted into the mind' belong, in fact, to two classes of objects, numerically distinct—the one outward, distant, and tangible; the other visible, but at no distance, and therefore, in reality, contained within the mind itself. But, as has been well pointed out by Mr. Bailey, this very distinction, taken in conjunction with the undoubted fact, that we do in maturity apprehend by the sight the distance of visible objects, furnishes a strong presumption that those perceptions cannot have belonged originally to the touch.

How little tactual sensations are able to modify visual perceptions is exemplified (as Mr. Bailey remarks) by the fact, that 'a straight stick, with one end placed in a basin of water, would still appear to the sight to be bent at that end, after a thousand proofs by the touch that it was otherwise.' In the same way, the finger immersed in water appears 'unnaturally bent, though the experimenter feels it to be otherwise.'

The nature of 'visible' or 'apparent distance,' and how it compares with 'real distance,' we shall consider when we come to speak of apparent, as contrasted with real magnitude. But we will first inquire what are the optical conditions within the eye itself which determine our perception of the direction of a visible point. Every such point, as we have before remarked, radiates to the eye a cone of diverging rays, whose base is situated in the pupil of the eye; and these rays being refracted in their passage through the eye, are brought to a focus on the retina, thus forming another cone, the base of which is opposed to that of the incident cone, whilst its apex coincides with the focal point of the refracted rays. If the point of emission be placed directly before the eye, it will be seen in the direction of the common axis of these two cones; or, in other words, in the optic axis; and the central point in which this axis passes through the common basis of the two cones is called the optical center of the eye.

Let us suppose, now, another visible point, a little above the first, but at an equal distance from the eye; this, too, will send forth to the eye diverging rays, which will, in like manner, be refracted to a focus upon the retina at a point a little below the preceding; and the line of visible direction will pass from the point of convergence on the retina through the optical center. Now, it is evident that the rays, by means of which we see a visible point, come to the retina from all possible directions within the limits of the cones they collectively form. How comes it, then, that we perceive the object only in one determinate direction? The explanation usually given (founded on experiments in which a portion of the cone has been excluded, without apparant change in the visible direction) is, that, by the constitution of the sense, upon any point in the retina receiving the apex of a cone of rays, we perceive the object in a right line extending from that point of the retina through the optical center; or, according to others, in a right line perpendicular to the surface of the retina at that point. It will, however, be more consistent with the principle that the incidence of light is accompanied by a positive action, related to its direction as well as to its other properties, if we express the law of visible direction by saying, that upon a multitude of rays from all possible directions falling upon a retinal point, the perceived direction is the mean or resultant of them all; which is just as true an account of the phenomena, and amounts, we think, to something more than a verbal distinction.

The optical facts we have thus, in brief, indicated, if followed out with respect to all the visible points forming the objects of sight, render it evident that inverted images of the latter are painted upon the retina; and the inquiry is prompted, how these can give rise to erect vision. On reflection, it will be seen that an explanation of this old and much debated 'paradox of vision,' is involved in the preceding statement of the law of visible direction, in whichever way it may be expressed; and, as has been shown by previous writers, the difficulty itself has arisen solely from the assumption, contrary to fact, that we *see* the retinal pictures, whereas, considered as images, they are not even the means, but only the concomitants of that operation of light by which we see. Even this important distinction, however, does not convey the whole truth; and we trust it will not be deemed an unnecessary refinement, if we point out that in a strict sense there is no *image* upon the retina, but only a concourse of rays, which, *to the eye of another person*, will undoubtedly give the perception of an image, but cannot be affirmed to exist, as an image, except in relation to this second observer. It is therefore with this reservation that the term retinal images is here made use of.

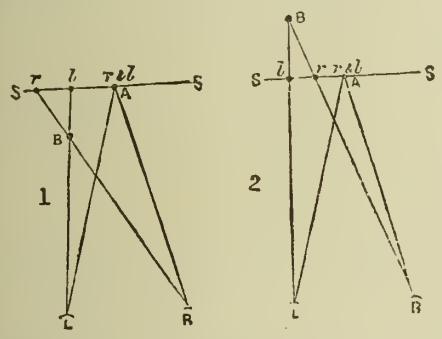
As a consequence of all the lines of visible direction passing through the center of the eye, it follows that as an object recedes from or approaches the eye, its retinal image becomes proportionally less, or greater; and, in like manner, the visible object itself varies in magnitude, under certain limitations, to be presently referred to, with every change in its distance. But as 'the magnitude of the object which exists without the mind, continues always invariably the same,' it is evident, argues Berkeley, that 'whenever we speak of the magnitude of anything, we must mean the tangible magnitude,' which alone is measurable by 'settled stated lengths.' The sense in which this is true, clearly illustrates the nature of magnitude and distance, as apprehended by the sight, in contradistinction to what is called real magnitude and real distance, the product of tactual experience. It must not be understood as imputing to the touch a superiority in mensurative capacity, but as simply meaning, that by the touch we come to know that the external world is endowed with resistant qualities—such as hardness, impenetrability, and incompressibility—qualities which we cannot conceive as modifiable by our bare visual perception of them; and from this experience accrues our conception of the reality and actuality of the magnitude and distance of objects, accompanied by a belief that the variability of magnitude and distance perceived by the sight is an appearance only, and dependent on conditions solely of a subjective kind. If this be a correct view, we are not forced to deny with Berkeley that the objects of sight are numerically the same as those we are cognizant of by the touch.

But we must now pass on to the concluding part of the subject—viz., 'single vision with two eyes;' in treating of which we shall have recourse, almost exclusively, to the masterly researches of Sir Charles Wheatstone, of whose admirable discoveries in this department of knowledge we have already had occasion to speak

in the article STEREOSCOPE (q. v.). It will be obvious to those who have read what is there stated, that the question of single vision with two eyes is naturally divisible into two classes—the first including those cases in which the optic axes are parallel, and the retinal images exactly alike; and the second those in which the optic axes are convergent, and the retinal images dissimilar. Now, to see an object double is to see it in two different places at the same time; and therefore, if it can be shown that by the law of visible direction an impression upon corresponding points of the two retinæ is necessarily referred to the same place, this will account for our single vision of the object at that spot. And on consideration, it will be plain that this is really what happens when the optic axes are parallel, and the images identical. But it is also evident that this explanation does not apply to the second class of instances; in which the only visible point which depicts itself on corresponding portions of the two retinæ, is that point to which the optic axes are directed.

All other points, whether situated before, beyond, or in the plane of the horopter,* are projected upon non-corresponding points of the retinæ; and as these conditions were presumed to be inconsistent with single vision, it was asserted by Aquilonius that objects are seen single only in the plane of the horopter (it has since, with greater consistency, been said, only at the point of intersection of the optic axes); but that this is not true is evinced by our common experience that, without movement of the optic axes, we enjoy a certain limited field of distinct vision. Its complete refutation, however, is involved in the theory of stereoscopic vision, which may be thus explained: Let the optic axis of the right eye (R) and of the left eye (L) be converged on the point A; suppose another point B, slightly to the left, and in advance of A; and then through the point B draw lines from L and R respectively interseeting the plane of the horopter in *r* and *l* (fig. 1).

Now, if two diagrams, SS, be prepared (the one representing *l* and A, and the other *r* and A), and these be presented to their appropriate eyes in the stereoscope, with the view of each eye



limited to its own pictnre, the points *r* and *l* will be seen as a *single* point, situated not on the paper, but in advance of it, in the point of intersection of the lines of visible direction, indicated in the above construction by R*r* and L*l*. If the point B be supposed beyond A, and also to the left of it, the lines drawn from L and R to B will intersect the plane of the horopter in *l* and *r* (fig. 2); and the stereoscopic pictures SS prepared under these converse conditions will exhibit the points *l* and *r* as a single point placed behind A at the point of interseetion of the lines drawn from L and R respectively. This simple rule involves, as it seems to us, the true principle of the stereoscope; and it is capable of being applied to the most complicated stereoscopic pictures. For, in a stereogram, let *l* and *r* stand for identical parts of the left and right pictures respectively, and suppose the pictures superposed; those parts which, read off laterally from left to right, stand in the order *lr* will recede, and those in the order *rl* will protrude (relatively to those parts of the pictures in which *r* and *l* absolutely overlie each other), when the pictures are viewed together in the stereoscope. It appears, then, that vision of the third dimension of space is directly obtained by impressions on non-corresponding retinal points; the proof of this being given in the appearance of solidity experienced in the stereoscope, although perfectly plane representations are alone employed; but it would be an error to suppose that this non-correspondence is without a limit; and the question still remains, to what extent the retinal points affected may be non-correspondent, consistently with single binocular vision.

Without attempting to propose any definite solution of this difficult question, it may, we think, be considered as highly probable that this limit is determined by the same law which regulates our distinct division of objects by means of rays inexactly focussed on the retinæ; for, according to Mr. Abbott, 'as long as the rays are contained within the area of one sensitive minimum, the sensation will be that corresponding to the vision of a point;' and 'a certain amount of dispersion does not interfere with distinct vision.' It seems certain that the double perception which is experienced of the farther of two objects, when the optic axes are fixed on the nearer, or *vice versâ*, can only arise when the object, thus doubled, is situated within the angle of the optic axes (whether before or beyond their intersection); for under these circumstances only, the sensitive points affected are not simply non-correspondent, but are utterly diverse, being in fact on different sides of the centers of the retina in the two eyes. That the law of projection of the various points composing the relief of a stereoscopic object is correctly stated above, is strongly corroborated by a curious experiment of Sir C. Wheatstone's, in which solid objects are placed in the stereoscope, instead of pictures.

As, for example, two skeleton cubes, so placed, that when the optic axes converge upon them, identical pictures are depicted on the retinæ; in which case, all appearance of relief vanishes, and a perfectly plane perspective representation of a single cube is alone visible; the reason being, that the lines of visible direction for each point interseet each other, neither before nor beyond, but *in* the plane of the horopter, where, accordingly, the object is seen as a perspective projection. The same rule holds when the right and left eye pictures are interchanged, for the pictures being supposed, as before, to overlie one another, the parts *lr* become now *rl*; that is, instead of having their point of interseetion beyond the plane of the horopter, they have it before that plane; and this, *mutatis mutandis*, being true of all the parts of the pictures, the stereoscopic resultant is the converse of that which would be perceived but for this abnormal arrangement. In these phenomena, named by Sir C. Wheatstone the 'conversion of relief,' and copiously treated of by him in his various papers, the usual relations of distance also are reversed, the nearer parts being seen as farther, while the latter are perceived to be of larger dimensions than the former; and, the same principle being applied to the vision of solid objects by means of an instrument called the Pseudoscope (q. v.) also invented by Sir C. Wheatstone, they are seen as if turned inside out, and under divers other aspects of a most extraordinary character, some account of which will be found in the article just cited. But, as to many of them, it is proper to mention, that the facility of conversion is found to depend, not on the optical conditions, which, of course, remain invariable, but upon mental conditions, as, for instance, previous familiarity or otherwise with the converse forms suggested; in short, upon our previous *visual* experience.

We have not yet considered those cases in which the retinal pictures are identical, and the optic axes convergent. In these, the law is, that the object is seen in the plane of the horopter, as is conclusively proved by a beautiful experiment, suggested by Sir D. Brewster. If, while looking at a wall-paper, consisting of a small pattern, continually repeated at intervals not exceeding 2½ inches from center to center, we cause the eyes to converge to a point in front of the wall, the paper will appear to advance to that point, and will there be plainly visible, in spite of the contradiction of the touch, which, of course, cannot feel the wall where it is seen; while, on the other hand, the eye can perceive no wall in the place where the touch affirms it to exist. The converse of this experiment, although more difficult to perform, is equally curious and instructive. It has also been shown by Sir C. Wheatstone, that if an increasing convergence of the eyes be unaccompanied by its usual concomitant, a corresponding enlargement of the retinal pictures, the object is seen as if continuously diminished in all its proportions, albeit the size of the retinal images remains unaltered.

This experiment, which, with several others of almost equal interest and importance, may be performed by means of the stereoscope, figured on p. 111, vol. 5 of this work, also establishes that every degree of convergence of the optic axes is associated with the particular adaptation of the eye suited for distinct vision at that distance. This adaptation is, of course, directly dependent upon the divergency, less or greater, of the impinging rays, and this again stands in a necessary relation to the distance, real or virtual, of the point from which they diverge; a branch of the subject to which we have already given sufficient prominence. All observations and experiments concur in showing that a part of the highest importance is played in vision, by the convergence of the optic axes, in particular, in so far as this is conjoined with a difference between the two retinal pictures; and, for this reason, it matters but little that we cannot, within our present limits, enter on a disenssion of the evidence obtained from those persons, blind from birth, who have gained their sight by means of a surgical operation; for, in almost every case, only one eye at a time was operated upon, and the information then obtained from the patients, under circumstances of so much difficulty, is admitted on all hands to be of a very dubious and unsatisfactory character.

By mere modification of the light incident upon the eye, the

* The horopter is a right line drawn through the point of intersection of the optic axes parallel with a line joining the centers of the eyes; a plane drawn through this right line at right angles to the plane of the optic axes, is called the plane of the horopter.

same visible objects may be seen under infinite variations of figure, situation, and magnitude; while, at the same time, their real figure, real situation, and real magnitude, as apprehended by the touch, shall remain unaltered; but these phenomena, artificially induced, argue nothing against the general fact, that under normal circumstances we find, in the very place of the visible objects, those 'dynamical qualities' which form the sum-total of our tactual experiences. To Berkeley is due the credit of having first pointed out the original entire disconnection and subsequent intimate blending of the two sets of experience—visive and tactual; but, if the views here proposed be correct, he erred in supposing that our realization of the geometrical proportions and relations of visible objects, is dependent on the suggestions of touch, and not upon the exercise of a primitive and inherent function of sight. To the popular view, the *objects of sight* have a positive and equal existence in absolute darkness, and are simply rendered visible by the light; whereas they are, in truth, the light itself variously modified.

But, in conclusion, while fully admitting that light and its modifications, viz., color in all its varieties, form the sole objects of sight, we venture to maintain that we only know color by our perception of it, as making up, by its superficial distribution, the visible form and shape of the objects of the outer world; and that this our perception of the shape, relative magnitude, and situation of visible objects is immediate, and strictly regulated by the laws of light in relation to the visual organ, irrespective of, and even in opposition to, tactual experience; but, at the same time, we hold that to the touch alone, we owe our ever-present and ineradicable belief, that these visible appearances have underlying them a materiality which we cannot conceive as actually modified concurrently with those changes of form and magnitude, which are perpetually occurring in relation to our faculty of sight; and therefore, in all questions which relate to real size or real distance, we necessarily have recourse in thought to those qualities of matter which are apprehensible by the touch.

That an instinctive power of direct visual perception is possessed by the young of the lower species, is not denied by any; whether a like power has been bestowed upon man, we must now leave to the consideration of the philosophic reader.

See Berkeley's *Theory of Vision;* Wheatstone *On the Physiology of Vision;* Review of Berkeley's *Theory of Vision*, by Samuel Bailey; review of the last-named work by J. S. Mill, in his Dissertations and Discussions; *Sight and Touch* by T. K. Abbott; Helmholtz's *Popular Lectures;* art. on Vision by Sully, in 'Mind,' Nos. IX. and X.

VISITA'TIONS, HERALDS', periodical circuits which were in use to be performed by the provincial kings-of-arms in England, in order to take cognizance of the arms, pedigrees, and marriages of the nobility and gentry. A visitation is said to have been held as early as the reign of Henry IV.; but the earliest visitation, in pursuance of a royal commission, was made by Thomas Benolti, Clarencieux, in 1528—1529, and comprehended the counties of Worcester, Berks, Oxford, Wilts, Gloucester, and Stafford. From that time, the visitations were repeated at periods varying from 25 to 30 years; never, however, extending to Wales, except on one occasion, in 1581. The latest commission was dated May 13, 1686, and under it some pedigrees were recorded as late as 1703—1704.

The cessation of the visitations seems to have arisen from the frequent prohibitions granted by the Court of King's Bench to stay proceedings in the Earl Marshal's Court, and the abolition of the Constable as a permanent officer, in consequence of which the officers-of-arms found it difficult to enforce attendance. The records of the visitations, though not absolutely free from error, contain a mass of historical and genealogical information of great value. They form the principal source of evidence regarding the hereditary right to bear arms in England. The register-books have been scattered among various public and private libraries, including the British Museum (which possesses 312 visitation-books), the College-of-Arms in London, and the Bodleian Library. Some of them are no longer extant. A number of the visitations have lately been printed, and others are in the press. A catalogue of the visitations preserved in the British Museum was printed by Sir N. H. Nicolas in 1825; an index to the pedigrees and arms in about 250 of the principal MSS. there was published by Mr. Sims in 1849; and an index to all the printed visitations by Mr. George Marshall appeared in 1866.

In Scotland, there was no such regular system of visitations. A statute of James VI. (1592, c. 125) empowered Lyon King-of-Arms to visit the whole arms used within the realm; and visitations were undoubtedly made in pursuance of this act; but they seem to have been very partial, and no record of them is preserved. Something like a general visitation of Scotland again took place after the Restoration, under Act 1672, c. 21, the statute instituting the armorial register in the Lyon Office, which record was constituted the sole legal evidence of a right to bear arms, and has been continued to the present day.

VISITOR, in the Law of England, is one who has a right to inspect the internal government of a corporation or charity. Thus, the ordinary, who is generally the bishop, is the visitor of spiritual corporations. Corporations instituted for private charity and lay foundations are visitable by the founder, or his heirs, or his nominees.

VISOR, or VIZOR, otherwise called BEAUVOIR or BEAVER, the part of the helmet of the middle ages which protected the face. It was perforated to admit light, and movable, so that it could be raised or put down at pleasure. According to the rules established in the later heraldry, the helmet of a knight, when placed over his shield of arms, has the visor up, while that of an esquire has the visor down.

VI'STULA (Lat. *Vistula* or *Visula*, Ger. *Weichsel*, Russ. *Wisla*), an important river of Austria, Poland, and Prussia, rises in Austrian Silesia, near the frontier of Galicia, in a morass in the Jablunka Mountains, 15 miles south-east of Teschen (q. v.), and at the height of 2000 feet above sea-level. Formed by three headwaters, the White, the Little, and the Black Vistulas, the V. flows north-west a few miles to the village of Weichsel, where its course is marked by a fall of 180 feet, and thence to the town of Schwarzwasser, where it leaves the mountains. At this point, the V. turns north-east, and flows in this direction past Cracow, to its confluence with the San, 10 miles below Sandomierz, forming throughout nearly the whole of this part of its course the boundary between Galicia and Poland. From its confluence with the San, the river turns to the north, enters Poland, which it traverses in a general north-west direction, passing Lublin, Warsaw, and Lipno. Leaving Poland, it enters the kingdom of Prussia, flowing west-north-west to its junction with the Bomberger Canal; thence north-north-east, past Kulm and Schwetz, to Graudenz, where it turns north, and flows in that direction to its embouchure in the Baltic Sea, which it enters by several mouths. About 10 miles below Marienwerder, it throws off an arm called the Nogat, which, taking a north-east direction, and after flowing 32 miles, enters the Frisches Haff by about 20 months.

The main stream continues to flow north for 115 miles, dividing, however, into two branches, one of which flows into the Frisches Haff, the other into the Gulf of Danzig at Weichselmunde, 3 miles below Danzig. The V. receives from the right the Bug, the San, the Dunajec, and the Wieprz; from the left, the Pilza and Brahe. The V. is 690 miles in entire length. It becomes navigable at Cracow for small vessels, and for large vessels at the confluence of the San.

VIS VIVA. See WORK.

VISWAMITRA is one of the most interesting personages in the ancient history of India. According to the Aitarêya Brâhman'a (see VEDA), his father was *Gâthin;* and in a remoter degree, V. derived his pedigree from the king *Purûravas* (q. v.), who was an ancestor of Kus'ika. In the Mahâbhârata, Râmâyan'a, and the Purân'as, his father is called *Gâdhi*, and the origin of the latter likewise traced up to Purûravas; but the distance between the two latter personages is differently filled up in the genealogies given by some of these works. As, according to several accounts, V.'s sister was *Satyavatî*, who married *Richîka*, and bore to him *Jamadagni*, he was the maternal grand-uncle of *Paras'urâma* (see VISHN'U, the sixth Avatâra). He had 100 sons, 50 of whom were, for an offence they committed, degraded by him to become outcasts, and the progenitors of the Andhras, Pun'd'ras, S'abaras, Pulindas, Mût'ibas, and other frontier tribes, which in the Vedas are called Dasyus, or robbers.

V. is the author of many hymns of the R'igveda (see VEDA), especially of its third, Man'dala; but his fame, which pervades all the periods of Sanscrit literature, is chiefly founded on the remarkable fact, that though by birth a Kshattriya, or a man of the military caste—he is also described as a Ra'ja of Canouj—he succeeded in having himself admitted into the Brâhmanic caste, after a long contest, which, for this end, he had to wage with the R'ishi *Vasisht'ha* (q. v.). That the result of this contest was the elevation of V. to the rank of a Brâhman'a, is the account given in the epic poems and the Purân'as; but as the rivalry between V. and Vasisht'ha is already alluded to in several passages of the Ri'gveda hymns, and as at their time the caste distinction of later periods of Hindnism was not yet established, it is probable that the later traditions relating to this contest rested on the circumstance, that *Sudâs*, a king named in the R'igveda, who, as is there stated, employed Vasisht'ha for his house-priest, allowed, for some unknown reason, also V. to officiate for him at sacrifices, and that the latter, incurring on this ground the jealousy of Vasisht'ha, had to maintain, probably by force, the prerogative conferred on him by his royal master.

In the epic poems and the Purân'as, the rivalry between these two personages is the subject of several legends, which, considering the relative age of the kings referred to in them, would encompass a period far exceeding that of the lifetime of a human being. A kind of consecutive biography of V. is given in the first

book of the Râmâyan'a, of which it forms one of the most interesting episodes. Its substance is as follows: Once, when roaming over the earth with his armies, V. came to the hermitage of Vasisht'ha, and was there received by the saint in the most sumptuous style. Vasisht'ha could afford to entertain the king in this manner, because he possessed a fabulous cow of plenty that yielded him everything he desired. V., becoming aware of the source of Vasisht'ha's wealth, strongly wished to possess the cow, and asked Vasisht'ha to sell her to him. The saint, however, refusing this offer, the king seized her, intending to carry her off by force. But the cow resisted, and ultimately displayed her supernatural powers in producing from different parts of her body numerous peoples, and by their aid destroying the armies of Vis'wâmitra.

The king then had recourse to the magical weapons he possessed, but they were defeated by those of Vasisht'ha; and to the humiliation thus inflicted on him he then gave vent in exclaiming: 'Contemptible is the might of a Kshattriya; a Brâhman's might alone is might.' And reflecting on what he should do in this emergency, he resolved to practise austerities in order to attain the rank of a Brâhman. In consequence, he went to the south, and performed severe penance during a thousand years; when, at the end of this period, the god Brahman appeared, and announced to him that he had become a Râjarshi, or royal R'ishi. But V., not satisfied with this degree of holiness, continued his austerities for another such period. During that time, a king, *Tris'anku* of Ayodhyâ (Oudh), of the family of *Ikshwâku*, had conceived the design of performing a sacrifice, that he might bodily ascend to heaven, and solicited for this purpose the assistance of Vasisht'ha, who was the family priest of 'all the Ikshwâkus.' This saint, however, having declared the scheme of the king impossible, and his sons, too, to whom the king likewise addressed himself, having refused compliance with his wishes, he told them that he would resort to another priest, and was, in consequence, cursed by them to become a man of the lowest caste. In this condition, he went to V.; and the latter showed his power by performing the sacrifice, so much desired by Tris'anku, and accomplishing his object in spite of the resistance of Vasisht'ha and his sons, and that of the gods themselves.

(The *Harivans'a* relates this story with somewhat different detail, but brings it to the same issue. According to the Vishn'u-Purân'a, which alludes to the version mentioned in the last-named work, Tris'anku was the 28th in descent from Ikshwâku; but in the Râmâyan'a, there are only five kings between Ikshwâku and Tris'anku.) This event having caused a serious interruption in the austerities of V., he proceeded to the forest *Pushkara*, in the west, to remain undisturbed. But while he resided there, it so happened that *Ambarîsha*, another king of Ayodhyâ, intending to perform an expiatory sacrifice, and requiring a human victim for this purpose, after a long search, had bought for immolation from the Brâhman *Richîka*, the brother-in-law of V., his son *S'unahs'epha*, and was bringing him home to his capital. On his journey, he halted in the forest Pushkara, and when S'unahs'epha there saw his uncle V., he implored him to come to his rescue. V. first directed 50 of his sons to offer themselves up as a ransom for their cousin, and, on their refusing to do so, cursed them to become outcasts; but afterwards taught S'unahs'epha two hymns, which, as he said, if sung by him at the sacrifice, would save his life. (In the genealogy of the Râmâyan'a, there are 21 kings between Tris'anku and Ambarîsha; in that of the Vishn'u-Purân'a, 15 kings; and in the former, between Ikshwâku and Ambarîsha, 27; and in the latter, between Ikshwâku and Ambarîsha, the *successor of Tris'anku*, 43 kings.

The liberation of S'unahs'epha having been effected, and V. having continued his penance for another thousand years, the god Brahman conferred on him the dignity of a *R'ishi*. But not yet satisfied with this distinction, he went on practising still fiercer austerities than those he had practised before. These the gods succeeded in depriving for a time of their spiritual efficacy, by sending him a heavenly nymph, *Menakâ*, who excited his worldly passions; still, in the end, he attained the rank of a *Maharshi*, or great R'ishi. And, after two other thousand years of still more rigorous penance, which for a time was again interrupted by the allurements of a nymph, Rambhâ, whom the gods had sent for the same purpose as previously Menakâ, the gods, headed by Brahman, came to acknowledge that he had now become a Brahmarshi, or Brâhman'ic R'ishi; and Vasisht'ha himself was compelled to express acquiescence in the result he had achieved. For other legends relating to this contest between V. and Vasisht'ha, see vol. i. of John Muir's *Original Sanscrit Texts* (Lond. 1858); and the article HARIS'CHANDRA. Compare also VISHN'U, the 7th Avatâra.—The name of V. is explained in the Mârkan'd'eya-Purân'a as representing a compound, *vis'wa*, 'all,' and *amitra*, 'no-friend,' and meaning, 'one who is no-friend of all, *scil.*, the three worlds.'

The Mahâbhârata, however, explains it as *vis'wa*, with its final vowel lengthened, and *mitra*, friend, when it would imply that V. was 'the friend of all, *scil.*, the gods;' and *Yâska*, the oldest writer who gives an etymology of this name, likewise renders it 'friend of all.' The former etymology would seem the more regular; but as in Vedic *inseparable* compounds the final vowel of the first part is frequently lengthened, the latter etymology is the preferable of the two.

VITA'CEÆ, also called SARMENTACEÆ and AMPELIDEÆ, a natural order of exogenous plants, of which the common vine may be regarded as the type. About 260 species are known, natives of warm and temperate climates, all shrubs, mostly climbing; with simple or compound leaves, with or without stipules, the lower leaves opposite, the upper ones alternate; the flower-stalks racemose, opposite to the leaves, sometimes (as in the vine), by abortion, changing into tendrils.—The only plant of the order of much value, in an economical point of view, is the Vine (q. v.), nor are there any fine fruits except its fruit (the grape), and that of species so closely allied to it as to be not improbably mere varieties; but species of the genus *Cissus* and of *Ampelopsis* (which many unite with *Cissus*) are sometimes planted for ornament. *Cissus antarctica* is the KANGAROO VINE of New Holland; and *Ampelopsis hederaceæ*, often called the VIRGINIAN CREEPER, is a frequent ornament of the fronts of houses in Britain, attaching itself to the wall by tendrils terminating in a peculiar kind of sucker, and climbing to a great height.

VITAL STATISTICS. The annual Reports of the Registrars-general for England and Scotland (see REGISTRATION) form a valuable storehouse of information on the various subjects connected with vital statistics. Besides detailed abstracts for each year of births, marriages and deaths, tables of the fatal diseases, classified in combination with ages, are given, and comments upon the salient points of the year's registration accompany the whole. The number of births, marriages, and deaths varies with the state of trade, price of food, and the seasons, and thus furnishes a test of the condition of a nation. We shall notice separately each of these three divisions of vital statistics.

1. *Births.*—From the 34th Report of the Registrar-general for England, it appears that the number of children born alive and registered during the year 1871 was 797,428, the population for the middle of that year being estimated at 22,782,812; the birth-rate being thus 35 per 1000 to the population. The proportion of the sexes was 104 boys to 100 girls. It is found on an average of ten years (1861—1871) that Cornwall, North Wales, Northumberland, Cumberland, Rutland, and Northampton have the largest proportion of male births; Hereford and Huntingdon the smallest. The proportion of male children is greater in the illegitimate than in the legitimate births. The registered percentage of illegitimate to the total births in 1871 was 5·6. Twenty years ago, the illegitimate were nearly 7 per cent. of the total births; in the ten years 1851—1860, the average was 6·5 per cent; in the following ten years, 6·1 per cent. 'I have no ground for supposing,' says the Registrar-general, 'that the general diminution in the illegitimate birth-rate is caused by any increase in the omissions to register; on the contrary, I think that, as in those elements of registration which we have the means of accurately observing, undoubted progress in the direction of greater completeness has taken place, it is fair to assume with respect to the registration of illegitimate births, that at any rate no more of them are lost sight of now than in former years. The birth-rate is usually highest in the first three months of the year; taking the mean of each of the quarterly rates during 34 years, the average annual births to 1000 persons living were 35·4 in the March, 35·1 in the June, 32·5 in the September, and 32·3 in the December quarters.

The direct cause of the increase of population in any country (apart from immigration) is, of course, the excess of births over deaths, and this will plainly depend on the following causes: (1.) on the prolificness of marriages; (2.) on the proportion born which lives to marry; and (3.) on the interval between the mean age of marriage and the mean age of death. All these conditions must be favorable to show the full power of increase in action. They have never yet, on any large scale at least, been found operating with maximum force. In the United States, we find a combination of the first two; but from the 'expectation of life' (see LIFE, MEAN DURATION OF) not being favorable in that country, it follows that the third cause is not in favorable operation.

2. *Marriages.*—It would seem to be contrary to the principles of human nature that early marriages should be united to longevity. Youthful marriages arise where the chances of the acquisition of wealth in youth are favorable; and when these are favorable the fact seems to tell against longevity. One of the most interesting and useful points of view in which registers can be considered is the evidence which they give of the varying prevalence of the prudential check to marriage and population in different countries and places. The prudential check will show itself in two ways—either by the proportion of marriageable persons who are not married, or by the lateness of the average age of marrying. On the supposition of the natural prolificness of women remaining at the same point, the birth-rate will indicate the extent

of prudential check in whichever of the two ways it may manifest itself. Suppose that from any cause the prudential restraint on marriage were to become weaker among any people than it had hitherto been, while the means of maintenance remained the same, what would happen? A corresponding increase would immediately take place in the annual mortality, and the mean duration of life would be correspondingly reduced. And there can be no doubt that the premature mortality which prevails all over the world is mainly owing to imprudent marriages. The death of one half of the human race under the age of puberty does not take place in virtue of any law of man's constitution, but from a disregard of the admonitions of its laws. Those who have the means of obedience under the conditions of civilized life generally greatly err; yet not so greatly, for the most part, as to be fatal to infant life. It is the want of means, in other words, imprudent marriages, which is the main cause. The following table is taken from an article 'On the Statistics of Marriages among the Families of the Peerage,' by Archibald Day, Esq. (*Assurance Magazine*, No. 48). The results as regards the peerage families are based on the data of a century to December 31, 1855:

PROPORTION PER CENT. OF MARRIAGES.

Ages.	Peerage Families.	England. (S. Brown.)		Belgium.	Massachusetts.	Poorer Classes (St. George's-in-the-East.)	Peerage Families.	1027 Peers. (Sadler)
	First and Subsequent Marriages.	1846—1848.	1851—1853.	1841—1845.	6¾ Years, to January 1857	Statistical Society's Journal.	First Marriages only.	First Marriages only.
Under 30	53·08	76·77	75·62	52·75	75·01	85·00	65·97	62·81
30 to 45	33·98	18·31	19·22	39·93	19·54	14 06	31.63	27·75
45 to 60	9·50	4·03	4·25	6·05	4·12	·94	2·40	7·88
60 and upwards	3·44	·89	·91	1·27	1·33	0·00	0·00	1·56
	100·00	100·00	100 00	100·00	100·00	100·00	100·00	100·00

In the above, column 1 shows the average rate of marriage at the given ages in the families of the peerage. Thus, of 100 persons married, it will, on an average, be found that 53·08 are under 30 years of age; and so on. Columns 2 and 3 give the same results for all England, as deduced by Mr. S. Brown (see his paper in the *Assurance Magazine*, vol. vii.). Column 4 is from M. Quetelet's observations in Belgium. Column 6 from a Report of the committee of the Statistical Society upon the poorer inhabitants of St. George's-in-the-East in 1845. Column 8 was compiled by Mr. Sadler, and will be found in the second volume of his work on the Law of Population. From the 34th Report of the Registrar-general for England, it appears that in 1871, in England, the number of persons married was 380,224, being 16,914 more than in the previous year, and 26.284 more than in 1869. In the 34 years, 1838—1871, the mean annual ratio of persons married was 1·65 per cent.; in 1871, the rate was 1·67 per cent. In the five years 1841—1845, nearly 92 per cent. of the marriages registered were solemnized according to the rites of the Established Church; in the five years 1866—1870, the proportion was 77 per cent.; and in 1871 it was 76 per cent. On the other hand, marriages in the Superintendent Registrars' office requiring no religious ceremony whatever have steadily increased from 2·3 per cent. of the total in 1841—1845 to 8·9 per cent. in 1866—1870, and to 9·7 per cent. in 1871. The mean age at marriage or remarriage in 1871 was for the men 27·9 years, and for the women 25·7 years. Curious instances are found in the tables of widowers of 60 and 70 marrying maidens of 15 and 19, of a bachelor of 75 wedding a spinister of 21, and of a bachelor of 21 marrying a spinister of 70. At 70 and upwards, 238 men and 32 women entered or re-entered into the married state.

3. *Deaths.*—The number of deaths registered in England in 1871 was 514,879, of which 265,563, or 51·6 per cent., were males, and 249,316, or 48·4 per cent., were females. From the census returns of 1871, the male mortality rate in the first five years of life is shown to have been 71·7 per 1000, the female 62·4; at ages five and under ten, these rates were respectively 8·3 and 7·5; at ten to fifteen, when the rates are at their lowest, the male is 4·4, the female 4·5 per 1000; at 15 to 25, the rates are nearly equal, being 7·7 and 7·4; from 25 years of age, both male and female rates increase to the end of life, male being invariably the highest. With regard to cases of reputed centenarianism, the Registrar-general points out that while many are recorded, he has as a general rule 'no alternative but to tell the tale as it is told to him;' but he notices a case, that of Jacob William Luning, whose death in 1870, at the age of 103, was proved to his, the Registrar-general's satisfaction, by documentary evidence. He adds that it is noteworthy that the experience of life assurance societies in this country gives but one example of an insured life completing its hundredth year, and that is the one of Luning. Nearly 13 millions of the population of England live in what are called the town districts, and the death-rate among these in 1871 was 25· per 1000, somewhat above the annual average; among the remaining ten millions, inhabiting the villages and rural districts, the rate was 19·5, being somewhat below the average. 'For general purposes,' says the report, 'this comparison may be taken as giving a fair idea of the relative advantages, as regards the duration of life, which a residence in the country confers over one in town; bearing in mind, of course, that there are special causes of unhealthiness in some country-places, and that the towns themselves have a wide range of death-rate.'

When any year is especially healthful, the fact tells most in favor of female life. The highest mortality rate during the 25 years 1838—1862, both male and female, occurs in the cholera year 1849, the second highest in the famine year 1847, and the third highest in the cholera year 1854. For the three years 1854—1856, it will be found that the mean male mortality is almost exactly that of the 25 years given, while the female rate is actually slightly (·006 per cent.) less. With regard, then, to the cholera visitation of 1854 at least, it may be held that the victims must have been generally those of diseased or debilitated constitution, who, had there been no cholera, would in course of the next year or so have died from some other cause. It is a curious fact in the experience of assurance offices, that while female annuitants are longer lived than male, female assured lives are no better. This fact doubtless arises from the critical periods incident to female life, and to the selection exercised by the public against the offices.

In 1871, the Scotch marriage rate was 14·2 per 1000, the birth-rate 34·5, and the death-rate 22·2; the marriage-rate was nearly 2·5 per 1000 below that of England, the birth-rates were almost identical, and the death-rate was ·4 per 1000 lower in Scotland. The registered rates of persons married, of birth, and of death in Ireland in 1871, were 10·7, 28·1, and 16·5 per 1000 respectively—'these rates,' says the report, 'differ so widely from those of England and Scotland as to show either that registration in Ireland is extremely defective, or that the constitution or the circumstances of the population is altogether different from that of Great Britain.'

In vol. viii. (for 1860) of the *Assurance Magazine* will be found an interesting paper, by Mr. Samuel Brown, F.S.S., 'On Mortality amongst American Assured Lives.' We extract the following table showing the

Age.	'Expectation of Life,' according to			
	Mutual Life of New York, Fifteen Years.	'Actuaries,' or Seventeen English Companies.	Massachusetts (1855) Tables. (Elliott's).	Farr's English, No. 1.
20	42·8	41·5	39·9	39·9
30	36	34·4	34	33 1
40	28·9	27·3	27·9	26·6
50	21·6	20·2	21·3	20
60	14·6	13·8	15	13·6
70	8·6	8·5	9·4	8·5

See also, on the subject of American mortality, the *Report of the Mutual Life Assurance Company of New York, for Fifteen Years ending February* 1, 1858 (New York, November 1859).

Influence of Occupation.—The interesting question of the influence of different trades, occupations, and habits of life on health and mortality, will be found ably treated in Mr. A. G. Finlaison's *Report on Friendly Societies*, with accompanying tables and returns,

printed by order of the House of Commons, August 16, 1853; in Mr. Neison's work on *Vital Statistics* (Lond. 1853); and in Mr. H. Ratcliffe's *Observation of Rate of Mortality and Sickness existing among Friendly Societies* (Manchester, 1850). From Mr. Finlaison, we give the following table, showing the

Ages.	Mortality per cent. among						
	Mariners.	Colliers.	Metal Miners.	Painters.	Police.	Railway Servants.	England and Wales.
20	·66	1·11	·65	..	1·09	..	·74
25	1·71	·77	1·76	1·55	·57	·52	·71
30	1·69	·84	·81	·88	1·35	1·18	·77
35	2·26	1·67	1·02	·87	1·77	1·00	·83
40	1·79	·96	·29	2·04	2·05	1·56	1·03
45	2·71	1·09	2·00	2·09	·68	1·63	1·21
50	2·48	1·70	1·84	2·87	6·35	1·74	1·50
60	2·79	3·96	2·61	6·06	..	5·50	2·61

Among the mariners, a strong contrast is found to prevail between the sickness and mortality rates, the former being low while the latter is high. The same fact is found among painters. 'The practical difference in the distribution of sickness,' says Mr. Finlaison, 'seems to turn upon the amount of the expenditure of physical force. This is no new thing, for in all ages the enervation and decrepitude of the bodily frame has been observed to follow a prodigal waste of the mental or corporeal energies. But it has been nowhere previously established upon recorded experience that the quantum of sickness annually falling to the lot of man is in direct proportion to the demands upon his muscular power. So it would seem to be, however.'—*Report*, p. 211.

The following is from Mr. Finleison's Digest of Returns:

England and Wales—Rural, Town, and City; and various trades.	Age.				
	20	30	40	50	60
England and Wales	39·88	33·13	26·56	20·02	13·59
Manchester Unity	40·92	33·70	26·41	19·40	13·29
Bakers	41·92	34·05	26·58	20·09	14·12
Blacksmiths	37·96	30·34	23·52	18·11	13·02
Bricklayers	37·70	29·66	22·22	14·78	8·44
Butchers	41·60	33·49	26·33	20·32	14·89
Carpenters	45·28	38·47	31·65	25·07	18·88
Clerks	34·99	27·77	20·61	14·18	12·11
Coopers	38·62	31·17	24·23	18·22	13·23
Dyers	39·89	32·60	24·73	18·20	13·40
Hatters	38·91	34·29	27·93	19·87	12 89
Laborers (Town and City)	40·87	33·65	26·27	19·07	13·33
" (Rural)	45·32	37·71	29·91	22·18	15·82
Millwrights	40·32	33·38	27·37	19·60	13·69
Mill Operatives	38·09	30·45	22·61	15·55	10·61
Miners	38·22	31·65	24·28	17·82	12·27
Plumbers	38·13	31·59	24·67	18·24	12·67
Potters	36·59	30·51	23·80	18·74	13·71
Printers	36·66	28·86	20·55	14·67	12·04
Sawyers	40·02	33·06	26·05	18·04	13·11
Servants, Domestic	42·03	34·30	27·32	20·77	14·81
Shoemakers	40 87	33·99	26·23	19 04	13·05
Spinners	39 04	32·42	24·32	16·62	12·21
Stone-masons	38·19	30·41	24 16	18·15	14·79
Tailors	39·40	32·51	25·34	18·31	10·23
Weavers	41·92	35·55	28·53	22·01	15·61
Wheelwrights	40·97	33·87	27·54	19·41	13·84
Wool-combers	38·56	33·73	25·96	17·64	13·22

GENERAL AVERAGES.

	Number returned as sick out of each 100 persons liable to sickness.	Average Sickness per annum to each Person, expressed in Days.	Average Sickness per annum to each Person sick, expressed in Days.	Mortality per Cent.	Withdrawals and Exclusions per Cent.
Light labor *without* exposture to weather	21·58	9·5489	44·2483	1·42	2·97
Light labor *with* exposure to weather	20·80	8·5288	41·0053	1·37	2·82
Heavy labor *without* exposure to weather	26·54	10·8122	40·7349	1·38	3·08
Heavy labor *with* exposure to weather	28·04	10·6537	37·9960	1·07	3·02
England and Wales	24.99	10·1155	40·4809	1·26	3·00

In Mr. Neison's work will be found a valuable chapter on the rates of mortality among persons of intemperate habits. The following shows the period of years which there is an equal chance of living among the

Ages	General Population of England and Wales.	Persons of Intemperate Habits.
20	44·212	15·557, being 35 per cent. of the duration of life in the general population.
30	36·482	13·800, " 38 "
40	28·790	11·627, " 40 "
50	21·255	10·860, " 51 "
60	14·285	8·947, " 63 "

The average duration of life, after the commencement of intemperate habits, Mr. Neison finds to be—among beer-drinkers, 21·7 years; spirit-drinkers, 16·7 years; indiscriminate, 16·1 years. Hence it appears that distilled liquors are more hurtful than fermented, but that both combined are worse than either taken separately.

The following table, from Mr. Ratcliffe's work, shows the 'expectation' at decennial periods of life, for England and Wales, Manchester Unity Order of Odd Fellows, and various trades:

It thus appears that at the early period of life, age 20, the following trades, placed according to their expectation, show an inferior expectation in comparison with the general results of rural, town, and city districts combined: Clerks, potters, letterpress printers, bricklayers, blacksmiths, mill operatives, plumbers, stone-masons, miners, wool-combers, coopers, hatters, spinners, tailors, dyers, sawyers, millwrights, town and city laborers, and shoemakers. The following trades show a superior expectation: wheelwrights, butchers, bakers, weavers, domestic servants, carpenters, and rural laborers.

At the last period given in the table, bricklayers, tailors, mill operatives, printers, clerks, spinners, miners, plumbers, hatters, blacksmiths, shoemakers, wool-combers, coopers, and sawyers show an inferior expectation; and dyers, town laborers, millwrights, potters, wheelwrights, bakers, stone-masons, domestic servants, butchers, weavers, rural laborors, and carpenters, show a superior expectation, in comparison with the general results.

The comparative healthiness of various occupations among the lower ranks in London is given by Dr. Letheby for the years 1855—1856; and another view of the healthiness or unhealthiness of industrial occupations as regards England generally, is given by Dr. Farr from the mortality of males at and above the age of 20 following different industrial occupations, in 1851, as compared with the number of persons enumerated in them at the census of that year. While the general annual rate of mortality in England in 1851, of 1000 males at and above the age of 20, was 20, that of farmers was 28; shoemakers, 18; weavers, 17; grocers, 11; blacksmiths, 18; carpenters, 19; tailors, 19; laborers, 21; miners, 15; bakers, 17; butchers, 21; innkeepers, 30. Taking into account the ages at death, the farmers were the longest livers. Laborers,

who form nearly a fourth of the males of England, had a general mortality almost the same as that of the general population, but a very high mortality at great ages. At any one decade of life, the mortality of inn and beer shop keepers exceeds that of all the other classes, except the butchers, at age 55—65. The mortality of butchers was much heavier than that of any other class, except that of innkeepers, under the age of 65; this fact is supposed to be owing to intemperance, slaughter-house effluvia, and the use of too much animal and too little vegetable food. All occupations have their peculiar dangers which counterbalance each other; thus the tailor is not exposed to the explosions so fatal to the miner, and the laborer has exercise denied to the tailor.

The mortality in the army and navy during peace and war shows many interesting points. Statistics tell us, that soldiers, though picked men, living in costly barracks in Britain during peace, are nearly as unhealthy as the people of our unhealthiest cities, and sometimes almost twice as unhealthy. The mortality at all ages in the army at home is almost double that of civilians, ages being alike. Lung diseases and cholera are twice as fatal to soldiers as to civilians. This excessive mortality in the army seems owing to overcrowded and ill-ventilated barracks and military hospitals, sameness of diet, and want of healthy exercise. In 1871, the strength of the entire British army abroad as well as at home was 192,665, of whom 105,757 were serving in the United Kingdom, and the remaining 86,908 were distributed in different parts of the world. The deaths occurring in the year out of the above numbers were, 1005 at home, and 1322 abroad, making altogether 2327. Proportionately to each 1000, there were at home 11·9 deaths of officers, and 9·4 of non-commissioned officers and men; abroad, 11·4 deaths of officers, and 15·4 of non-commissioned officers and men. The mean annual mortality of officers in the six years 1866—1871, was at the rate of 10·5 deaths per 1000 at home, and 12·6 abroad; among non-commissioned officers and men, the corresponding rates were 11·2 at home, and 18·3 abroad. Of the army at home, the mortality rate was considerably less among the 1216 officers stationed in Ireland than it was among the 3664 officers stationed in Great Britain. Of non-commissioned officers and men, 26,437 were stationed in Ireland, and their mortality rate was 8·5 per 1000, while it was 9·7 among the 74,440 stationed in Great Britain. 'As the condition of the mercantile marine,' says the Registrar-general, 'is just now engaging a good deal of public attention, it may be worth while to see how that service compares in point of mortality with the naval service, and the general home population of corresponding age.' The mean age, it appears, of the men afloat in the merchant service is about 28 years, while that of the men in Her Majesty's navy is about 26, so that there is really little difference in age between the two. Now the mortality among the English male population at age 28 is by the 'English Life Table' 9·7 per 1000; in the navy, the average annual rate of mortality in the period 1856—1872, was 14 per 1000; in the merchant service, from 1852—1871, it was 21 per 1000. The following table gives a comparison of the death-rate in the Royal Navy, and in the merchant service from disease and from accident:

	Deaths per 1000.	
	Royal Navy, Annual Average, 1856—1872.	Merchant Service, 1871.
From disease	10·	6·8
From injury or accident (including drowning)	4·	14·9
All causes	14·	21·7

Thus it appears that in the navy about two-thirds of the deaths are the result of disease, while in the merchant service two-thirds of the deaths are the results of causes other than disease. Among the home population, at the sailor's ages, the mortality from all kinds of violence does not exceed 1 per 1000. The dangers of the sea are now in the navy four times, and in the merchant service fifteen times as great as the dangers on land.

Mortality varies with density of population, place, and climate. It is a popular notion that a mild winter is most fatal to life, but the truth is the reverse. Either extreme cold or extreme heat immediately raises the mortality rate of Great Britain; the injurious effect of cold is in a great measure, however, confined to those whose circumstances do not enable them to protect themselves against it.

Some years ago, ten of the principal life-assurance offices of Scotland, with several of the leading English offices, contributed their experience down to 31st December 1863, as a basis of investigation into the mortality of assured lives. In England, the scheme was under a committee of the Institute of Actuaries; in Scotland, it was in charge of Mr. James Meikle, actuary of the Scottish Provident Life Assurance Society. It was completed with much care, and a valuable and elaborate work illustrative of its scope was published by Mr. Meikle in 1872.

VITE'BSK, a government in the north of West Russia, bounded on the N.-W. by Courland and Livonia, and on the N.-E. by the government of Pskov. Area, 17,425 sq. m.; pop. (1870) 888,727. The surface is, as a rule, hilly, though wooded plains, marshes, and lakes abound. The Dwina flows for 466 miles in this government; and by means of this river and its affluents, large quantities of timber are floated down to the port of Riga. The soil is not fertile, the quantity of cereals grown being generally insufficient for local consumption. Flax is successfully grown; and this material, together with timber, constitutes the chief articles of export. Ship-building is carried on on the Dwina; the lake-fisheries are profitable; and tanning is the most important branch of industry.

VITEBSK, a city of West Russia, capital of the government of the same name, on both banks of the Western Dwina, 389 miles south of St. Petersburg. It covers a very large area, and contains many monasteries, churches, and synagogues. Manufactures are not extensive; and the trade—the chief articles of which are corn, flax, hemp, tobacco-leaves, sugar, and timber—is carried on by Jews, who form the larger section of the population. V. is connected by railway with Dünaburg and Smolensk. Pop. (1867) 28,944.

VITE'LLIN. This name was, until recently, given by chemists to a supposed protean body occurring in the yelk of egg. It has been discovered by Lehman that this substance is merely an admixture of casein and albumen.

VITE'LLIUS, AULUS, Roman emperor, son of Lucius Vitellius, the prince of the sycophants who surrounded Caligula, but who, according to Tacitus, 'in his provincial administration exhibited the virtues of a former age,' was born September 24, 15 A.D., and through his father's influence at court, became consul, 48 A.D., and afterwards proconsul of Africa, where his administration gave great satisfaction. He had been a companion of Tiberius at Capreæ, and was equally a favorite with Caligula, Claudius, Nero, and Galba, the last of whom appointed him commander of the legions in Lower Germany, thinking his intense devotion to gastronomic pleasures would effectually prevent his becoming a rival. However, V. had not been a month in his new post, till he had completely gained the affections of his soldiers by extreme familiarity and liberality (strongly contrasting with Galba's parsimony); and on January 3, 69, they took him from his tent, and proclaimed him emperor.

This decision was adopted by the rest of the troops in Gaul; and two armies, under Valens and Cæcina, immediately set out to secure Rome, V. following leisurely. A notice of his contest with Otho in Northern Italy will be found under OTHO. The adherents of his predecessor were leniently treated, with the exception of the centurions of Otho's army, who were put to death, an act which greatly offended his own supporters. V.'s journey to Rome was a curious specimen of a triumphant advance, the nominal conqueror being invariably muddled with liquor, and the soldiers of his army straggling about, committing excesses of all sorts with perfect impunity. At last he reached Rome, and without loss of time, proceeded, by right of his office as Pontifex Maximus, to deify Nero. The administration was mostly in the hands of the freedman Asiaticus, though P. Sabinus (brother of Vespasian), and the two generals who had gained for him the imperial dignity, were high in authority; and the government was marked by great moderation, for V. was too far sunk in the vilest debauchery to be capable of tyranny. But he was not long allowed to disgust the respectable part of the citizens of Rome; for the legions of Pannonia and Illyricum, having proclaimed Vespasian emperor, advanced into Italy under Antonius Primus. They were opposed by the Vitellian troops, commanded by Cæcina, but through the treachery of the latter general, gained a decisive victory near Bedriacum, and another, on the following evening, over another Vitellian army which had marched to the support of the first. V., at this critical period of his fortunes, nothing abated his swinish indulgences; but his brother, Lucius, in the south, displayed more energy, and defeated Vespasian's partisians in several battles. Meantime, the soldiers, enraged at the treachery of P. Sabinus, and his allies among the senators and knights, stormed the Capitol, and slew Sabinus. From this time, Rome was a scene of unintermitting violence and bloodshed, till the troops of Primus entered the city. V. was found wandering about his palace in a state of stupid terror, and after being ignominiously exposed in the streets, was killed by repeated blows, his head carried about Rome, and his body thrown into the Tiber, in December 69 A.D. —For a complete sketch of his private life, see Tacitus's *Historia*, ii., iii., and Dion Cassius, 65; see also Suetonius. *Vit. Duodec. Cæs.*

VITE'LLUS O'VI, or the *yelk* of the egg of the domestic fowl, is employed in pharmacy for the purpose of administering substances insoluble in water (the oils and resins, for example) in the form of emulsions. The *white* is employed as an antidote, in cases of poisoning by corrosive sublimate or with salts of copper. As a dietetic article in the sick-room, eggs, either lightly boiled or poached, or as ingredients of puddings, are invaluable; the stomach, after an acute disease, being often able to digest an egg, when any more solid article of animal food would set up gastric irritation.

The article EGG, CHEMISTRY OF, requires a few supplementary remarks. The albumen, occurring in the *white*, is for the most part in combination with soda; in addition to this principal ingredient, the white contains fats (chiefly margarin), grape-sugar (averaging 5 per cent. of the dried residue), and soluble salts, in which the chlorides preponderate, with a little silica (for the formation of feathers) and fluorine. The yelk consists of caseine (forming 14 per cent.) albumen (about 3 per cent.), fats, some of which contain phosphorous (about 30 per cent.), a little grape-sugar, and mineral constituents (about 1·5 per cent.), in which there is a great preponderance of potassium compounds and phosphates. Of the pigments of the yelk we only know that there is both a yellow and red pigment, and that one at least of them contains iron. It is difficult to conceive a more concentrated form of nourishment than a food thus composed of casein, albumen, fat, sugar, potassium salts, phosphates, and iron; and its resemblance in composition to milk is very remarkable.

The shell of the egg consists almost solely of carbonate of lime (about 97 per cent.), with a little phosphate of lime, and traces of magnesia and organic matter. The variety of color in the eggs of different birds is supposed to be due to certain modifications of bile-pigment with which they come in contact in the cloaca.

VITE'RBO, a city of Central Italy, in the province of Rome, stands amid gardens and vineyards, at the foot of Monte Cimino, 42 miles north-north-west of Rome. Its well-built streets are paved with marble, and there are numerous elegant fountains. Its Gothic cathedral contains the tombs of several popes, and is memorable as the scene where Guy de Montfort assassinated Prince Henry, brother of Henry III. of England. Among other attractive buildings are the churches, mostly rich in works of art, the bishop's palace, and the city halls. There are many monuments of antiquity in and around the city. Alum, vitriol, and sulphur abound in the neighborhood, and exquisite wines are produced. No important manufactures are carried on. Pop. (1871) 16,326.

VI'TEX, a genus of trees or shrubs of the natural order *Verbenaceæ*, the fruit a drupe, with a 4-celled stone. *V. Agnus castus*, the CHASTE TREE, a native of the countries around the Mediterranean, is downy, with digitate leaves white on the back, and has an acrid fruit, the seeds of which are used in Smyrna as an external application in cases of colic. It derives its name from the practice of Grecian matrons to strew their couches with its leaves, especially during the sacred rites of Ceres, in order to banish impure thoughts; for which purpose a syrup, made of its fruit, was also, and perhaps still is, used in convents in the south of Europe, although, in reality, it possesses stimulating properties.—*V. Negundo*, an Indian species, has aromatic leaves, which are bruised and applied to the temples for relief of headache.—*V. trifolia* is another Indian species, whose leaves are a powerful discutient.



Chaste Tree (*Vitex Agnus castus*).

VITILI'GO was the name given by Celsus to some kind of cutaneous eruption which cannot be clearly identified. The term has, in recent times, been used by different writers in different senses, but is now most commonly employed to designate cutaneous patches characterized by loss of pigment.

VI'TIOUS INTROMISSION, in the Law of Scotland, means the unwarrantable interference and management of the movable estate of a deceased person. The consequence is, to make the intromitter liable for all the debts of the deceased person, though far exceeding the value of the assets. The mode of putting an end to this liability is to obtain confirmation as executor in the usual way.

VITO'RIA, a pleasant, gay, and thriving inland town in the north of Spain, capital of the province of Alava, stands on a gentle elevation, 70 miles west of Pamplona. The old town, the Villa Suso, consists of dark and tortuous streets; the new town is regularly laid out. There are several charming *alamedas*, or public walks, especially La Florida and El Prado. The Plaza Nueva, a square of 220 feet, was built in 1791, and under its arcades is the favorite promenade in winter. Brass and iron wares, earthenware, candles, and linen goods, are manufactured, and a brisk general trade is carried on with towns further inland. The plain surrounding the town is extensive and fruitful. The climate is temperate and healthy. Pop. 18,700.

V. will be ever memorable for the decisive and important victory which Wellington gained here over the French under Joseph Bonaparte and Jourdan, June 21, 1813. The numbers in this encounter were nearly equal. The French lost 6000 killed and wounded, 150 cannon, together with baggage, eagles, and an amount of booty in pictures, &c., which amounted to 5,000,000 dollars. The direct result of the battle of Vitoria was, that the French had to retire from Spain. About this engagement, Southey says the French 'were beaten before the town, in the town, through the town, out of the town, behind the town, and all about the town.' The loss of the British, Portuguese, and Spaniards was 4900 men.

VITRÉ, an ancient town of Brittany, France, in the dep. of Ille-et-Vilaine, on the left bank of the Vilaine, 24 miles east of Rennes by railway. It is a curious specimen of the old towns of the middle ages, and is still surrounded with Gothic ramparts flanked with towers. At three miles' distance is the Château des Rochers, the celebrated residence of Madame de Sévigné. Manufactures of cloth and hats are carried on. Pop. (1876) 8475.

VI'TRIFIED FORTS, the name given to certain remarkable stone enclosures bearing traces of the action of fire, about fifty of which exist in various parts of Scotland. They are generally situated on a small hill, overlooking a considerable valley, and consist of a wall, which may have originally been about 12 feet in height, enclosing a level area on the summit of the hill. The most remarkable feature of these structures is, that the wall is always more or less consolidated by the action of fire—in some cases only to the extent of giving a glassy coating to its inner side, while in other instances the vitrification has been more complete, the ruins assuming the character of vast masses of coarse glass. Structures of this kind are to be found at Noath and Dunnideer, in Aberdeenshire; Craig Phadrick, Tordnn, and Glenever, in Inverness-shire; Knockfarril, in Ross-shire; Creich, in Sutherlandshire; Dunskeig, in Argyleshire; Finhaven, in Forfarshire; and elsewhere, but principally in the northern counties. They were first noticed by Mr. John Williams, in his *Account of some Remarkable Ancient Ruins lately discovered in the Highlands and Northern Parts of Scotland*, published in 1777. Mr. Williams's observations led him to conclude that they were artificial structures intentionally vitrified by a partial melting of their materials. Mr. Williams's views were combated by other writers, who contended that the supposed forts were of volcanic origin, a supposition quite irreconcilable with their obviously artificial character.

In 1828, the subject engaged the attention of the Society of Antiquaries of Scotland, a series of careful observations being made by Dr. Samuel Hibbert, one of the secretaries of that body; and the conclusion arrived at was, that while the structures were artificial, the vitrification was an accidental effect, which might have arisen from such causes as the frequent kindling of beacon fires as signals of war and invasion, or of bonfires forming a part of festive or religious rejoicings. The alkali produced from the accumulation of the ashes of continually blazing wood-fires would be a powerful aid to the fusion of stone. The view originally taken by Mr. Williams has since been supported by Dr. John M'Culloch, who argues that the character of the works shows them to have been designed for defensive military posts, and observes, that in some cases where the most accessible materials for a stone-fort are incapable of vitrification, stones more capable of being vitrified have been brought from a distance. Dr. Petrie has noted one vitrified fort in the county of Cavan, and four in the county of Londonderry, and he conjectures that they belonged to the Irish Picts. A single instance, that of the 'Camp

of Péran' in Brittany, occurs in France. In this case, only the central portion, or core, of the wall is vitrified, and in it a Roman roofing-tile was found by M. Lukis firmly attached to the melted stone. A number of the hill-forts of Bohemia have also been found to be constructed with a core of vitrified stones occupying the center of the walls. Dr. Fodisch attributes them to the bronze age and to a Celtic race. More detailed descriptions of these Irish, Breton, and Bohemian examples, however, are necessary to enable us to pronounce definitely as to their identity with those of Scotland. But there seems to be little doubt that the vitrification in them all was the work of design, though produced, it may be, by different methods, and with structural intentions not quite the same.—See *Archæologia Scotica*, vol. iv.; M'Culloch's *Highlands and Western Islands of Scotland;* Burton's *History of Scotland*, chap. 3; *Proceedings Soc. Antiq. Scot.*, vol. viii., p. 145.

VITRINGA, Campegius, an eminent Dutch divine and commentator, was born at Leuwarden in Friesland, 16th May 1659. He studied at Franecker and Leyden, at which last place he was created D.D. in his 20th year. In 1681, he was appointed Professor of Oriental Languages; and two years later, received the chair of Theology in the university of Franecker, where he died, March 21, 1722. V. is regarded as one of the most learned and laborious divines of his age, and has left many excellent and erudite works, chiefly commentaries on portions of the Scriptures, nearly all of which are in Latin. Among others may be mentioned, *Commentarius in Jesaiam; Anacrisis Apocalypseos Johannis Apostoli; Commentarius in Jeremiam; Commentarius in Zecharaiam; Vetus Synagoga; Dissertationes Sacræ; Typus Theologicæ Propheticæ*, &c.

VI'TRIOL (derived from the Latin *vitrum*, glass) is a term which the early chemists applied to glass-like salts, distinguishing them by their colors into blue vitriol, green vitriol, and white vitriol. *Blue Vitriol* is still the popular name for sulphate of copper, which may be obtained on a large scale in various ways, but most simply by boiling copper in an iron pot with dilute sulphuric acid, by which means we obtain a salt having the formula, $CuO,SO_3 + 5Aq$, and crystallizing in oblique prisms of a clear blue color, which are soluble in four parts of cold, and two of boiling water, and when moistened, redden litmus paper. In large doses, it acts as a powerful irritant poison, unless, as is frequently the case, it is rejected by vomiting. In small but repeated doses (as from half a grain, gradually increased to two grains, made into pills with conserve of roses), it acts as a tonic and astringent, and will often check the discharges in cases of chronic diarrhœa and dysentery, when other medicines have failed; and according to Neligan, it has been found serviceable in croup by checking excessive bronchial secretion. It has been much employed in cases of epilepsy, and is a valuable remedy in chorea and other spasmodic diseases, especially when they occur in weak constitutions about the period of puberty. Its use in doses of from 10 to 15 grains as an active emetic is mentioned in all works on materia medica; but sulphate of zinc in a doze of a scruple, is as efficacious, and safer. Externally, this salt in solution (varying from one to ten grains in an ounce of water) forms a good application to indolent ulcers, aphthæ, cancrum oris, and the sore throat in scarlatina; it is also used in chronic ophthalmia, and as an injection in cases of urethral or vaginal discharges. In the solid state, it is used as a caustic to repress excessive granulations (proud flesh), to destroy warts, and to excite indolent ulcers.

Green Vitriol is the popular name for sulphate of iron. Its characters, the method of obtaining it, and its therapeutic uses, are sufficiently noticed in the article Iron.

White Vitriol will be described in the article Zinc.

Oil of Vitriol is the old name given to commercial sulphuric acid, in consequence of its oily appearance, and of its being formerly obtained from green vitriol.

Elixir of Vitriol is the old name for the aromatic sulphuric acid of the Pharmacopœia. It is a mixture of three ounces of sulphuric acid and two pints of rectified spirit, in which powdered cinnamon and ginger have been digested. Its uses in doses of from ten to thirty minims, in a wine-glassful of water, are much the same as those of dilute sulphuric acid, but it is more agreeable to the taste, and sits more lightly on the stomach.

VI'TRO DI TRI'NA, the name given to a beautiful kind of glass which was made by the Venetians in the 15th century. Its distinguishing character is a series of wave-like marks in opaque colors, but usually white, arranged pretty regularly in the substance of transparent glass.

VITRU'VIAN SCROLL, a continuous scroll-work forming a kind of cresting, used in classical architecture.

VITRU'VIUS, the name of two Roman architects, the most celebrated of whom is Marcus Vitruvius Pollio, about whom we have no direct information further than the mention of his name by Pliny and Frontinus, though, from the references to himself in his own work, we can gather that in all probability he was born about 76 or 80 B.C. He received a liberal education, pursued specially those studies which were calculated to fit him for the profession of an engineer and architect, and was engaged in the African war (46 B.C.) as superintendent of military engines. He does not seem to have become very popular as an architect, and never succeeded in acquiring wealth, though the constant patronage which the emperor (Augustus) was induced by his sister (probably *Octavia Minor*) to extend to him, insured him comfortable subsistence during his life. The only public work he executed was a basilica at Fanum. V., in his book, *De Architectura*, enters at some length into the reasons which induced him to write it, the chief of them being, the care bestowed by his patron (after settled peace had been secured to the empire) on buildings public and private, his intention to erect numerous edifices, and the danger that, owing to the depraved architectural taste of the time, the beauty and correctness of the pure Grecian models would be neglected.

The *De Architectura* is arranged in ten books; the *first* of which contains a dedication to the emperor, a general view of architectural science, hints as to the proper subjects of study for young aspirants, and directions for building cities; the *second* treats of the early history of architecture, and of the materials employed at various times, and contains a sketch of the physical theories of various philosophers; the *third* and *fourth* treat of the erection of temples, and in connection with this, of the four orders of architecture, Ionic, Corinthian, Doric, and Tuscan; the *fifth* treats of public buildings; the *sixth*, of private houses in town or country; the *seventh*, of the finishing and decoration of private buildings; the *eighth* of water, the mode of discovering it, whence it may be obtained, and the modes of conveying it in large quantities to a distance; the *ninth*, of the principles of gnomonics, the rules for dialing, and other subjects physical and astronomical; and the *tenth*, of machines used in building and in military warfare, of the mechanical powers, of mills, engines for raising water, odometers, &c. To each book there is a preface, more or less connected with the main subject of the book, and it is in these prefatory remarks that we discover what we know of V.'s personal history. There have been many editions of V.; the first was published along with Frontinus's *De Aquæductibus* at Rome about 1486, and afterwards at Florence (1496) and Venice (1497). Rude woodcuts were introduced into various subsequent editions; and the edition of Bode (Berl. 1800) has a volume of plates; but the best edition, that of J. G. Schneider (Leip., 3 vols. 1807—1808), is without illustrations.—See Smith's *Classical Dictionary of Biography and Mythology.*

VITRY-LE-FRANCOIS, a town of France, in the dep. of Marne, on the right bank of the river Marne, 128 miles east of Paris by railway. The first site of the town was at Vitry-en-Perthois; but it was taken and burned by Charles V. in 1544. François I. rebuilt V. on its present site surrounded with fosses and ramparts, and erected a castle for its protection. There are manufactures of hats and cotton goods. Pop. (1876) 7580.

VITTO'RIA, a modern town of Sicily, in the province of Siracusa, 18 miles north-west of Modica, on the Camarana. It possesses little interest, and is made only a noonday resting-place for travelers. The soil of its vicinity, however, is fertile in fruits and wines, bee-culture is carried on, and the town maintains an active trade in silk and cattle. Pop. 17,855.

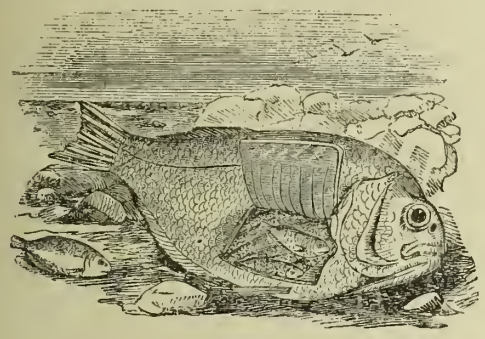
VI'TUS, ST., DANCE. See Chorea.

VIVANDIÈRE, in continental armies, and especially that of France, a female attendant in a regiment, who sells spirits and other comforts, ministers to the sick, marches with the corps, and contrives to be a universal favorite. Although a familiar friend to all, these women contrive to maintain themselves respectable, and generally respected; and a corps is usually extremely jealous of the slightest discourtesy shown to its vivandière. The woman wears the uniform of the regiment, short petticoats replacing the man's tunic.

VIVE'RRIDÆ, a family of *Carnivora*, having the body elongated, the claws partly retractile, the pupil of the eye circular during the day, and not contracted into a vertical line, as in the *Felidæ*, and, in general a strong musky odor, proceeding from a secretion in a pouch near the anus. To this family belong the civet, genet, ichneumon, &c.

VIVI'PAROUS FISH. It has been mentioned in the articles Fishes and Reproduction that a few species of fishes are viviparous, or rather ovoviviparous, the eggs being hatched within the ovary. An example of this occurs in the Viviparous Blenny of the British coasts. See Blenny. But it is the common characteristic of a whole family of the order *Pharyngognathi*, therefore designated by the popular name of Viviparous Fish, and by the scientific name of *Embiotocidæ*—a name formed from the Greek and signifying *viviparous*. The general aspect of fishes of this family is somewhat perch-like; the scales are cycloid, the gill-covers are entire; the lips are thick. On the north-west coast of

America from San Francisco to Sitka, species of this family are very abundant. They come into shallow water near the coasts, when the time approaches for producing their young, which is about the middle of summer. They swim in vast shoals close to the surface, and have a peculiar habit of leaping high out of the water when alarmed, of which the Indians take advantage to capture them, by striking the water violently with their paddles, and uttering yells. The terrified fish leaping out of the water, many of them fall into the canoes. The Indians also capture these fishes by thrusting a spear with four barbed points into the midst of a dense shoal. They can be easily taken by nets, but are not of great value for the table. Our figure represents a female, cut open to



Viviparous Fish (*Ditrema argenteum*).
(From Lord's *Naturalist in Vancouver Island and British Columbia*).

show the manner in which the young are arranged within the mother.

VIVISE'CTION—a term which is employed to designate operations performed with the knife on living animals, with the view (1) of increasing our physiological knowledge; (2) of confirming previously known facts; and (3) of giving dexterity in operative surgery—is a course of procedure which may be traced back to almost the earliest periods of medicine and surgery, and was largely practiced in the Alexandrian School. It is, however, only comparatively lately—about half a century ago, when the barbarous experiments of Magendie, Brachet, and other distinguished French physiologists, became known in this country—that the subject has attracted much popular notice; and during the last ten years, attention has been so specially drawn to the atrocities systematically carried on in the great French veterinary colleges at Alfort and Lyon, that a deputation of 'The Royal Society for the Prevention of Cruelty to Animals' laid a statement of the facts before the Emperor Napoleon. When it is stated, that with the nominal object of teaching the veterinary students at Alfort to become skilful operators, six living horses were supplied to them twice a week—that sixty-four operations were performed on each horse, and that four or five horses generally died before half the operations were completed—that it takes nearly two days to go through the list—and that all the old exploded operations, as well as those now practised were performed—and lastly, when it is borne in mind that most, if not all, these operations could just as instructively have been practised on the dead animal (as is done in this country), there cannot be a doubt that a vast amount of unwarrantable and gratuitous cruelty was carried on in these establishments. Although the subject was brought before the *Académie des Sciences*, and warmly discussed, the final conclusion was, 'that the complaints of the London Society are totally without foundation; and that there is no occasion to take any notice of them.'

We believe that it is only by the veterinary colleges of France that the view is advocated that vivisection is necessary for the purpose of giving dexterity in surgical operations.* But while all right-minded persons—except the majority of the members of the French Academy, whose votes were probably influenced by a feeling of nationality—must concur in the view, that the argument in favor of vivisection utterly breaks down, some go further, and doubt whether any experiments on living animals, performed with the object of advancing medical and surgical knowledge, and of thereby relieving, indirectly, human suffering, or prolonging human life, are, on moral grounds, to be regarded as justifiable. In opposition to this view, it is maintained that, under certain circumstances, and with due restrictions, such experiments are not only justifiable, but their performance becomes a positive duty. It may be observed that, though in stating this controversy the term vivisection is retained, the remarks apply to all kinds of experiments on living animals. It is universally admitted that man may destroy animals for his food, and to furnish him with many of the necessaries and luxuries of life; and most persons go a step further, and see no impropriety in the pursuit of field-sports. Now, as Dr. Markham argues in his excellent prize essay on this subject, in all these cases of admittedly legitimate destruction of animal life, the infliction of pain is a necessary ingredient. In some modes of destruction, the death-blow is dealt at once, and the pain is but fleeting; whilst in others, the agony of the death-struggle is equivalent to a prolonged and painful torture. An ox may be at once stunned, while the animal bled to death suffers prolonged convulsive struggles.

The humanitarian, if he be a sportsman, thinks little of the lingering pain which a wounded bird or broken-legged hare undergoes; nor, if he be engaged in the whale-fishery, does he lament over the prolonged suffering which the object of his pursuit must suffer before its capture. If, then, man can legitimately put animals to a painful death in order to supply himself with food and luxuries, why may he not also legitimately put animals to pain, and even to death, for the far higher and more noble object of relieving the sufferings of humanity, and of prolonging human life? To point out what gain has accrued to physiology (and hence, indirectly, to the healing art) by experiments on living animals, would occupy many pages of this work. It is sufficient to allude to the facts, that the doctrine of the circulation of the blood, and of the existence of, and circulation through, the lacteals, was thus established, and that nearly the whole of our present knowledge of the functions of the nervous system has been thus obtained, and could never have been afforded by the most minute anatomical research, and that in consequence of the knowledge thus obtained we no longer divide a motor nerve, and thus paralyze the face, in the hope of relieving tic douloureux; while, on the other hand, thanks to the researches of Brown-Sequard, Bernard, and others, we can now see our way to a more rational mode of treating epilepsy, various obscure forms of paralysis, &c. Without vivisection, we could never clearly have understood the causes of the sounds of the heart, without the knowledge of which the stethoscope would have been useless in the diagnosis of cardiac diseases; nor should we have known anything of the true nature of that mysterious disease, diabetes. The Hunterian treatment of aneurism by ligature, which has saved hundreds of human lives, was worked out by experiments on living animals.

The study of anæsthetics, which, after prolonged investigation, led to the introduction of chloroform (soon, possibly, to be superseded by some even less dangerous agent), was unquestionably accompanied by the suffocation of many animals; but surely no one who can form any estimate of the vast amount of misery which has been spared to humanity by the general introduction of the use of chloroform into surgical and midwifery practice, can regret the sacrifice. Indeed, the advantage of the discovery is experienced in more ways than one upon the lower animals, since the domestic animals are subjected to its beneficent influence when surgical operations are necessary, and since, in most cases, animals subjected to physiological experiments are now usually rendered insensible by it. If such questions as—the best means of restoring to life persons apparently drowned—why chloroform sometimes kills, and how those who are suffering under apparently fatal effects can be best recovered—admit, as they doubtless must, of a solution, that solution must be sought for in experiments on living animals. These and a multitude of similar considerations which might be adduced, are sufficient, it is maintained, to lead any unbiased inquirer to the conclusion that experiments on living animals, performed with the object of advancing medical, surgical, or toxicological knowledge, and of thereby indirectly relieving human suffering, or of prolonging human life, are not only justifiable, but a matter of duty.

At the meeting of the British Association held at Liverpool in 1870, the general committee requested the committee of section D (Biology) to draw up a statement of their views on pysiological experiments in their various bearings, and they further requested the committee to consider 'from time to time whether any steps can be taken by them, or by the association, which will tend to reduce to its minimum the suffering entailed by legitimate physiological inquiries.' Accordingly, at the meeting of the association at Edinburgh in 1871, the biological committee gave in a report, in which the following resolutions were presented: 1. That no experiment which can be performed under the influence of an anæsthetic ought to be done without it; 2. That no painful experiment is justified for the mere purpose of illustrating a law or fact already demonstrated; 3. Whenever, for the investigation of new truth, it is necessary to make a painful experiment, every effort should be made to insure success, so that the suffering inflicted may not be wasted—that, therefore, no painful experiment ought to be performed by an unskilled person, or in an unsuitable place; 4. In the scientific preparation for veterinary practice, operations ought not to be performed on living animals for the purpose of obtaining manual dexterity. On the reception of this report, a standing committee was appointed for the purpose of carrying out, with all the influence of the British Association, the above humane suggestions.

* *Vivisection: is it necessary or justifiable?* Being two prize essays, published by the Royal Society for the Prevention of Cruelty to Animals (Lond. 1866).

A still more satisfactory result, however, was the interference (following upon the report of a Royal Commission) of Parliament, which, in the year 1876, gave its assent to a bill to amend the law relating to cruelty to animals, the purpose of which was the restriction, or better regulation, of vivisection. The provisions of this Act coincide to a great extent with the resolutions of the committee as given above, and require that every one performing a painful experiment upon a living animal (which must be with a view of advancing physiological knowledge, or knowledge which will be useful for saving or prolonging life, or alleviating suffering), must hold a license from one of Her Majesty's principal Secretaries of State. Persons holding a conditional license are allowed to perform such experiments only in a registered place, while the same rule applies to experiments performed for the sake of instruction (which, however, are permitted only under certain stringent limitations). Special protection is afforded to horses, asses, mules, dogs, and cats. The Act does not apply to invertebrate animals.

Agitation for the total prohibition of vivisection has nevertheless been maintained in Great Britain by not a few zealous persons. Both the British Medical Congress and the International Medical Congress pronounced unanimously in favor of vivisection, properly regulated, and insisted on its value both to physiological science and to medical and surgical practice. The arguments for and against vivisection were discussed in numerous articles in the *Nineteenth Century*, *Contemporary Review*, and *Fortnightly Review* for 1881 and 1882.

VIZIER, or VIZIR (pronounced *viz-eer'*), the title of various high functionaries in the Ottoman Empire, and other Mohammedan states. The word, which is of Arabic origin, and signifies 'he who bears or supports (a burden),' was first bestowed as a title of honor on the chief minister of the first Abbaside calif, in 750 A.D. During the decline of this dynasty, the vizier had to 'bear the burden' of government almost entirely, and consequently, increased so much in power and authority, that the califs thought it prudent to counteract his influence by the creation of the new dignity of *Emir-al-Omrah* (q. v.), which, being generally bestowed upon one or other of the powerful alien princes who had made for themselves sovereignties in Persia, was found to be an efficacious counterpoise. The dignity of vizier was first introduced among the Ottoman Turks during the reign of their second sultan, Orkhan, and the title was exclusively confined to the sultan's prime-minister; but in 1386, it was conferred by Amurath I. on his victorious general, Timur-tâsh, and the prime-minister's title was then changed into *vizir-a-z'hem*, 'grand or illustrious vizier.' The title is now given, as is also that of Mujir, to all the Turkish ministers of State. The political changes introduced at the end of 1876 (by which Turkey became a 'constitutional' monarchy) have not seriously affected the dignity of Grand V., though in 1878 the title was abolished, that of President of the Council of Ministers being substituted. This dignitary, whether under the old name or the new, is, after the sultan, the most important personage of the Turkish Empire, and is the head of the administration; but he is subject as formerly to more serious control from the intrigues of the palace than from the new constitution.

VIZZI'NI, a town of Sicily, in the province of Catania, is well built, and contains a number of churches. Pop. 14,900.

VLAA'RDINGEN, a town in South Holland, lies about five miles west of Rotterdam, near the New Maas. It has a good haven, and sends annually a large fleet of vessels to the herring-fishing, besides carrying on a considerable shipping-trade. Pop. (1876) 9124.

VLADIKAVKAS, the chief town of the Terek district of Ciscaucasia in Russia, at the foot of the main Caucasus chain, and at the opening of the valley of the Terek. It is the terminus in this direction of the Russian railway system, and is on the only carriage road through the pass to Tiflis and the south of the mountains. The population has rapidly increased from 8000 to near 30,000 in 1881 (Cossacks, Armenians, and a motley representation of various Asiatic races).

VLADIMIR, the name of two celebrated Russian princes, the former of whom, VLADIMIR SVIATOSLAVITCH, was the first Christian sovereign of Russia. On the death of his father (972), V., though illegitimate, received Novgorod as his share of the heritage, but was driven out by Jaropolk, who had already murdered the third brother, Oleg. However, V., by the aid of a body of Varangians (from Scandinavia), returned and overcame Jaropolk, by whose assassination (980) he became sole ruler in Russia. Disembarrassing himself of his dangerous allies by persuading them to take service with the Byzantine emperor, he next recovered by force from the Poles the provinces of which they had deprived his brother, and subdued various tribes which had recently revolted. Russia at this time was an ill-compacted empire; the various Slavic tribes which dwelt within its boundaries acknowledged the sovereignty of the Russian princes solely by the payment of tribute, and that only when the princes were powerful enough to enforce it; hence it was the custom for the princes personally, or their delegates, to go their regular rounds after the fashion of tax-collectors, backed up by a large armed retinue. V. tried to increase the central authority, and one of the means he adopted was the erection at his capital, Kiev, of the idol Perun (Thunder), the supreme divinity of the Slaves, and of the images of other inferior deities, Slave and Finnish. But a few years more effected a remarkable change; many of V.'s subjects were Greek Christians; his mother, Olga, had become one; besides, he wished to be allied with the Byzantine imperial family; and moved by these and other reasons of personal or patriotic ambition, he resolved to turn Greek Christian.

His mode of arriving at conversion and matrimony was as curious as effective; he first made an attack upon the Byzantine Empire, then sent an embassy to Constantinople, promising peace and his conversion, in exchange for the hand of Anna, the sister of Constantine IX.; threatening war in case of refusal. His demands were gladly complied with; and after his marriage and baptism at Kherson in 988, he returned to Kiev, destroyed all the idols, and commanded his subjects to be baptized. They had not the slightest objection to be baptized, if their feared and admired prince wished it; and for days the Dnieper was crowded with applicants for the first testing ordinance of Christianity. It could hardly have been expected that a conversion managed in such a fashion would have affected the manners and conduct of such an arbitrary, violent, and daring prince as V.; yet, strange to say, from 988 he appeared to have undergone a thorough mental and moral transformation; churches were built, schools established, capital punishment was supplanted by a fine, and such excessive lenity shown to all criminals, that in the interests of good government, it was found necessary to remonstrate with the thorough-going convert. Formerly, the wisdom and valor for which he was renowned were equalled by his licentiousness, so that the chronicles had more than one reason for saying that 'he was like unto Solomon;' but the strictest chastity characterized the latter part of his life; and his charity to the poor, and personal forbearance, were extreme. He died in 1014, three years after his wife Anna. The Russian Church has decreed him the epithets of 'saint,' and 'equal of the apostles.'—VLADIMIR II. VSEVOLODOVITCH, surnamed *Monomachus*, grand-prince of Kiev, the great-grandson of the preceding, was born in 1053. His father being a younger son, there seemed to be little chance of V.'s attaining power in the ordinary course of events, in his own country; and he accordingly led a band of auxiliaries to join Boleslas II. of Poland in his wars with Bohemia; gaining such renown, as on his return ranked him at the head of Russian warriors.

V.'s father having, as the eldest of the Russian princes, succeeded to the grand principality of Kiev (1078), V. took advantage of the opportunity to wrest from their lawful possessors, Smolensk, Tchernigov, and Novgorod; though some years afterwards, his cousin Oleg, the dispossessed prince of Tchernigov, with the aid of the Polotzee or Cumans (a Turkish nation which was at that time the terror of the Russians), recovered his dominion. V. having subsequently routed the Polotzee in several engagements, became so extremely popular, that in 1112 he was chosen grand-prince of Kiev, and for 13 years displayed his eminent qualities as a ruler and a warrior. The maintenance of internal tranquillity, the improvement of old, and the building of new towns, and the encouragement of commerce, on the one hand; and the successful campaigns against the Tchudes, Poles, Polotzee, and Bolgars (a Mohammedan commercial people settled on the Volga), on the other, are the principal characteristics of his reign. Most of V.'s fame, however, rests on his writings, which present an interesting picture of the internal life of Russia in the 11th c., and indicate prominently the earnest practical influence of the newly introduced Christianity. V.'s mother was a daughter of Constantine Monomachus; and Alexis Comnenus, who wished to be on good terms with his powerful northern neighbor, is said to have sent him the crown, sceptre, and sword of his grandfather, which are still shown as such, and which are employed in the coronation of the czar.

VLADIMI'R, a government of Russia, bounded on the E. by the government of Nijni-Novgorod, and on the S.-W. by that of Moscow. Area, 18,796 sq. m.; pop. (1870) 1,259,923. The surface is level or undulating; the soil consists chiefly of clay or sand, and is fertile only in exceptional spots. The principal rivers are the Oka and its tributaries, of which the chief is the Kliasma, a navigable stream. Of the lakes, which are numerous, but of inconsiderable size, that of Pereiaslav is remarkable for its productive fisheries, and is famous in history as being the cradle of the Russian fleet. After St. Petersburg and Moscow, the government of V. is the most actively industrious in the Russian Empire. Of its manufactured goods, cotton-yarn and cloth are made to the value of 13,000,000 rubles annually; chintz and dyed goods, 12,000,000 rubles; linen, 2,000,000 rubles; glass, 1,000,000

rubles; iron and brass foundries produce goods to the value of 1,000,000 rubles; and the manufactures of chemicals and paper are very extensive. The inhabitants are also much employed in painting images and in knitting stockings, which are used in Russia and Siberia, and yield 1,000,000 rubles per annum. The grain-crops raised are insufficient for local consumption, and corn is imported from neighboring governments. Hemp is successfully grown; and besides being used in considerable quantities in local manufactures, is exported to Archangel and St. Petersburg. Forests, mostly of pine, form a border round the government, but do not occur in the interior. In the 9th c., the country was inhabited by Finns; and though it was subsequently conquered and settled by the Slavonians, traces of the original inhabitants are visible in the present population.

VLADIMIR, a town of Great Russia, capital of the government of the same name, stands on the left bank of the Kliasma which is high and wooded, 125 miles north-east of Moscow. It was founded in the 12th c., during the ascendency of the Dukes of Vladimir, and was the capital of Russia till 1328. It contains many historical remains, as the Kreml; the 'Golden Gate,' built in 1158; ruins of old fortifications, and many ancient churches. The ecclesiastical seminary is important. Pop. (1878) 16,422.

VLADIVOSTOK, a small town near the furthest frontier of Asiatic Russia, near the north limit of Corea, on the Sea of Japan. It has one of the finest harbors in the world, is a naval station, has an arsenal, and is the terminus of the overland part of the telegraph by Irkutsk and Kiachta; but the population is only between 500 and 600.

VODENA, a town of Turkey, on a mountain slope, 46 miles W.N.W. of Saloniki. Streams of water run down the middle of all the streets. V., which is still the seat of an archbishop, occupies the site of the ancient Edessa, the early capital of Macedonia. Pop. 8000.

VOGHE'RA, a city of Northern Italy, in the province of Pavia, stands on a fertile elevated plain, in a district rich in vineyards, orchards, and cornfields, 24 miles east-north-east of Alessandria by railway. The Via Emilia passes through the town, and divides it into two parts. There are several handsome squares, of which that of the Duomo is the chief; the streets are adorned with porticoes; and there is an old castle, built by Galeazzo Visconti in 1372. The civic palace contains many valuable parchments and manuscripts of the 11th, 12th, and 13th centuries. Silks, linens, canvas, and leather are manufactured. Pop. 11,450.

VOICE (Lat. *vox*) may be defined as an audible sound produced by the larynx, and may be produced by any animal possessing that organ; while speech or articulate language may be regarded as voice modified in the cavity of the mouth. The Larynx (q. v.) is the organ by which the so-called *vocal sounds* (or primary elements of speech) are produced. In the article LARYNX, it is shown that there are two groups of muscles, which respectively govern (1) *the pitch of the notes*, and (2) *the aperature of the larynx*. Those which affect the pitch of the notes are divisible into two antagonistic sub-groups, viz., (*a*) those which depress the front of the thyroid cartilage on the cricoid, and *stretch* the vocal ligaments; and (*b*) those which elevate the front of the thyroid cartilage, and *relax* the vocal ligaments; while those which control the aperture of the glottis are divisible into (*c*) those which *open* it, and (*d*) those which *close* it. It is only the first of these groups, viz., the muscles which stretch or relax the vocal ligaments, that is concerned in the production of voice.

In the ordinary condition of rest, there is a wide opening between the vocal ligaments, which are in a state of complete relaxation, and the air passes freely between them. For our knowledge of the appearances presented under varying conditions by the interior of the larynx, we are mainly indebted to Professor Czermak, the inventor of the Laryngoscope (q. v.); and the reader who wishes to enter fully into this subject is referred to his work on that instrument, of which a translation was published by the New Sydenham Society in 1861. The three figures, 1, 2, 3, repre-



Fig. 1.—Condition of the Larynx during tranquil respiration:
e, epiglottis; *œ*, fissure-like opening of œsophagus; *c*, fold of mucous membrane bounding the opening of the glottis posteriorly.

sent respectively the condition of the larynx as seen during tranquil respiration, its condition during the emission of the broad vocal sound A, and its condition during the emission of a high or acute sound. The movements of the arytenoid cartilages during the production of vocal sounds can be distinctly seen—the views that had been previously deduced, from theory and experiments on the dead subject, being thus confirmed by ocular proof. As soon as we wish to utter a sound, the two arytenoid cartilages raise themselves in the fold of mucous membrane which covers them, and approach one another with surprising mobility.

This movement effects the approximation of the vocal cords, and consequently the contraction of the glottis (fig. 2). It is im-

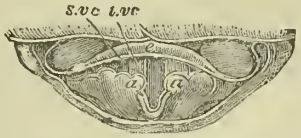


Fig. 2.—Condition of the Larynx during the emission of the broad vowel sound A.
a,a, cartilages of Santorini, surmounting the arytenoid cartilages; *e*, epiglottis; *ivc*, inferior or true vocal cord; *svc*, superior or false vocal cord of left side.

possible to study with the laryngoscope the mode of formation of the gravest chest-sounds, because the arytenoid cartilages become so raised that they almost come in contact with one another, while they bend under the border of the depressed epiglottis, and thus conceal the interior of the larynx. During the emission of the most acute sounds, the glottis contracts into a mere line, on each side of which the vocal cords may be recognized by their whitish-

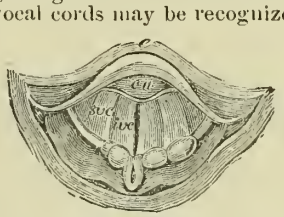


Fig. 3.—Condition of the Larynx during the omission of a high or acute sound:
e, epiglottis; *cu*, cushion of epiglottis; *ivc*, true vocal cord; *svc*, false vocal cord.

yellow color; while further outward, and separated from the former by a narrow groove, are the false or superior vocal cords of either side. The arytenoid cartilages are raised, and come in contact in the median line, the epiglottis is drawn outwards, and a short stiff tube is then formed above the glottis; all these parts being, as we learn from our sensations during the experiment, in a state of very great tension. Independently, however, of such observations as those we have recorded from Czermak's interesting Memoir, any one may easily prove for himself that the aperture of the glottis is much contracted during the production of sounds, by comparing the time occupied by an ordinary expiration with that required for the passage of the same quantity of air during the maintenance of a vocal sound; moreover, the size of the aperture varies with the note that is being produced, as may be readily seen by any one who compares the time during which he can hold out a low and high note. When the distance between the vocal cords exceeds one-tenth of an inch, no sound can be produced.

How the vocal cords produce sounds, is a question which has long attracted the attention of physiologists and physicists. To answer it, they were compared with various musical instruments. More than a century ago, Ferrein (*De la Formation de la Voix de l'Homme*, 1741) compared them to vibrating *strings;* and at first sight, there is an apparent analogy; but on further investigation (for reasons which may be found in Carpenter's *Human Physiology*, 6th ed., p. 715), this view was found to be untenable. The analogues between the organ of voice and the *flute-pipe*, in which the sound is produced by the vibration of an elastic column of air contained in a tube, were then investigated, but found to fail. The third class of instruments with which the human organ of voice has been compared are vibratory *reeds* or *tongues*, which may either possess elasticity in themselves, or be made elastic by tension. From the experiments of Weber, it appears that the action of the larynx has more analogy to that of *reed*-instruments than to the instruments previously named, and though there would seem at first sight to be a marked difference between the vocal ligaments and the membranous tongue of any reed-instrument, this difference is not very great. Müller ascertained that membranous tongues made elastic by tension may have three different forms, of which the following, which alone concerns us, is one: 'Two elastic membranes may be extended across the mouth of a short tube, each covering a portion of the opening, and having a chink left open between them.' Here there is clearly an approximation to the human glottis, which may be increased by prolonging the membranes in a direction parallel to that of the current of air, so that not merely their edges but their whole planes shall be thrown into vibration.

Professor Willis has, upon this principle, invented an *artificial glottis*, in which the vocal ligaments are imitated by leather, or preferably by sheet india-rubber. It is composed of a wooden

pipe, of the form of fig. 4, *a*, having a foot, C, like that of an organ-pipe, and an upper opening, long and narrow, as at B, with a point, A, rising at one end of it. A piece of leather or sheet india-rubber doubled round this point, and secured by being bound at D with strong thread, will form an artificial glottis, *b*, while its upper edges, G, H, are capable of vibrating or not by inclining the planes of the edges. Two pieces of cork, E and F, are glued

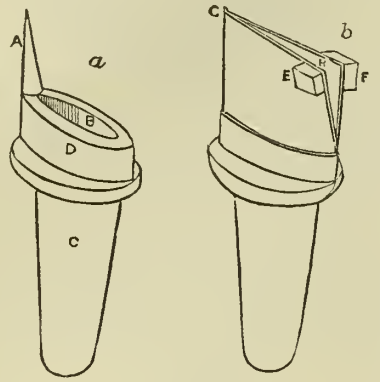


Fig. 4.

to the corners to make them more manageable. From this machine various notes may be obtained by stretching the edges of the leather in the directions of their length, G, H; the scale of notes yielded by leather is much more limited than that yielded by india-rubber; and other observers have found that the middle coat of the arteries in a moist state (as being more elastic, and almost identical in structure with the vocal ligaments), yields more satisfactory results even than india-rubber. 'It is worthy of remark,' as Dr. Carpenter observes, 'that in all such experiments it is found that the two membranes may be thrown into vibration, when inclined *towards* each other in various degrees, or even when they are in parallel planes, and their edges only approximate; but that the least inclination *from* each other (which is the position the vocal ligaments have during the ordinary state of the glottis) completely prevents any sonorous vibrations from being produced.' —*Op. cit.*, p. 718. The *pitch* of the notes produced by membranous tongues may be affected in various ways (as by increasing the strength of the blast, the addition of a pipe, &c.), and is mainly governed by their degree of tension, while the foregoing statements show that the sound of the voice is the result of the vibrations of the vocal ligaments which take place according to the same laws with those of elastic tongues generally. Little is, however, known with certainty regarding the mode and degree in which the tones are modified by the shape of the air-passages generally, the force of the blast of air, and other circumstances.

The *falsetto* is a peculiar modification of voice, differing from the ordinary or *chest voice*, not only in the higher pitch of the notes, but also in their quality. The theory of its production is still an open point, into which we have not space to enter, further than to remark that, according to Professor Wheatstone, falsetto notes are to be explained by supposing that 'the column of air in the trachea may divide itself into *harmonic lengths*, and may produce a *reciprocation* of the tone given by the vocal ligaments.'

The pressure of the air within the trachea during the production of voice is very considerable. From observations made by Cagniard-Latour on a man with a fistulous opening in the trachea, it was found that when the patient called out at the top of his voice, the pressure was equal to that of a column of water 38 inches in height; when he spoke at his usual pitch, to one of 5 inches; and when he sang in a high note, to one of about 8 inches. The glottis has been well chosen by Dr. Carpenter to illustrate the minute precision with which the degree of muscular contraction can be adapted to the desired effect. The musical pitch of the tones produced by it is, as we have shown, regulated by the degree of tension of the elastic vocal ligaments. Their average length, in a state of repose, is $\frac{73}{100}$ths of an inch; while in the state of greatest tension, it is about $\frac{93}{100}$ths—the difference being thus *one-fifth* of an inch; while in the female the respective lengths are $\frac{51}{100}$ths and $\frac{63}{100}$ths respectively—the difference being thus about *one-eighth* of an inch. Now, the natural compass of the voice, in persons who have cultivated the vocal organ, is about two octaves, or 24 semitones. Within each semitone, an ordinary singer could produce at least ten distinct intervals (the celebrated Madame Mara could sound 100 different intervals between each tone, the compass of her voice being 21 tones), so that 240 is a very moderate estimate of the number of different states of tension of the vocal cords, every one of which can be produced at will; and the *whole* variation in the length of the cord being not more than one-fifth of an inch, even in man, the variation required to pass from one interval to another will not be more than $\frac{1}{1200}$th of an inch (while in such a case as that of Madame Mara the distance would be reduced to $\frac{1}{12000}$th of an inch).

In the production of vocal sounds, the delicate adjustment of the muscles of the larynx, which is requisite to the evolution of determinate tones, is directed by the sense of hearing, being originally learned under the guidance of the sounds actually produced; but 'being subsequently effected voluntarily, in accordance with the mental conception of the tone to be uttered, which conception cannot be formed unless the sense of hearing has previously brought similar tones to the mind. Hence it is that persons who are born *deaf* are also *dumb*. They may have no malformation of the organs of speech, but they are incapable of uttering distinct vocal sounds, or musical tones, because they have not the guiding conception, or recalled sensation, of the nature of these. By long training, however, and by imitative efforts directed by muscular sensations in the larynx itself, some persons thus circumstanced have acquired the power of speech; but the want of a sufficiently definite control over the vocal muscles is always very evident in their use of the organ.'—*Op. cit.*, p. 556. A fund of interesting matter in connection with this subject may be found in Dr. Kitto's *Lost Senses*. Although not born deaf, he became *completely* so in early childhood, in consequence of an accident. His voice became similar to that of a person born deaf and dumb, and taught to speak. It was observed that the words which he had been accustomed to use before his accident, were still pronounced as they had been in childhood, the muscular movements concerned in their production having been still guided by the original auditory conception, while all the words subsequently learned were pronounced according to the spelling.

The various muscular actions which are concerned in the production of vocal tones, are commonly regarded as being under the influence of the will. It is, however, easy to show that this is not the case. We cannot, by simply *willing* to do so, raise or depress the larynx, or move one cartilage of it towards or from another, or extend or relax the vocal ligaments; although 'we can readily do any or all of these things by an act of the will, exerted for a specific purpose. We conceive of a tone *to be* produced, and we *will* to produce it; a certain combination of the muscular actions of the larynx then takes place, in most exact accordance with one another, and the predetermined tone is the result. This anticipated or conceived sensation is the guide to the muscular movements, when as yet the utterance of the voice has not taken place; but while we are in the act of speaking or singing, the contractile actions are regulated by the present sensations, derived from the sounds as they are produced.' From these remarks, in which Dr. Carpenter has placed a very difficult subject in as clear a light as the subject admits of, it follows that the muscular actions which are concerned in the production and regulation of the voice, are due to an *automatic* impulse, similar to what occurs in the movements of the eyeball, and in many other cases that might be adduced. There cannot be a doubt that the simple utterance of sounds is in itself an instinctive action; although the combination of these sounds into music or into articulate language, is a matter of acquirement.

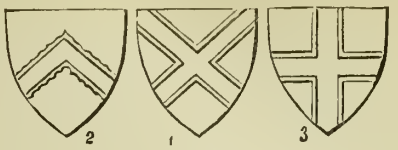
Having explained the way in which the larynx produces those *tones* of which the voice fundamentally consists, and the sequence of which becomes *music*, we come to the subject of *speech*, which consists in the modification of the laryngeal tones by other organs superior and anterior to the larynx (as the tongue, the cavity of the fauces, the lips, teeth, and palate, with its velum and the uvula acting as a valve between the throat and nostrils), so as to produce those *articulate sounds* of which language is formed. The organ of voice is thus capable of forming a large number of simple sounds, which may be combined into groups, forming words. Vocal sounds are divided into vowels and consonants. When a vowel is pronounced, what happens? This question is thus answered by Professor Max Müller: 'Breath is emitted from the lungs, and some kind of tube is formed by the mouth, through which, as through a clarionet, the breath has to pass before it reaches the outer air. If, while the breath passes through the vocal cords, these elastic *laminæ* are made to vibrate periodically, the number of their vibrations determines the pitch of our voice, but it has nothing to do with its *timbre*, or vowel. What we call vowels are neither more nor less than the qualities, or colors, or *timbres* of our voice, and these are determined by the form of the vibrations, which form, again, is determined by the form of the buccal tube.' —*Lectures on the Science of Language*, 2d series, p. 116. This writer enters very fully into the various configurations of the mouth requisite for the formation of the different vowels. (1.) In pronouncing *u* (the vowels are all understood to be pronounced as in Italian), we round the lips, and draw down the tongue, so that the cavity of the mouth assumes the shape of a bottle without a neck. (2.) If the lips are opened somewhat wider and the tongue be somewhat raised, we hear the *o*. (3.) If the lips are less rounded, and the tongue somewhat depressed,

we hear the å of the northern languages (as in *august*). (4.) If the lips are wide open, and the tongue in its natural flat position, we hear *a*. (5.) If the lips are fairly open, and the back of the tongue raised towards the palate, the larynx being raised at the same time, we hear the sound *e*. (6.) If we raise the tongue higher still, and narrow the lips, we hear *i*. The buccal tube here represents a bottle with a very narrow neck, of no more than six centimètres (or about two inches and a quarter) from palate to lips. Dipthongs arise when, instead of pronouncing one vowel directly after another with two efforts of the voice, we produce a sound *during* the change from one position to the other, that would be required for each vowel. Though the tube of the mouth thus modified by the tongue and lips is the chief agent in the production of vowels, Czermak has proved that the *velum palati* is changed in position with each vowel, and that it is lowest for *a*, and rises successively with *e*, *o*, *u*, and *i*, when it reaches its highest point. He likewise found that the cavity of the nose is more or less opened during the pronunciation of certain vowels. Languages might have been formed entirely of vowels, but the existing words, consisting solely of vowels, show how unpleasant such languages would have been. Something else was obviously wanted to supply what Max Müller happily terms *the bones of language*—namely the consonants. These are commonly divided into (1) those which require a total stoppage of the breath at the moment previous to their being produced, and which cannot, therefore, be prolonged; and (2) those in pronouncing which the interruption is partial, and which, like the vowel sounds, can be prolonged at pleasure. The former are termed *explosive*, and the latter *continuous*, consonants. In pronouncing the *explosive* consonants, the posterior openings of the nostrils are completely closed, so as to prevent the passage of air through the nose, and the current may be checked in the mouth in three ways—viz. (*a*) by the approximation of the lips; (*b*) by the approximation of the point of the tongue to the front of the palate; and (*c*) by the approximation of the middle of the tongue to the arch of the palate.

The letters *b* and *p* are pronounced by the first of these modes; *d* and *t* by the second; and *g* (hard) and *k* sounded as *key*, by the third; the difference between *b*, *d*, and *g*, on the one hand, and *p*, *t*, and *k*, depends upon the approximating surfaces being larger, and the breath being sent through them more strongly at the moment of opening in the former than in the latter group. The *continuous* consonants may be subdivided into three classes, according to the degree of freedom with which the air is allowed to escape, and the compression which it consequently experiences. In the *first* class, no air passes through the nose, and the parts of the mouth that produce the sound are closely approximated, so that the compression is considerable. This is the case with *v* and *f*, *z* and *s*, *d* and *t*, *th*, *sh*, &c., the movement of the tongue being also concerned in the production of several of these sounds. In the *second* class, including *m*, *n*, *l*, *r*, the nostrils are not closed, and consequently the air is scarcely at all compressed. In pronouncing *m* and *n*, the breath passes through the nose alone; *m* is a labial, like *b*, but the latter is formed with the nose closed. Hence the passage of *m* to *b* (as in *lamb*) is easy; so also is that from *n* to *t*, or from *n* to *g*, as is seen in the frequent combination of *nt* and *ng* in most languages. The sounds of *l* and *r* (letters which Max Müller places in a special group under the name of Trills) are produced, according to Helmholtz, as follows: 'In pronouncing *r*, the stream of air is periodically entirely interrupted by the trembling of the soft palate, or of the tip of the tongue, and we then get an intermittent noise, the peculiar jarring quality of which is produced by these very intermissions. In pronouncing *l*, the moving soft lateral edges of the tongue produce, not entire interruptions, but oscillations in the force of air.'—*Die Lehre von den Tonempfindungen*, 1863, p. 116. The *third* class contains sounds which scarcely deserve to be called consonants, since they are merely *aspirations*, either simple, or modified by an elevation of the tongue, causing a slight obstruction to the passage of air, and an increased resonance in the back of the mouth. The present *h* and the Greek *χ* are examples of these sounds. The method of pronouncing these sounds is very fully discussed in Max Müller's Lectures, 2d Series, pp. 127—136.

For further details, the reader is referred to the admirable chapter on 'Voice and Speech' in Carpenter's *Human Physiology*, and to Max Müller's *Lectures on the Science of Language* (from both of which we have borrowed largely in this article), to Mr. Bishop's article 'Voice' in the *Cyclopædia of Anatomy and Physiology;* and the various works of Funke, Helmholtz, Brücke, Czermak, Du Bois Reymond, &c. mentioned by Max Müller in his chapter on 'the Physiological Alphabet.'

VOIDED, in Heraldry, a term applied to an ordinary when its central area is removed, so that the field is seen through it, and little but a mere outline remains, as in the example No. 1—Azure, a saltire voided argent. When the ordinary has its outer edge formed of any of the lines of partition other than dancetté, wavy, or nebuly, the voiding is nevertheless plain, as in No. 2—Azure, a cheveron engrailed voided or. An ordinary voided and couped differs from an ordinary couped and voided in so far as the former



Voided.

is open at the extremities, and the latter enclosed. One ordinary may sometimes be voided in the form of another, as a cross voided per pale in the example No. 3.

VOIRE DIRE (*veritatem dicere*). In English Law, when a witness is supposed to be liable to objection for incompetency or otherwise, he is first sworn, not in the cause, but on the *voire dire*, that is, to answer questions relating to this incompetency; and if it is apparent that he is incompetent, he is discharged without further examination.

VOIRON, a town of France, in the dep. of Isère, beautifully situated on the Morge, 15 miles by railway north-west of Grenoble. Among the manufactures which are here carried on with great activity are to be mentioned blacksmiths' work, paper-making, nail-making, and tanning. Pop. (1876) 7909.

VO'LANT, in Heraldry, flying. A bird volant is represented flying bendways towards the dexter side of the shield; and its position may be distinguished from that of a bird rising by the legs being drawn up towards the body.

VOLCA'NOES are openings in the earth's crust from which various kinds of matter in a highly heated condition are ejected, such as gases, steam, ashes and cinders, masses of solid rock, and molten rock called lava. The heavier portions of the materials thus ejected fall back within and around the vent, thus in time building up the hilly or mountainous cones by which volcanoes are in general distinguished. The depression in the top of these conical formations is called the crater; and the appearance of burning and of vomiting forth flame and smoke, peculiar to volcanoes in action, is not caused by external combustion, but is simply the fiery reflection thrown upon the ascending volumes of steam and vapor from the incandescent materials within the vent. Volcanic structures are likewise formed in the ocean. In 1796 a column of vapor was seen to rise from the Pacific Ocean about 30 miles to the north of Unalaska. The ejected materials having raised the crater above the level of the water, the fiery crest of the islet illuminated the country for ten miles around. Six years afterwards, when a few hunters landed on the new island, they found the soil in some places so hot that they could not walk upon it. Repeated eruptions have increased the dimensions of the island, until now it is several thousand feet in height, and between two and three miles in circumference. In the same region is the volcanic island of Kliutschewsk, which rises at once from the sea to the enormous height of 15,000 feet.

The lava, scoriæ, and ashes which are thrust out of the crater form highly inclined and more or less regular beds on the surface of the mountain, extending from the crater mouth to varying distances down the sides of the volcano. This method of increase gives the uniform conical outline to volcanoes, without the terraces or breaks which are found in almost all other mountains. The sides are often furrowed logitudinally by straight narrow ravines, which increase in number towards the base. These are produced by the action of running water obtained from rain or from melting snows during an eruption. The rapidity with which floods rush down the steep sides of a volcano gives a prodigious force, which the loose scoriæ and ashes, and even the solid lava, cannot resist.

The grayish color of volcanic mountains is produced by the ash and scoriæ, which, though in composition the same as the dark lava, have this lighter color from the minute subdivision of their particles. When a particular series of rocks remain on the surface, and are not covered by the products of more recent eruptions, they weather and decompose, and produce a very fertile soil, which is speedily clothed with vegetation, and thus change the whole aspect of the formerly bare and uniformly-colored mountain.

The vent through which the materials are vomited forth is called the crater. This is a more or less circular opening, communicating with the source from which the ejected materials are obtained. The crater has generally one side much lower than the other—that from which the prevailing wind blows, which carries with it the showers of ashes to the opposite side of the mountain. In many cases, the cone is truncated; a wide hollow of immense extent, and often of great depth, in the base of which the crater is situated, occupies the summit. The Spanish name Caldera is technically applied to these hollows. Their origin has been a subject of

considerable controversy. Von Buch and others maintain that they are craters of elevation; that is, that the rocks were originally spread out in nearly horizontal deposits, and then upheaved into a dome-shaped mountain, with the hollow caldera in the center of its summit. The more satisfactory explanation is that the original cone, formed by the alternate deposition of the lava and ashes ejected from the crater, has, from the great heat of the molten lava rising in the tube of the volcano, or from gaseous explosions, given way, and fallen in. The cones both of Etna and Vesuvius have frequently fallen in and been reproduced. In 1822, the summit of Vesuvius was reduced by 800 feet. The immense size of some calderas seems, however, opposed to this theory. That of the island of Palma, one of the Canaries, is from three to four geographical miles in diameter, and the precipices which surround the cavity are from 1500 to 2000 feet in vertical height. They form an unbroken wall, except at the south-western end, where a deep gorge permits the passage of the torrent which drains the caldera. The precipices are traversed by numerous vertical dikes, and exhibit all the appearances which would be produced by the falling-in of the huge summit of this once enormous volcano.

The pressure of the incandescent lava often forces for itself a passage to the surface before it reaches the mouth of the crater, and this is more frequently the case when the volcanic eruption is accompanied with earthquakes. Immense vertical fissures are found radiating from the center of the volcanic action, and reaching the surface of the ground, and even rising to the summit of the mountain; these being filled with the molten rock, which in course of time solidifies and forms often a large portion of the mountain mass, as is shown in the Val del Rové on Etna (q. v.). The lava sometimes pours out of these fissures instead of rising to the crater. In 1783, during a terrible eruption of Hecla, a prodigious stream of lava flowed from a lateral crevice; moving slowly down the mountain-side, it reached a distance of 50 miles in 42 days; it then branched into two main streams, the one running 40 miles, and the other 50 miles further towards the sea. Its depth varied from 600 to 1000 feet, and its greatest width was 15 miles. The amount of lava poured out into this stream would almost equal Mont Blanc in bulk.

The power which exhausts itself in the eruption of a volcano often shows itself by changes which it produces in the level of the country around. About a hundred years ago, a volcano appeared in the center of the great table-land of Mexico, and raised an area of nearly four square miles 550 feet higher than it was before, covering it at the same time with conical hills of various heights, the highest of which is Jorulla, which is 1600 feet high. But sometimes a subsidence takes place. In 1772, a great part of the Papandayang, a mountain in Java, was swallowed up; the inhabitants of its declivities were suddenly alarmed by tremendous noises in the earth, and before they had time to retire, the mountain began to subside, and soon disappeared. The area thus sunk was 15 miles long and 6 broad.

A volcanic eruption is generally preceded by rumbling noises and slight movements of the earth; then fitful puffs of gases and steam are given off. These contain much sulphur; and some volcanoes give out such quantities of carbonic acid and other mephitic gases as to destroy the animals in the neighborhood. Sir William Hamilton picked up dead birds on Vesuvius during an eruption; in 1730, all the cattle in the island of Lancerota, one of the Canaries, were destroyed by these deleterious emanations. The Upas Valley in Java contains an extinct crater; and the certain death which overtakes every animal that penetrates the valley is due to the noxious gases given out from it, and not to the *Antiaris*, which, though yielding a deadly poison, does not affect the atmosphere in which it grows. The eruption itself begins, perhaps, with the ejection of the finest dust, and that with such a force as to project it high into the atmosphere, where, taken up by air-currents, it is often carried to enormous distances. In 1845, the dust from Hecla was in ten hours thickly deposited on some of the Orkney and Shetland Islands: the ashes from Consequina fell, in 1835, on the streets of Kingston, Jamaica, at a distance of 700 miles; and during the same eruption, the fine dust covered the ground at a distance of nearly 30 miles to the south of the volcano, to a depth of more than 10 feet, destroying the woods and dwellings, and enveloping thousands of quadrupeds and birds.

The flames seen issuing from the crater are usually the reflection of the glowing lava emitted from the crater, and illuminating the clouds of vapor, scoriæ, and ashes.

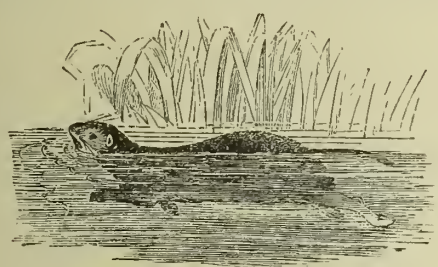
Lava and scoriæ are at last vomited forth. Sir William Hamilton says that, in 1779, the jets of liquid lava from Vesuvius, mixed with scoriæ and stones, were thrown to a height of 10,000 feet, giving the appearance of a column of fire. The lava, however, generally issues from openings in the side of the mountain. It pours forth in a perfectly liquid state, bright and glowing with the splendor of the sun. At first, it flows rapidly; but as its surface becomes cooled and converted into slag, its velocity diminishes. It has to burst the indurated coating before it can continue its progress, and the liberated lava when it flows bears on its surface masses of scoriæ, looking like the slag from an iron furnace. The theories propounded to account for volcanic action are either chemical or geological. Sir H. Davy suggested that if immense quantities of the metallic bases of the earths and alkalies were present in the interior of the earth, all the phenomena would be produced by their oxidization from contact with air or water. Although the distinguished author of this theory abandoned it, it has since been taken up and advocated by Daubeny and others. Bischof, assuming that the interior of the earth consists of a highly heated and fused mass, considers that the mechanical action of water, converted into steam by the great heat, would produce volcanic action. Both theorists seek support for their views from the fact, that the great majority of volcanoes are situated on or near the sea-coast. Geologists accepting also the doctrine of internal heat, and believing that at a certain depth the rocks of the earth are, partially at least, in a state of fusion, explain volcanoes by considering them as connections established between the interior of the earth and the atmosphere, the elastic force of steam being the propelling power. Darwin, from observations made in all parts of the world, believes that volcanoes are chiefly, and, indeed, almost only found in those areas where subterranean motive-power has lately forced, or is now forcing upwards the crust of the earth, and are invariably absent in those where the surface has lately subsided, or is still subsiding. The mineral and chemical constituents of the various materials ejected by volcanoes have recently been carefully studied, and much valuable information on this and the kindred subject of the causes of volcanic action will be found in Professor Judd's work, *Volcanoes: What they are, and What they Teach* (1881).

Volcanic action is limited to particular regions of the earth. In these regions, the active vents are distributed at intervals, and are generally arranged in a linear direction. The Pacific Ocean is bounded by an almost unbroken line of active volcanoes. Beginning in the New South Shetlands, where there is an active volcano in lat. 62° 55′ S., we pass to Tierra del Fuego, and then on to the Andes, which are throughout their whole course volcanic, although the great centers of present action are confined to Chili, Peru, the neighborhood of Quito, Guatemala, and Mexico. The line is continued northwards by the burning mountains of North-western America, and the Aleutian Islands carry the chain across to Kamtchatka on the Asiatic side. Here turning southwards, the line may be traced through the Kurile Islands, Japan, Formosa, the Philippines, Moluccas, New Guinea, and the Salomon and New Hebrides groups, to New Zealand. From Celebes, a branch proceeds in a north-westerly direction through Java and Sumatra, to Barren Island in the Bay of Bengal; and even beyond this we find a region in Northern India subject to earthquakes, which may lead us, on the one hand, to the volcanic region in Tartary, or, on the other, through Asia Minor to the Greek Archipelago, Sicily, Naples, and on to the Canaries and Cape de Verdes. According to the geological theory, the lines thus traced over the globe would represent rising lands, where the crust is less strong, and so less liable to repress the expansive powers below. There are a number of isolated volcanoes also scattered over the surface of the earth; these are supposed to have opened a star-shaped communication with the interior. The most remarkable of these isolated volcanoes are Jan Mayen, in lat. 70° 49′ N.; and those in Iceland in the north, and Mount Erebus in South Polarland, in lat. 77° 32′ S.

VOLE (*Arvicola*), a genus of rodent quadrupeds, of a group which some naturalists constitute into a family (*Arvicolidæ*), but which is more generally regarded as a tribe or sub-family of *Muridæ* (q. v.). This group is characterised by a thicker and shorter form than that of the true rats and mice; an obtuse muzzle; ears of moderate size; a round and hairy tail, not so long as the body; the molar teeth with flat crowns, which present angular enameled plates. These characters exhibit an approach to the Beaver family (*Castoridæ*). The Lemmings (q. v.) belong to this group. The species are numerous, and widely distributed, being found in Europe, Asia, Africa, and North and South America. Some of them are completely terrestrial in their habits, others are aquatic. Many are popularly called rats and mice, as the species of the genus *Arvicola*, which are found in Britain. In this genus, the teeth are only ten in number; two incisors and three molars in each jaw. One of the most common British species is the FIELD V. (*A. agrestis*), also known as the MEADOW MOUSE and SHORT-TAILED FIELD MOUSE. The whole length of the head and body is scarcely more than four inches, that of the tail rather more than an inch and a quarter. The Field V. has a large head, a very obtuse muzzle, ears just appearing above the fur, the thumb of the fore-feet rudimentary, and without a claw. The upper parts are reddish brown, the under parts ash-color, the feet and tail dusky. It burrows in the ground, or finds a retreat for itself in the excavations of some other animal, as of the mole. It chiefly inhabits low and damp situations, and dry seasons are very fatal to it. It produces from five to seven young at a birth. It is some

times very injurious to plantations, by destroying the roots of trees and devouring their bark. Excessive numbers of this little animal were regarded in 1813 and 1814 as threatening the destruction of the Forest of Dean, and the New Forest in Hampshire; and many trees were killed; but a remedy was found in digging pits into which the voles fell, and from which they could not escape. The same method has been successfully employed in some of the forests of continental Europe. This species of V. is found in most parts of Europe, and in many parts of Asia. It is common in the Himalaya.

Another very common British species is the WATER V. (*A. amphibia*), popularly known as the WATER RAT, a much larger animal, the head and body being about 8¼ inches in length, and the tail 4¾ inches. The head is thick and short, the muzzle very obtuse, the eyes small, the ears scarcely seen beyond the fur; the last joint only of the thumb of the fore-feet conspicuous beyond the skin. The fur is thick and shining, of a rich reddish brown mixed with gray above, yellowish gray beneath. Although the feet are not webbed, the Water V. swims extremely well, and not only at the surface of the water, but often under it. It burrows in the banks of streams, ditches, and ponds. Its food appears to consist chiefly of aquatic plants, although it objects to no kind of vegetable food, and has been known to store up potatoes in its burrow for winter. It has been supposed also to feed on worms, frogs, and small aquatic animals, and to be destructive to the spawn of fish;



Water Vole (*Arvicola amphibia*).

but this is very doubtful. This species is widely diffused over the continent of Europe. There is a black variety of it, common in some parts both of England and Scotland, which has been described as a distinct species (*A. atra*). Several species of V. are found in North America.

VOLGA, the most important river of Russia, and the longest in Europe, has its origin in a marshy plain among the Valdai Hills, in the government of Tver; lat. 57° N., long. 33° 10′ E. From its source, which is 550 feet above ordinary sea-level, and 633 feet above the level of the Caspian Sea, into which it falls, the river flows south-east to Zubzov, then north-east past Tver and Koliazin to Mologa, where it turns east-south-east, and flows in that direction past Jaroslav, Kostroma, Nijni-Novgorod, and Kazan, 50 miles below which, on receiving the Kama, it turns south, passing Simbirsk, Stavropol, and Samara. Here its course again changes to south-west, and in this direction the river flows until it reaches Tzaritzin, when it bends to the south-east, and reaches the Caspian Sea, which it enters by many mouths, and after a course of 2320 miles.

The V. waters 9 governments—those of Tver, Jaroslav, Kostroma, Nijni-Novgorod, Kazan, Simbirsk, Saratov, Samara, and Astrakhan; but besdes these, 12 other governments are watered by its tributaries. The course of the stream is generally divided into three parts—the upper part reaching from its source to its confluence with the Szeksna, and, though presenting many hindrances to navigation, yet capable of being traversed from Tver to Rybinsk by craft of 1½ and 2 feet draught; the middle part, from Rybinsk in Jaroslav to Nijni-Novgorod, navigable for larger craft; and the lower V. from Nijni-Novgorod to Astrakhan—where it is about 90 feet deep—navigable for the largest vessels. Below Astrakhan, the V. is very much shallower—in some places only 1½ feet deep. At Tver, the breadth of the river is 720 feet; at Mologa 2060 feet; at Nijni-Novgorod, 2069 feet, but sometimes in the spring 2½ miles broad; at Simbirsk, about a mile broad; between Samara and Sysran, from 1 to 3 miles broad. Below Tzaritzin, at the confluence of the Sarpa, the river affords few facilities for navigation, and is remarkable for the number of branches into which it divides itself before it enters the Caspian Sea. The banks of the V., which are elevated in the upper and middle reaches become much lower as the river approaches its embouchure. The chief ferries and commercial towns on the V. are: Rjev, Zubzov, Tver, Koliazin, Uglitch, Mologa, Rybinsk (the great center of the corn-trade), Jaroslav, Kostroma, Nijni-Novgorod, Kazan, Simbirsk, Samara, Tzaritzin, and Astrakhan. The system of water-communication established by the V. and its tributaries, is of the greatest importance to the commerce of Russia, connecting as it does the central districts of the country with the White Sea by means of the canal of the Prince of Würtemberg; with the Baltic by the three canal-systems of Tichvin, Vishni-Volotchek, and Mariinsk; with the Black Sea by the Upa Canal, which connects the Oka and the Don; with the Caspian Sea by the great stream of the V. itself; and with Siberia by the rivers Kama and Tchussovaia. The principal affluents on the right are the Oka (q. v.) and the Sura; on the left, the Tvertza, Mologa, Szeksna, and Kama (q. v.)..

VOLHY'NIA, a frontier government of West Russia, bounded on the S.-W. by Galicia, and on the W. by Poland, from which it is separated by the river Bug. Area, 27,348 sq. m.; pop. (1880) 1,981,300, mostly Russians, Poles, Lithuanians, Jews, Germans, and Tartars. The surface in the north of the government is low; and plains and morasses, covered with forests, abound; in the south, there are hills, branches of the Carpathian Mountains, but which do not rise higher than 1230 feet. Almost all the rivers flow north, and join the Pripet, an affluent of the Dnieper; a few streams, however, flow west, and join the Bug, by means of which river timber is floated down from this river to Prussia. The soil is sandy or clayey; agriculture flourishes in the south, and corn is exported to Odessa, Galicia, Poland, and partly to Great Russia. Cattle-breeding has always been a prosperous branch of industry in V. until recently, but a fine breed of sheep are still reared, and the government possesses the finest studs in the empire—those of the Princes Sangousko and Tzartorisky. Of the woods, which form the principal riches of the north districts, fir is the chief. The forests abound in foxes, hares, and bears, and hunting is a favorite pastime. Many sugar-mills, cloth-factories, and distilleries are in operation, and the manufactures are increasing yearly. Corn, cattle, sheep, wool, cloth, linen, timber, honey, and wax are the principal articles of trade.

V. in early times belonged to the ancient Russians, but was conquered by the Lithuanians and Poles in 1320, and remained in their hands till its annexation to Russia in 1798.

VOLI'TION. See WILL.

VO'LLEY, the simultaneous discharge of a number of small-arms. The same operation from cannon is called a salvo.

VOLNEY, CONSTANTIN FRANÇOIS CHASSEBŒUF, COMTE DE, was born at Craon, in Anjou, on the 3d of February 1757. He was the son of an advocate of good reputation. His family name was Chassebœnf, but on arriving at manhood he assumed the additional surname of Volney. He got his preliminary education at the colleges of Ancenis and Angers, and afterwards went through a protracted course of study at the university of Paris. His father wishing him to join his own profession, he spent some time in preparing for the bar; but he renounced law for medicine, which, however, he never practised. He had inherited a competency from his mother, and soon after completing his studies, in the year 1783, he set out for Egypt, with the intention of traveling in Egypt and Syria. This expedition occupied him about four years. On his return to France in 1787, he published his celebrated *Travels in Syria and Egypt*, which still contain the most trustworthy as well as one of the liveliest and most interesting accounts which have been published of the tribes with which he came in contact. This work at once procured him a great reputation. At first, there was a disposition to question the veracity of some of his descriptions; but their truthfulness was fully confirmed when the French became more familiar with the Egyptians and the Arabs through the expedition of 1796. The sagacity of the chief political conclusions to which his residence among these peoples had brought him, which in 1788 he embodied in a pamphlet—*Considerations on the War between the Turks and the Russians*—has also been shown by subsequent events. In 1790 he was elected to the Etats Généraux, as a member for his native district, and took a somewhat prominent part in the political discussions of the years which followed, showing himself, as he has done in his works, a fast friend of the public liberties, a mocker at all systems of religion, and at the same time a fearless opponent of popular excesses. He was imprisoned for his outspokenness in 1793, and was not liberated till after the downfall of Robespierre, in July of the following year.

In September 1794, V. published his *Ruins; Reflections upon the Revolutions of Empires*, upon which, and upon his *Travels*, his reputation chiefly rests. V. believed that political, like all other organizations, are subject to decay and destruction. The discussions contained in the *Ruins* cover almost all the radical questions in politics. Its principles are those of 1789. It vindicates the doctrine of the rights of man, establishes the duty of toleration in matters of opinion, and maintains, with perhaps too much of sarcasm and mockery, the human origin and the essential falsity of all religions systems. In the previous year, V. had published his *Natural Law*, a catechism for a French 'citizen,' in which he treats morality as a physical and material science, to be studied upon the same methods as the other natural sciences, and having no object but the conservation and improvement of society. This work was afterwards republished under the title of the *Physical Principles of Morality*.

Towards the close of 1794, he was appointed Professor of History in the short-lived Ecole Normale; and the brilliant discourses, not untinged with paradox, which he delivered in this capacity, made a sensation in Paris even at that unsettled time. On the suppression of the Ecole Normale in 1795, he went to the United States, intending to spend the remainder of his days there; but circumstances made his residence there extremely disagreeable to him, and he returned to France in the spring of 1798. In his absence, he had been elected a member of the Institute; he was, soon after his return, admitted to the Academy; and henceforth his life, though not inactive, was prosperous and untroubled. He had early been acquainted with Bonaparte, and had been of service to him at the time when political circumstances had deprived him of employment; and Bonaparte, on becoming First Consul, desired to associate him with himself in the government as consul or as Minister of the Interior.

V. refused both offices, but accepted a seat in the Senate. He protested against the establishment of the Empire, and resigned his seat in the Senate; but his resignation was declined; and during the existence of the Empire he formed one of the little band, sneered at by Napoleon as *idéologues*, who in the Senate attempted by their criticisms to restrain the arbitrary conduct of the emperor. Henceforth, however, his occupations were mostly literary. He published *Researches into Ancient History*, several of the papers contained in which were written in the earlier part of his career; and also several linguistic works, in which he attempted to popularize, and, by means of a universal alphabet, to simplify the study of the eastern languages. He had accepted from Napoleon the title of Count, and the commandership of the Legion of Honor; and upon Napoleon's downfall he was among those who were called to the House of Peers by Louis XVIII. His latest work, published in 1819, was *The History of Samuel, the Inventor of the Sacredness of Kings*. V. died on the 25th April 1820, shortly after completing his 63d year.

VOLO'GDA, an extensive government of Great Russia, bounded on the E. by the Ural Mountains, and on the N.-W. by the government of Archangel. Area, 151,500 sq. m.; pop. (1880) 1,131,584, chiefly Russians, but comprising also a few Finns, by which race this territory was inhabited in early times. The districts in the east, adjoining the Ural Mountains, are traversed by branches of that chain, which rise to the height of from 3000 to 4000 feet. But by far the greater part of the government is occupied by marshy plains, covered with impenetrable forests. The soil is not fertile, except in the south-west districts, which are the most densely peopled, and produce corn sufficient for local consumption and the supply of the distilleries. In the middle districts, there are comparatively few inhabitants; cultivated land is rarely seen, and hemp is the only crop produced liberally. The wooded morasses of the north are inhabited only by Finnish tribes, engaged in hunting. The banks of the rivers are, as a rule, the only inhabited places. The principal rivers, fifteen of which are navigable, are the Northern Dwina, with its great upper waters, the Suchona, Jug, and Witchegda; and the Petchora, with its affluents. Lakes are numerous. Salt-works, iron-works, and distilleries are in operation; and salt, iron, skins, tallow-candles, and cheese are exported; and corn and manufactured goods imported.

VOLOGDA, a city of Great Russia, in the south-west angle of the government of the same name, of which it is capital, stands on both banks of the river Vologda, 467 miles east of St. Petersburg. It is said to have been founded in the 13th c. by settlers from Novgorod, to which principality it belonged down to the 15th c., when it was annexed to Moscow. In 1553, when England opened up a trade with Russia, through the port of Archangel, V. was the great entrepôt for goods deported north by the Northern Dwina; and even yet it exports to St. Petersburg and Archangel various products of its own and neighboring governments, to a considerable amount. Nigello and filigree work are manufactured. Political offenders are sometimes banished to Vologda. Pop. (1880) 17,250.

VO'LSCI, an ancient Italian people, closely related to the Umbrians. See UMBRIA. Their territory was bounded on the W. by that of the Latini, on the N. they marched with the Æqui and Hernici, on the E. with the Samnites, and on the S. they had the sea. Along nearly the whole of their coast lay the Pontine Marshes, while, inland, their territory was somewhat mountainous. The V. were a brave and warlike people, who, frequently in alliance with the Æqui, were incessantly at war with the Romans for upwards of 200 years previous to 338 B.C., about which time they appear to have been finally subdued, their territory incorporated into Latium, and they themselves created Roman citizens. See LATINI. These wars were very harassing to the Romans, as they were often carried on not so much by the V. as a whole, as by different cities, each frequently on its own account. Some of the chief towns, and those which took a principal part in the wars, were Antium, Velitræ, Satricum, Privernum, Ulubræ, Suessa Pometia, Anxur, and Tarracina, and later Forum Appii and Tres Tabernæ. The legend of Coriolanus (q. v.) is connected with the Volscian wars. See ROME, TARQUINIUS SUPERBUS, ANTIUM. From the time of their final subjugation, their history belongs to that of Rome (q. v.).

VOLSK, or VOLGSK, a town of European Russia, in the government of Saratov, on the right bank of the Volga, 80 miles north-east of Saratov. Fat and skins are prepared and exported to St. Petersburg, and corn is exported in large quantities to Astrakhan and Rybinsk. The inhabitants are chiefly engaged in the culture of gardens and orchards, and the fruits grown are exported principally to Nijni-Novgorod. Pop. (1880) 31,270.

VOLTA, ALESSANDRO, a celebrated Italian physicist, was born at Como, of a noble family, in 1745, and received an excellent education. In 1774, he was appointed Professor of Natural Philosophy at Pavia, and continued to discharge the duties of this chair till 1804, when he retired to his native town, to spend the rest of his days. V., while but a youth, had exhibited considerable taste for letters, and had even written two poems, one in Italian, and the other in Latin; but as he grew older, he abandoned all such pursuits, and devoted himself exclusively to the sciences, especially those connected with electricity. At intervals between 1777 and 1782, he visited Switzerland, Tuscany, Germany, Holland, France, and England, making the acquaintance of the most eminent philosophers of these countries; and on his return is said to have introduced the culture of the potato into Lombardy. In 1796, he was one of a deputation sent to solicit the forbearance of Napoleon; and was received with distinction by the French general, who afterwards invited him to Paris, to exhibit, to the members of the Institute, the action of the 'pile' (see GALVANISM), which he had invented, enrolled him in the Legion of Honor, and conferred on him the order of the Iron Crown, with the titles of Count and Senator of the Kingdom of Italy. He was also elected (1801) a Foreign Associate of the French Institute ten years after he had been made a Fellow of the Royal Society of London. He died at Como, March 5, 1826.

V.'s contributions to the science of electricity are of great importance, the chief of them being his theory, in opposition to the 'animal-electricity' doctrine of Galvani, that the electric power resides in the metals; although, in turn, he fell into the error of supposing that the chemical action of the different kinds of metal on each other was only incidental. He also invented an electric battery, consisting of a series of cups arranged in a circle, each cup containing a saline solution, in which were immersed, edgewise, two plates, one of zinc and the other of silver, the zinc plate in one cup being connected with the silver one in the next by means of a wire. This battery was, however, soon after superseded by his 'pile.' He also invented, in 1775, the *Electrophorus* (q. v.); in 1782, the electrical *Condenser* (q. v.), employing with it an electrometer (see ELECTRICITY), in which two straws were employed instead of the gold-leaf strips now in use; and also (1777) the hydrogen-lamp, and the electrical pistol. Most of his important discoveries were communicated by him directly to the Royal Society (published in the *Philosophical Transactions* of 1782, 1783, 1800). A collection of V.'s works, in 5 vols., was published in 1816 at Florence. After him Galvanism (q. v.) is often called *Voltaic Electricity;* and the practical unit of electromotive force is called a *volt*.

VOLTAIRE (FRANÇOIS-MARIE AROUET, his true name)—one of the most famous of French writers—was born, according to his own account, as given in later life, on 20th February 1694, at Chatenay, near Sceaux. The register of his baptism, however, assigns Paris as the place of his birth, and dates it 21st November of that year. As to which of these statements may be really the correct one, his biographers are not yet fully agreed. His father was François Arouet, a notary of the Châtelet, ultimately Treasurer of the Chamber of Accounts; his mother, Marguerite d'Aumar, of a noble family of Poitou. Of two sons born to them, François was the younger. He received his education at the College of Louis le Grand in Paris, and on its completion he was set to study law by his father. But he found this pursuit too disgusting, and speedily quitted it for the career of a man of letters. By his godfather, the Abbé de Châteauneuf, who was very intimate with her, he was introduced to the celebrated Ninon de l'Enclos, and through her to the best French society of the period.

In these wicked and witty circles, being himself deficient in neither wickedness nor wit, the young man prospered extremely; and so perfectly unexceptionable was the company in which he found himself, that one day he could exclaim, looking round the table with complacency: 'Are we all, then, either princes or poets?' His father, however, deeply disapproving of the life he led as immoral, and probably not inexpensive, had him sent to Holland with an embassy. Here he became involved in a love-affair of the more respectable kind, which ended, not in marriage, as he seems to have proposed, but in his being sent back to Paris, to resume his gay career. Shortly, it suffered another interruption: on suspicion (unfounded) of his being the author of some

satirical verses, reflecting on the government of Louis XIV., then just dead, he was sent to the Bastille (May 17, 1717), where he remained upwards of a year. This time of imprisonment he improved by sketching his famous poem, afterwards published as the *Henriade*, and by finishing his tragedy, *Œdipe*, which was produced on the 18th November 1718, and had so great a success with the public, as not only to delight the author, but somewhat to mollify his old parent, who began to surmise that the despised 'poetry' of his offspring was not unlikely to come to something. The same success did not, however, attend his next ventures: his tragedy, *Artemire*, produced in 1720, was hissed off the stage; and his *Mariane*, which followed in 1724, fared but little better. Meantime, he had again visited Holland, making, on the way, the acquaintance of Jean Baptiste Rousseau, a poet of some importance, then living at Brussels. The two geniuses met as friends, only to part as irreconcilable enemies. Their quarrel is said to have originated in a characteristic *mot* of V., who, his critical opinion being asked of an *Ode à la Postérité*, which Rousseau read to him, had the candor to reply thus: 'Mon ami, voilà une lettre qui n'arrivera jamais à son adresse.'

In the summer of 1725 occurred a misadventure, which, for V., had important consequences. At the dinner-table of the Duke de Sulli, he resented with spirit an affront put upon him by the Chevalier de Rohan, who, worsted in the war of wit, as most men were likely to find themselves with V., avenged himself some days after by having his adversary thrashed in public by footmen. Subjected to so gross an outrage, V. retired for a time into private life, assiduously perfected himself in the small-sword exercise, and then courteously entreated the Chevalier to a meeting in the *duello*. The Chevalier, as it proved, had small stomach for the encounter; having immortalized himself sufficiently by his insult to the poet, he considered it unnecessary to aspire to the further immortality of being killed by him. Under superficial pretences of accepting the challenge, his practical answer to it came in the form of a *lettre de cachet*, which consigned V. once more to the Bastille. His imprisonment was not on this occasion a long one; but it was only under sentence of exile that he was permitted to issue from durance; and on doing so he betook himself to England. Some little time previous, the young Arouet had assumed the name of Voltaire, destined to become so famous. As to the origin of this name, considerable perplexity has existed; but there can scarce be a doubt of the correctness of the conjecture thrown out by Mr. Carlyle, in the second volume of his *Frederick*, that it is simply an anagram of Arouet *l. j.* (*le jeune*).

Arriving in England in 1726, V. remained there upwards of two years. Of this episode of his life, we have only the most meagre account. It is certain, in a general way, that he had the *entrée* to the best English society; he knew Bolingbroke, Pope, and, we need not doubt, many others of the intellectually distinguished. Of his visit to the famous Mr. Congreve, and the little skirmish of wit between them, we have express record. It was a whim of Congreve to affect dislike of his fame as an author, as to a certain extent a disparagment of his claims as a person of quality. On his signifying to V. that it was simply as this last he desired that his friends should regard him, he was answered to the effect that had he been nothing more than the elegant gentleman he considered himself, M. de V. would scarce have thought it worth while to solicit the honor of his acquaintance. To V., his residence in England was fruitful of new knowledge and ideas; in the school of the English Deists, Bolingbroke, Collins, Tindal, Wollaston, &c., he found speculations much to his mind; the philosophies of Newton and Locke he studied diligently; and in his subsequent dramas there may be traced a distinct influence from Shakspeare, whom, however, he has expressly vilified as a barbarous monster of a writer, intolerable to any reader with the least tincture of orthodox French *goût* in him. Not the less the distinction remains with V. of having been the first Frenchman to recognize in some decisive, if grudging and inadequate way, the essential superiority of our great national poet. The intellectual debt thus indicated was not the only one which V. owed to England. Whilst resident there, he published in a revised form his epic poem, the *Henriade*, a surreptitious edition of which had already appeared in France. The work was dedicated in English to Queen Caroline; the subscription for it was headed by her and other members of the royal family; the rank and fashion of the country could not but follow the illustrious example set them; and for result, V. could convey into his pocket a comfortable sum (stated so high as £8000), which became the basis of his future fortune.

From the time of his return to Paris in 1728, he had always on hand some money speculation: investments in corn, bacon, or whatever a pretty penny could be turned by, with now and then a fat army-contract, which a friend might have interest to secure for him; and so shrewd in his finance was he, that, owing but little to his books, which, despite of their immense popularity, were never a source of great profit to him, his income at his death is ascertained to have netted some £7000 per annum, a revenue then to be styled princely. Of his literary labors, from this time forward unremitting, the sum of which remains in something like ninety volumes, no detailed account can here be attempted. His was truly a universal genius; he wrote literally everything—histories, dramas, poems, disquisitions, literary, philosophical, and scientific; novels, for the most part with some doctrinal purpose, of which his famous *Candide, or the Optimist*, may stand as the type; his literary correspondence was on an unexampled scale; and he was seldom without some fierce polemic on hand, in which his adversaries had to writhe for the amusement of the public, under the scourge of his envenomed wit.

In the gay society of Paris, he became acquainted with a certain Madame du Châtelet, who was living apart from her husband, the Marquis, though still on polite terms with him. She was *assez spirituelle;* a most fascinating woman of the world, and in the matter of intellectual accomplishment, the bluest wonder of the period; most especially she was deep in mathematics, and had mastered the mysteries of Newton's *Principia*.

As himself an admirer of Newton, V. could not but be charmed to meet him thus surprisingly put into petticoats; nor could a woman so intellectual as Madame fail, in her turn, to appreciate the tender attentions of such a genius as M. de Voltaire. Their intimacy became extreme; and finally, in 1733—the husband of the lady behaving like a philosopher and man of fashion of the time, and continuing now and then to visit them—they went off to prosecute it undisturbed at Cirey, an old château in Champagne, the property of M. du Châtelet. Here, for the most part, they diligently studied Newton together for the next fifteen years. The arrangement seems to have been on the whole a not unhappy one; but towards the close, it became complicated for M. de V. by the advent of another lover, in the person of a Monsieur de Saint-Lambert. It is not conjectured that this gentleman knew anything of Newton, or was at all such a genius as V.; but it is certain that, on some other ground unexplained, he found favor with Madame du Châtelet. The philosophy which the husband had been good enough to practise in favor of V., was now required of himself; and after a little unpleasantness he was able to reconcile himself to the inevitable. This curious triangular love-affair —or *square*, if we include the husband—was not, however, of very long duration. In 1748, Madame du Châtelet died in childbed. V. was overcome with grief; and the touching reproach which, in the first agony of bereavement, he addressed to the culpable M. de Saint-Lambert, a fortunate chance has preserved for us: 'Eh! mon Dieu! Monsieur, de quoi vous avisiez vous de lui faire un enfant.' This, which is now so shocking, illustrates strikingly the morals of a period in which it seemed entirely *comme il faut*.

To dissipate the sense of loneliness which overpowered him in the loss of his 'divine Emilie,' as he was wont, in his more lyrical moments, to call her, V. once more betook himself to Paris, whence, in 1750, he proceeded to Berlin, on the invitation of the young king of Prussia, Frederick, since known as 'the Great.' Between him and V., much correspondence had already passed; and they seem to have entertained for each other a sincere admiration and regard. When they came together, however, it was found, as so often in such cases before and since, that it is not in the matter of mountains only that 'distance lends enchantment to the view.' They quarreled bitterly, and parted; V., at his exit from the country, being subjected to indignities which he found it hard to forgive. Into the details of the quarrel we need not enter. When we say that the king was a poet at once most profuse and most execrable; and that the main function of V.—himself a poet—was to criticise and correct his verses, it should almost seem that we indicate, without going further, a sufficient *origo mali*. V. detested the king's verses; the king could hardly have been even the very bad poet he was, without heartily detesting V.'s criticism and corrections. Is it marvelous that in no long time they got heartily to detest each other? A reconciliation was afterwards effected, and their literary correspondence was resumed under the old forms of friendliness; but meantime V. had avenged himself in the amusing but most scandulous chronicle, entitled *Vie Privée du Roi de Prusse*, which was found at his death among his papers, and published, as there is pretty good reason to suppose the wicked wit meant it should be.

After some years of a somewhat unsettled kind, V., in 1758, established himself along with his niece, Madame Denis, at Ferney in Switzerland, where, with little exception, the last 20 years of his life were passed. During this period, some generous traits of character are recorded of him. Thus, he rescued from extreme want a grand-niece of Corneille the great dramatist, had her carefully educated under his own eye at Ferney, and made over to her the proceeds of an annotated edition of her ancestor's works, which he issued for her express benefit. His noble exertions in behalf of the Calas family, the victims of a shameful persecution, are also well known. In 1778, he was induced by his niece to revisit Paris. By the Parisians, the poet, now in his 84th year, was received with a perfect tumult of enthusiasm, the excitement con-

nected with which is thought to have hastened his death, which took place on 30th May of that year.

With the doubtful exception of Roussean (Jean Jacques), who in his character of *vates* and enthusiast, was perhaps even more deeply influential, V. is by far the most memorable of the band of celebrated writers whose crusade against established opinions was preparing the grand *culbute* of the French Revolution. As every one knows, it was mainly in the field of religious polemic that his destructive energies were exerted. It is common to stigmatize him as an Atheist, but this is simply to exhibit ignorance. Discarding revelation, he steadily upheld the truths of natural religion, and was, in fact, a Deist pretty much of the English type. As such, he was not a little despised by the more 'advanced' minds of the period. Diderot and the like, who considered belief in a God clear evidence of intellectual infirmity. His favorite weapon was ridicule, and there was never, perhaps, a greater master of it. In a particular form of polished mockery, V. remains almost without a rival. His prose is the perfection of French style; it is admirable in grace, clearness, vivacity, and alive like a sparkling wine with the particular quality of *esprit* peculiar to the people and the language. As a dramatist, V. takes rank as a worthy third with his two great predecessors Corneille and Racine. His most famous poems are the *Henriade*, before mentioned, the one epic of the language, and *La Pucelle*, which is, perhaps, more properly to be styled infamous, such is the profanity and indecency with which the writer has wilfully defiled the heroic story of the Maid of Orleans. In the historical works of V., with the utmost lucidity of method, there are traces of a more philosophical treatment than had previously been applied to such subjects. For its narrative charm, his little historiette, *Charles Douze*, familiar to every school-boy, is in its kind a perfect model. In English, biographical works on V. are very few in number. Of his earlier life, a most racy and amusing sketch will be found in the second volume of Mr. Carlyle's *Frederick the Great;* and his relations with Frederick are of course in that work treated of in full, with the writer's characteristic humor and insight. As a critical estimate at once of the man and of the writer, nothing better can anywhere be found than Mr. Carlyle's earlier Essay.

In 1866, the first volume of a *Life and Times of François-Marie Arouet, calling himself Voltaire,* by Francis Espinasse, was published by Chapman and Hall; but this work, which promised to ably supply a desideratum, has been left unfinished. See also *Voltaire*, by David Friedrich Strauss (1870); *Voltaire*, by John Morley (London 1872); and *Voltaire et la Société du XVIII. Siècle*, by T. G. Desnoiresterres (8 vols. 1855—1876).

VOLTE'RRA, a town of Central Italy, in the province of Pisa, stands on a table-land at the height of nearly 2000 feet above sea-level, 30 miles south-east of Leghorn. It is surrounded by cyclopean walls, which are in a better state of preservation than any structures of the same kind in Italy. The gate called *l'Arco*, and the remains of baths and of an amphitheater, are interesting vestiges of antiquity; the cathedral, municipal palace, and *Pretorio*, are monuments of the middle ages; and the *Mastio*, a prison, is a modern edifice. V. contains a college, numerous schools, and a library of 120,000 vols. Wine, oil, corn, and mulberry trees are grown in the lands belonging to the town, which also possesses considerable mineral wealth. Pop. 6000.

V., the ancient *Volaterræ*, was one of the most powerful and important of all the Etruscan cities, and came into the possession of Rome 474 B.C.; after the fall of the Empire, it suffered much from the invasion of barbarians.

VOLTIGEURS, picked companies of irregular riflemen in the French regiments. They are selected for courage, great activity, and small stature. It is their privilege to lead the attack.

VO'LTI SU'BITO (Ital. turn quickly), in Music, an indication placed at the foot of a page, to signify that the page ought to be turned without delay.

VO'LTRI, a town of Northern Italy, in the province of Genoa, and 9½ miles west of the city of that name, on the Gulf of Genoa. Its churches are richly adorned; it contains many fine villas, and manufactures paper extensively. Near it are the sulphurous springs and baths of Aqua Santa, very efficacious in cases of cutaneous disease. Pop. 6000.

VOLUME'TRIC ANALYSIS, in Chemistry, consists in submitting the substance to be estimated to certain characteristic reactions, the chemist employing for such reactions liquids of known strength, and from the quantity of liquid employed to induce the reaction, determining the weight of the substance to be estimated by means of the laws of equivalence. The idea of this method first suggested itself to Gay-Lussac in considering how most readily to determine the amount of silver in an alloy of that metal and copper; but the method itself did not come into general use till within the last thirty years. The liquid reagents of known strength are called *standard solutions;* and the amount employed may be estimated either by weight or by volume, but the latter being the easiest of application, is universally employed; and hence this method of analysis, based on the use of standard solutions, is called *volumetric analysis.* In order that a reaction may be applicable in volumetric analysis, it must satisfy the two following conditions: (1) It must not occupy much time; and (2) the termination of the reaction must be easily recognized and unmistakable to the eye. The necessity that these conditions should be fulfilled, very much limits the number of volumetric processes. In addition to the ordinary chemical apparatus, this kind of analysis requires graduated glass vessels of different kinds for the measurement of the standard solutions. Of these, the most essential are: (1) *Pipettes*, which are glass vessels of the form of figs. 1 and 2, intended for the delivery of the standard solution. Fig. 1 is provided with a single mark upon the neck, while fig. 2 is divided and graduated through its whole length, the division being always made into cubic centimètres (c. c.), according to French scale; (2) *Flasks* graduated for the contents in various sizes from one-tenth of a litre to five litres, and used for the preparation of standard solutions; (3) *Burettes*, or graduated tubes for measuring the liquids used in an analysis.

The burette was invented by Gay-Lussac; but since his time, various modifications have been proposed, the best of which, for general purposes, is that which is known as Mohr's Burette. It is shown in fig. 3; and its lower part is attached to an india-rubber

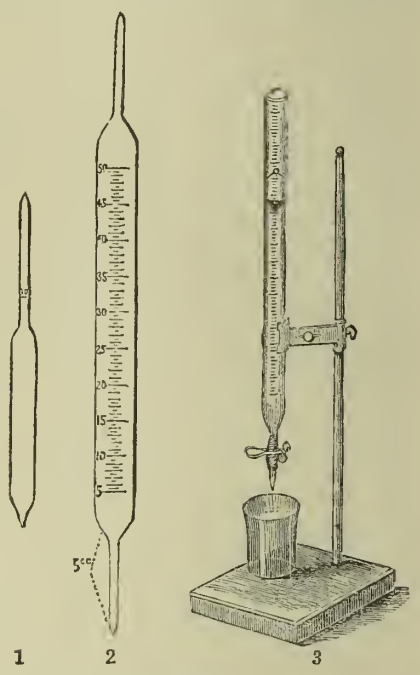


Fig. 1.—A Pipette, containing 10 c. c.
Fig. 2.—A Pipette, containing 50 c. c., divided through its whole length in c, c.; being thus graduated for measuring the delivery of fluids.
Fig. 3.—*a*, the india-rubber; *b*, the slips made of brass wire, by which the india-rubber tube can be closed at will.

tube and spring-clamp or clip (*Quetsch-Hahn*). Its principal advantages over other forms of the instrument are, that its constant upright position enables the operator at once to read off the number of degrees of standard (or test) solution used for any analysis, while the quantity of fluid to be delivered can be most accurately regulated by the pressure of the thumb and finger on the clamp; moreover, as it is not held in the hand, no error is likely to arise in the measurement from the heat of the operator's hand. The greatest drawback to it is that it cannot be used for those test-solutions which decompose india-rubber.

The *standard solutions*, known also as *test* or *titrated solutions* (from the French word *titre*, which signifies the standard of a coin), may be divided into (1) such as are immediately prepared by weighing a substance of known composition, dissolving it, and diluting it to the required volume; and (2) such as are prepared by approximate mixture and subsequent exact analyses. The preparation of the first kind requires no description; for the preparation of the second kind, we must refer to the article 'Analysis Volumetric,' in Watts's *Dictionary of Chemistry*, vol. i. p. 259, where the method is fully explained, and as an example, the preparation of a standard solution of sulphuric acid containing *t* grammes of hydrated sulphuric acid in 1 litre is given. It is obviously essential that the greatest care must be taken both with respect to the graduation of the measuring instruments and the strength and purity of the standard solutions, which must be protected from evaporation and other hurtful influences by being

kept in bottles of 1 or 2 litres' capacity, provided with well-ground stoppers.

Volumetric methods are usually classified as follows, according to the principles on which they are based—(1.) *Analysis by saturation*, when the quantity of a base or an acid is measured by the quantity of acid or base which is required for exact saturation—a point to be determined by test-papers. tincture of litmus, &c. (2.) *Analysis by oxidation and reduction*, when the quantity of the substance to be determined is found by the quantity of chlorine, bromine, iodine, or oxygen to which it is equivalent (regarded as oxidant), or by the quantity of chlorine, bromine, iodine, or oxygen which it requires to pass from a lower to a higher stage of oxidation. The chief oxidizing agents are permanganate of potash and bichromate of potash; while the reducing agents chiefly used are protoxide of iron and hyposulphite of soda. (3.) *Analysis by precipitation*, when the determination of a substance is effected by precipitating it in some insoluble and definite combination. Our limited space does not admit of our giving an example of more than one of these forms of analysis, and from its historic interest we shall select the last, in its application to the determination of silver. We shall borrow Mr. Sutton's account of this process. 'Suppose,' he observes, 'that it is desirable to know the quantity of pure silver contained in a shilling. The coin is first dissolved in nitric acid, by which means a bluish solution containing silver, copper, and probably other metals, is obtained. It is a known fact that chlorine combines with silver in the presence of other metals to form chloride of silver, which is insoluble in nitric acid. The proportions in which the combination takes place are 35·5 of chlorine to every 108 of silver; consequently, if a standard solution of pure chloride of sodium is prepared by dissolving 58·5 grains of the salt—i. e., 1 eq. sodium (= 23) *plus* 1 eq. chlorine (= 35·5) or 1 eq. chloride of sodium—in so much distilled water as will exactly make up 1000 grains by measure, every single grain of this solution will combine with 0·0108 of a grain of pure silver to form chloride of silver, which precipitates to the bottom of the vessel in which the mixture is made. In the process of adding the salt solution to the silver, drop by drop, a point is at last reached when the precipitate ceases to form. Here the process must stop. On looking carefully at the graduated vessel from which the standard solution has been used, the operator sees at once the number of grains that have been necessary to produce the complete decomposition. For example, suppose the quantity used was 520 grains; all that is necessary to be done is to multiply 0·0108 grains by 520, which shows the amount of pure silver present to be 56·16 grains.'

By volumetric as compared with ordinary analysis, a large amount of time, labor, and therefore of expense, is saved; at the loss, however, often of due accuracy, unless the greatest care be taken that the standard solutions are of due strength, and the instruments accurately graduated. An analysis can thus be completed in a quarter of an hour, that would formerly have occupied a day or more. Independently of its application to pure chemistry, it facilitates to a great extent the chemical analysis of urine (on which subject see the English translation of Neubauer and Vogel *On the Urine*, published by the New Syd. Soc.), of waters (on which see Parkes *On Hygiene*), of manures, soils, &c.; and its processes have been freely introduced in the British Pharmacopœia. The standard book on this subject is that of Mohr, a German chemist; the English reader may consult the text-books of Scott of Dublin, and Sutton of Norwich, and various Memoirs in the *Chemical News*.

VO'LUNTARY CONVEYANCE is, in Bankruptcy and other proceedings, a conveyance which is made without any legal consideration, either of money or of marriage; and in competition with creditors having deeds made for consideration, is often deemed fraudulent, and is generally postponed or set aside altogether.

VO'LUNTARYISM, the principles or system of polity distinctive of those who advocate the separation of church and state; the cessation of state endowments and state grants for religious purposes, and, in general, of all interference, patronage, or exercise of authority on the part of the civil power in the religious and ecclesiastical affairs of the subject. The terms Voluntaryism and Voluntary have been in use since the date of the keen discussions regarding civil establishments of religion—commonly called the 'Voluntary Controversy'—which sprung up in the second decade of this century between churchmen and dissenters, in Scotland; and they serve to suggest, not inappositely, the fundamental conception which underlies the creed of religious dissent, that all true worship, or acceptable service in religion, must be the free expression of individual minds, and that, therefore, religion ought to be left by civil society to mould itself spontaneously according to its own institutions and spiritual nature, without violence to individual freedom from any interposition of secular authority or compulsory influence.

Voluntaryism seeks to define more accurately the limits of civil power by defining more adequately than preceding theories have done the latitude due to the movements of religion. Assigning the magistrate his proper sphere, it is equally careful to assign the church and the individual their appropriate spheres of responsibility and duty in reference to religion, within which they may work unchecked, in full harmony with all the claims of civil order. Voluntaryism may be regarded as the formula of advanced Protestantism, the corrected doctrine of church and state, which the failure of the experiment of national churches has forced on public thought. It is a protest in modern language against the encroachment of the temporal power, whether under the name of magistrate, nation, or political majority, on the rights and liberties of individual conscience. Voluntaryism has sometimes been erroneously considered the offspring of theological neutrality. On the contrary, its leading advocates base it on the expressed law of Christ respecting the constitution, administration, support, and extension of the church, as well as on the rights of conscience, the nature of civil government, and considerations of general equity and policy. In its most extensive sense, Voluntaryism embraces the whole question of the province of the magistrate in reference to religion and the church. Voluntaries admit that magistrates as well as other men, being under law to God, ought so to execute the proper duties of their office that all shall be done in consistency with the paramount claims of morality and religion. At the same time, the nature and design of civil government excludes their authority from the domain of religion and conscience, and confines it to the secular concerns of individuals and of society.

Magistrates, like other men, are under obligation to seek and to follow the highest available light and guidance in duty; but it is not therefore allowed them to convert the rules of the Divine Word, which are addressed exclusively to the individual conscience, into laws for civil society. God alone being lord of the conscience, such laws only—though revealed in His Word—may be adopted and enforced in civil society as are requisite for its outward preservation, peace, and good order, and for the advancement of those secular interests which are the proper care of its rulers. While, therefore, magistrates, no less than other men—and for reasons common to all favored with the Gospel—ought, as individuals, to embrace and profess the Christian religion, and to employ wisely and justly the influence arising from their circumstances and station, it is no part of their political or official duty, or of the homage required of them by Christ, to enact, adopt, prescribe, or enforce a confession of faith; neither is it within their province to aim at establishing or propagating Christianity by the civil arm, to provide for, endow, or subsidize its teachers either in churches or schools; but it is their duty impartially to protect all their subjects, of whatever creed, in the enjoyment of full religious liberty, so long as their manner of exercising this civil right does not infringe on the equal rights of others. On this ground, and with such qualification, it is their duty to abstain from all interference with the jurisdiction and economy of the church—not excepting the matter of its support—which being regulated, as Voluntaries believe, by special ordinances of Jesus Christ, its Head, it is an invasion of His prerogatives, and a frustration of His law for its support and extension, to place, or suffer to be placed, on the footing of a civil establishment. The doctrine regarding the support of religion has always been an important article in the Voluntary creed, and, in a restricted sense, Voluntaryism has been popularly defined by this doctrine. Negatively, the duty of providing for the support of Christian institutions, does not lie with the magistrate or nation.

The giving of property for the support of the gospel has been elevated by Voluntaryism from the position of an almost eleemosynary and political custom, to the rank of a systematic obligation and a financial law of the church. It is recognized as an act of religion, the duty and privilege of all Christians; and as each man is a steward of his silver or gold, responsible to none but its great Owner for his disposal of it in religious matters, the magistrate can possess no right to demand from him any portion for religious uses, or to apply to these uses the proceeds of taxation imposed for general ends. Civil society being promiscuous and variable in its constituents, a fixed arrangement for the endowment of religious bodies out of the public funds, is a fixed usurpation—as a system of occasional grants is an occasional usurpation—upon the liberty and property of all who dissent. The existence of an absolute unanimity among the subjects—even were it possible, as it would be otherwise, to ascertain and secure it from time to time—however it might remove for the moment from any minds the feeling of political grievance incident to such arrangements, could neither justify them as a policy, nor alter their character as an interference with religion in its economics. In its broad aspect, as an overstepping of the sphere of magistracy, all who restrict the magistrate, on whatever specific grounds, to secular affairs, must deem such interference objectionable; and Christian Voluntaries would reasonably ask, why legal machinery should be employed to gather the offerings which, in the state of public sentiment sup-

posed, must be flowing unforced through their natural channels? and in particular, whether, if Christ has not appointed the magistrate to 'tithe and toll' for his church, society can presume to assign him a work beyond his province? There is a manifest division of duties dictated alike by reason and revelation; and Voluntaryism claims the results of experience as proof of the entire want of adaptation in the compulsory or magistratical power to deal with the support of a living religion.

To burden the rent-roll, increase the assessments, distrain the goods and chattels of citizens, or even to preserve the forms of legal exaction for such a purpose, are measures which it is hard to believe either politic, scriptural, or just. The pecuniary supplies required for religious objects are to be secured, according to Voluntaryism, solely through the operation of moral influences and sacred motives. Truth, as well as error, must be left to provide for itself. The responsibility and privilege of providing for the support of Christianity having been attached by Christ to His church, it is further His law that its institutions shall be maintained and extended by the voluntary liberality of its friends. A primary obligation rests on those enjoying the services of a pastor to provide according to their ability for his maintenance, on the apostolic principle—'Let him that is taught in the word communicate to him that teacheth in all good things;' while, on the equally apostolic principles, that the laborer is worthy of his hire, and that the strong should aid the weak, a mutual and collective responsibility remains with the general membership, to supply each other's ecclesiastical necessities, and to unite in measures that may provide an adequate remuneration to the pastors or other ministers of the church. Civil establishments of religion, together with all forms of state endowments and grants for religious purposes, are thus condemned by Voluntarics as human expedients, adverse to Christian development and the working of the law of self-support, which alone draws forth the resources, and educates the consciences and habits of the people. Inadmissible, as introducing the compulsory element into the free and delicate movements of Christian society, and intruding magistracy into a sphere which the history of all struggles for the higher liberty teaches must be preserved to the individual and the church, these institutions tend to foster political dependence and class-feeling among the recipient bodies, and prevent those relations of honorable trust and responsibility which best unite pastors and people. These views express what may be called ecclesiastical Voluntaryism. On the question of education, various shades of opinion exist among Voluntarics.

All are agreed that the religious education of the young belongs to the parent and the church, and is not to be provided or superintended by the state. How to secure this principle in connection with a system of national schools or government grants for education, continues to be the problem of Voluntaries. Some seek the solution in a plan of local boards representing the parentage and community, who shall manage the schools, and decide the character of the teaching; and of these, some advocate separation of the hours for religious and secular lessons. Others, who think that while by these methods state superintendence may be avoided, state aid is yet directly or indirectly received for religious instruction, would accept a system which provided simply for schooling in secular or common branches. Those known as Voluntary educationists reject the idea of any national system, some on account of the religious difficulty, and others on grounds connected with the philosophy of education and the theory of government. Voluntary educationists would leave the education of the poor to be secured by the operation of those influences which originate and sustain other necessary and benevolent measures. The education of the children of classes not necessitous they expect to flow from private enterprise and free association. Voluntaries consistently object to grants to denominational schools dependent on the condition of teaching religion, to grants to ragged schools and all semi-religious institutions, as well as to the appointment and payment by the state of chaplains for prisons, the army, &c. In reference to the Sabbath, holding the sacred character of the day, some Voluntaries appear to admit that the magistrate is both entitled and bound not only to make it a *dies non* in his own department, but also to prohibit labor and amusements throughout the nation. Others, equally holding the morality of the day, with more regard to strict theory, deny him the power of inflicting pains and penalties, however mild, in a matter radically religious, at the same time that they assert the obligation of the state to secure all its members due protection and facility in the practice of their worship, and to make such laws for this end as may be fit, in view of prevailing religious observances.

Regarding national fasts and thanksgivings, most Voluntarics hold that the style of authority in which royal proclamations appointing these have usually been expressed is objectionable, as assuming a right to prescribe the topics and language of devotion, and to regulate its seasons, and insist that the language of invitation should be substituted for that of command. Some, while ready to comply with an invitation of the sovereign to join in an offering of prayer on occasions they judge suitable, do not allow that it forms any part of magisterial duty to issue such appeals, or that the royal act imparts a national character to the service. Ordinary political acts become national when done by the proper national organs; but no religious acts can acquire a national character except they are participated by the body of the people. When this is the case, the exercise is national, though not evoked by the call of the chief of the state, and it is not made more national by that call. The advantage of simultaneousness and unity is attainable on the widest scale by the natural concert of churches apart from royal initiative, which, if it may be followed when right, need not be waited for as indispensable to true national worship. On the question of marriage, Voluntaryism, recognizing its character as a civil transaction, demands that all religious parties stand on the same level in regard to it. Withholding legal sanction from all immoral connections, and punishing breaches of the lawful contract, magistrates are not warranted to visit with penalties any mere departure from the standard prescribed to Christian conscience, or embodied in ecclesiastical law. Political Voluntaryism, as it is sometimes called, is simply Voluntaryism expressed in the language of the politician—the doctrine of the entire religious equality of all citizens in the eye of law, stated and defended without reference to specific religious opinions.

VOLUNTEERS—the great defensive citizen-force of Great Britain, in some degree corresponding to the National Guard of continental states, and now forming part of the army of the United Kingdom. The members of the force receive no pay; although government arms the men, and contributes a certain sum towards the corporate expenditure. The oldest volunteer corps is the 'Honorable Artillery Company' of the city of London, which dates from the reign of Henry VII.: although still called artillery, it comprises artillery, cavalry, and infantry, and is probably the oldest armed body in Europe. When the country was in dread of invasion by Bonaparte, almost the whole available male population flew to arms as volunteers, and in 1803 they mustered 463,134 effectives. About this time, George III. reviewed 150,000 volunteers. The force gradually diminished, when the immediate danger ceased; and before the war closed, they were replaced by a new force, called the 'local militia,' which was supposed to be more thoroughly amenable to government control. As early as 1857, two small volunteer corps, the 1st Devon and the Victoria Rifles, had sprung into existence; but in 1859, the whole nation seemed to awake to a sense of insecurity, with a comparatively small army, half of which was abroad, amid the enormous armaments of neighboring states. In a few months, 150,000 men had organized themselves into companies; and in the following year, government, which had at first shown no favor to the movement, gave it a helping hand by combining the companies into battalions, by appointing paid adjutants and drill instructors, and by the establishment of a staff of inspectors under the control of an Inspector-general of Volunteers. The volunteers numbered, in 1880–81, 196,938 efficients, in a high state of training, and capable of performing in a very satisfactory manner all the simpler military manœuvres. They are divided into a small number of Light Horse, Mounted Rifles, and Engineers, a force of 36,084 Artillery, and quite an army of about 152,173 Riflemen. Where 60 men can be got together, a company of volunteers may be formed, which is entitled to have a captain and two lieutenants as its quota of officers.

If a place is populous enough, and sufficiently zealous in the cause to produce a corps of two companies, the senior officer becomes 'captain commandant.' Four companies make a major's command. Six are sufficient to constitute a battalion, for which government provides an adjutant, hitherto an old military officer, but now an army captain, who receives 10*s.* a day besides his forage. When there are a number of detached companies in the different villages of a district, they are grouped into a consolidated battalion (or brigade for detached batteries of artillery), with an adjutant, and with qualified field-officers. England and Scotland are further divided into military districts, each commanded by a general officer, who commands and inspects all forces of whatever kind within his district, his constant endeavor being to keep the corps in his district up to the standard of efficiency. Every company may have an honorary assistant-surgeon; but a corps of two companies is entitled to an assistant-surgeon; of four companies, to a surgeon, who may have one assistant when there are six companies, and two for eight or more companies. If a corps exceed a strength of twelve companies, it is customary to divide it into two battalions. The volunteer corps were originally raised under an act of 1804; but the circumstances of modern times having rendered various supplementary enactments necessary the whole were embodied in a new act, the 26 and 27 Vict. cap. 65 (1863), under which, and the 'Regulation of the Forces Act, 1871,' and under Orders in Council issued from time to time, the volunteer force of Great Britain is now constituted.

All officers are appointed by the crown. (Till of late, lords-lieutenant of counties nominated sub-lieutenants.) The non-commissioned officers are appointed by the officers commanding. Adjutants and sergeant-instructors are at all times subject to the Army Discipline and Regulation Acts—the other officers (and men) only when their corps is embodied; but the Queen can at any time deprive them of their commissions. Offences within corps, in time of peace, are punishable by fines or otherwise, as laid down in the rules of the several corps, which must have the approval of the Secretary of State for War. Every volunteer on joining must take the oath of allegiance, and must be of the age of 17.

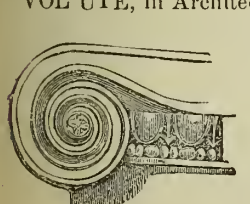
The force may not be used in times of civil disturbance, but may be embodied for active service anywhere in Great Britain, whenever the country is invaded, or invasion is apprehended by the crown. The occasion must first be communicated to parliament, or, if parliament be not sitting, to the country, by an order in council, and then the crown may direct the general commanding in districts to call out any or all of the volunteer corps in their respective commands for active service. Corps so called out come under the Army Discipline Acts, and are bound to march whither the general may command. While embodied, officers and men are entitled to the same pay as in the regular army. In point of precedence, volunteers rank with, but after, the same ranks in the army and militia. The yeomanry are reckoned as part of the volunteers. Among themselves, the volunteers rank in the following order: 1st, Light Horse; 2d, Artillery; 3d, Engineers; 4th, Engineers and Railway Transport Corps; 5th, Mounted Rifles; 6th, Rifles.

Members of a corps are honorary and enrolled. The first are merely subscribers of a certain amount; they are entitled to wear the uniform, but perform no duties. The enrolled members are the actual rank and file; they are classed as 'efficient' and 'non-efficient'—the efficient being those who are certified by the commanding-officer and the adjutant to have a competent knowledge of the duties of the service, to have attended a fixed number of drills, and to have completed a course of target practice.

The assistance afforded by the government to volunteer corps consists in the supply of adjutants; and of sergeant-instructors in the proportion of 1 to a corps of three companies or less, 2 from 4 to 7 companies, 3 up to 12 companies, &c. The money aid is a *capitation grant* of 30*s*. annually for each volunteer who is efficient, including officers, in addition to which there is a special grant of £2, 10*s*. for each officer and volunteer sergeant who holds a certificate of proficiency (for which a severe examination has now to be passed). In scattered battalions, a charge for each efficient is allowed to cover the cost of attending battalion drills. These allowances are, however, none of them personal, but are granted to corps, to be expended by the adjutant, who is accountable to the War Office, within certain limits, according to the discretion of the commanding-officer. Government likewise provides all the arms, and a certain quantity of practice-ammunition. In order to draw the volunteer force more closely to the regular army, the government provides annually for the training of several volunteer battalions in camp duties at Aldershott, and also for the formation of regimental camps of instruction all over the country. For artillery volunteers, camps of instruction have been provided at Shoeburyness and Irvine, during the period of the prize competitions there.

At first the several corps were allowed to choose their own uniform, subject to the approval of the lord-lieutenant; subsequently, corps had to conform to 'sealed patterns' of uniforms similar to those of the regular army, variations in color (e.g., gray) being allowed. But corps now changing uniforms are expected to conform to the pattern adopted by the territorial regiments of the district to which they belong. Volunteer corps do not bear colors. By the Naval Artillery Volunteers Act, 1873, a force was formed similar in organization to the land volunteer force for the defence of the coasts of the United Kingdom, or for service in the seas adjacent thereto. This body is under the control of the Admiralty. The system has not yet been extended to Ireland.

VOL'UTE, in Architecture, the spiral ornaments of the Ionic and Corinthian capitals, probably derived from Assyrian architecture, in which it is also used.



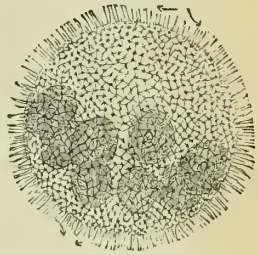
Volute.

VOLU'TIDÆ, a family of gasteropodous molluscs, of the section *Pectinibranchiata*, all marine, having a spiral shell, which is turreted or convolute, the aperture notched in front, the *columella* obliquely plaited; no operculum. The animal has a very large foot, and a recurved siphon. The species are numerous, and abound chiefly in tropical seas. Many of them have very beautiful shells, much prized by shell-collectors. Several small species are found on the shores of Britain, of which *Voluta tornatilis* is the only one that is not rare. This genus makes its appearance in the Cretaceous strata, and increases in numbers in Tertiary deposits, no less than 50 species being known in the Pleistocene beds.



Shell of *Voluta tornatilis*.

VO'LVOX, a genus of minute organisms, the type of a family, *Volvocineæ*, once treated as *Infusoria*, but now, as being vegetable, ranked among *Protophytes*. They are globular, or nearly so, are found in stagnant water, and move slowly through the water, revolving round an axis, by the agency of numerous Cilia (q. v.), which project from their surface; one pair arising from each of the numerous component cells of the sphere, and passing through their common gelatinous envelope. Both sexual and asexual multiplication take place; in the former case certain cells enlarge to form oospores, while others divide and redivide, so producing a mass of tiny segments, which are set free as ciliated antherozoids, and unite with the oospores, which ultimately divide to form new colonies. In asexual multiplication, eight cells of the ball undergo repeated division, so forming new spheres, which are set free by the breaking up of the parent. These frequently exhibit, even whilst within the parent globe, a rotatory motion similar to its own. The presence of starch in the interior of the *Volvocineæ* has been detected by means of iodine, and is regarded as a conclusive proof of their vegetable nature. The most common and best-known species is *Volvox globator*, which is just visible to the naked eye. It is a transparent sphere, having its surface studded with innumerable green spots, united by a beautiful net-work. From six to twenty young are often to be seen in its interior.



Volvox globator.

VO'LVULUS (Lat. *volvere*, to twist) is the term used in Medicine to signify a twisting of the intestine, producing obstruction to the passage of its contents. There are three distinct varieties of rotatory movement capable of giving rise to volvulus—(1.) A portion of intestine may have become twisted on its own axis, and, in that case, even semi-rotation brings the intestinal walls into contact, so as to close the passage. This is a rare condition, and only occurs in the ascending colon. (2.) The Mesentery (q. v.), or a part of it, may be twisted into a cone, dragging the intestine with it; the mesentery being the axis, and the intestine being rolled up upon it. This form occurs in the small intestine. (3.) A single portion or a coil of intestine may afford the axis round which another portion, with its mesentery, is thrown, so as to compress it, and close the passage. A coil of small intestine, the sigmoid flexure or the cæcum (see DIGESTION, ORGANS OF), may form the axis. All these varieties occur chiefly in advanced life, and their seat is commonly towards the posterior unyielding wall of the abdominal cavity, the smoothness and yielding nature of the parts anteriorly rendering such an event almost impossible. The *symptoms* of twisting of the intestines, especially of the sigmoid flexure, which is the most common seat of the affection, are usually very well marked from the beginning. Great pain is suddenly experienced in a small circumscribed spot of the abdomen, obstinate constipation usually setting in from that date. If the sigmoid flexure, which lies just above the rectum, is the seat of the twisting, the abdomen soon becomes distended, especially on the left side, the distention being much more marked than when the twist is in the small intestine, as might physiologically have been expected. Vomiting, often constant and copious, is usually present. These cases are so desperate in their nature, that it is needless to enlarge upon their treatment. Attempts to remove the displacement by injecting water or air into the intestine by means of a long tube, have often been made, but with very slight success.

Mr. Pollock, in his article on 'Disease of the Alimentary Canal,' in Holmes's *System of Surgery*, remarks, that 'relief in twist of the sigmoid flexure is just possible without opening the abdomen, provided the long tube be introduced into the distended gut, its contents drawn off, and the twist be reduced by the altered position of the bowel. But no operation for the ultimate relief of the patient will be successful unless the intestine be unloaded first, and the twist then reduced.'—Vol. ii. p. 158. The operations that have been proposed for the relief of this and other intestinal obstructions are so often fatal, and, even when successful, leave the patient in so wretched a state, with an artificial outlet for the discharge of the contents of the bowels, that it is doubtful whether

they should be recommended. It is simply a choice between almost certain death in a few days, and a possible chance of a prolonged (but usually a miserable) existence. There are, however, a few rules that should be universally known and attended to—viz.. wherever symptoms such as we have described occur, aperients should only be given by the rectum, while opium should be freely given by the mouth. Leeches and hot fomentation should be applied to the seat of pain; and all solid food should be prohibited, the nourishment being given solely in the fluid form.

VO'MER, a bone which, in the human skeleton, forms part of the middle partition of the nose, and the lower edge of which fits into grooves between the apposed surfaces of the palatine processes of the upper jaw and palate-bones. It exhibits many modifications in the different classes of *Vertebrata*. Its position is indicated in the figure of *Archetype Vertebrate Skeleton*, in the article SKELETON. It is specially noticed here because of the frequent occurrence of the term vomer in articles on fishes—a very important character being often found in the presence or absence of teeth on the vomer, that is, along the middle line of the roof of the mouth.

VO'MITING consists in the stomach emptying itself through the gullet and mouth. It is preceded by a feeling of nausea, a flow of saliva in the mouth, and the breaking out of perspiration; the countenance grows pale, a feeling of weakness spreads over the whole body, and the pulse becomes slow. At last the muscles of the abdomen and the diaphragm strongly contract, and the whole contents of the stomach are ejected with greater or less violence. The first matters to be ejected are the food and drink present, then mucus from the stomach and œsophagus, and lastly, bile from the duodenum. In cases of disease, abnormal substances are sometimes vomited, such as blood, fragments of the intestines, and even excrementitious matters. When the vomiting is over, it is followed by languor and drowsiness, or, if the excitement was inconsiderable, the usual state immediately returns.

The causes of vomiting are various. In the first stages of infancy, it is almost normal, and occasions no disturbance of the system. In many animals, too, it is a normal function of life, as when birds of prey reject the hair and feathers of their victims. The infant gets rid of the superabundant milk it swallows by throwing it up with no trouble. Some persons can excite themselves to vomit by swallowing air.

The immediate causes of vomiting may be reduced, according to Dr. Carpenter, to the three following categories: '(1.) The contact of irritating substances with the mucous membrane of the stomach itself; these however, cannot act by *direct* stimulation upon more than its own muscular coat; and their operations upon the associated muscles must take place by *reflexion* through the nervous circle furnished by the pneumogastric and the motor nerves of expiration. (2.) Irritations applied to other parts of the body, likewise operating by *simply-reflex* transmission; as in the vomiting which is consequent upon the strangulation of a hernia, or the passage of a renal calculus; or in that which is excited by the injection of tartar emetic or emetin into the circulating current, when these substances probably produce their characteristic effect by their operation on the nervous centers. (3.) Impressions received through the *sensorial* centers, which may be either sensational or emotional, but which do not operate unless they are *felt*. In this mode seems to be excited the vomiting that is induced by tickling the fauces, which first gives rise to the sensation of nausea; as well as the vomiting consequent upon disgusting sights, odors, or tastes, and upon those peculiar internal sensations which are preliminary to sea-sickness. The *recollection* of these sensations, conjoined with the emotional state which they originally excited, may itself become an efficient cause of the action, at least in individuals of peculiarly irritable stomachs, or of highly sensitive nervous systems.'—*Principles of Human Physiology*, 6th ed., p. 77.

According to the oldest doctrine respecting vomiting, it was held to arise solely from convulsive movements of the stomach, which was thought to take on a motion contrary to the usual peristaltic motion. Bayle advanced the opinion, that the stomach is quite passive in the operation, and that its contents are emptied entirely by its being compressed through the contractions of the abdominal muscles and the diaphragm. An apparently conclusive experiment of Magendie's, in which the stomach was removed, and a bladder substituted for it, had more recently (in 1813) satisfied most physiologists as to the passiveness of the stomach in vomiting, until Béclard and Budge showed the insufficiency of his experiment. It is found, in fact, that in vomiting there are two sets of actions, viz., (1) contractions of the abdominal walls, while the diaphragm remains fixed, and forms a support to the stomach, and (2) the stomach itself performs jerking movements, the pylorus, or inferior orifice, at the same time closing, while the cardiac sphincter relaxes, without which last-named action vomiting is impossible; and that either of the two kinds of movement—the abdominal or the stomachal—may eject the contents of the stomach into the gullet.

In the treatment of vomiting, we must consider it as a symptom rather than as a malady. Where the stomach is irritated, relief is afforded, according to circumstances, by drinking cold water, aërated or soda water, or, if necessary, by opium or nux vomica. Cold applications outwardly also do good. In other cases, infusions containing ethereal oils—camomile, coffee, &c.—astringents, or correctives for acidity—magnesia, soda, &c.—are the fitting remedies. When the irritation is in the brain, the best remedy is a horizontal position, with composure and darkness. If a person in sound health is suddenly seized with vomiting, poisoning may be suspected.

VONDEL, JOOST VAN DEN (pr. *Yost*), the greatest Dutch poet, was born at Cologne, November 17, 1587, his parents, who were Anabaptists, having fled from Antwerp to avoid persecution. His maternal grandfather, Peter Kranen, ranked among the poets of Brabant. When freedom began to raise the head in Holland, the elder Vondel removed with his family to Utrecht, and afterwards to Amsterdam, where he prospered in trade. The poet's education in boyhood was limited to reading and writing, but his perseverence and love of study enabled him in after-life to become intimately acquainted both with ancient and modern literature.

At the early age of 13, his poetical efforts were praised by Hooft. In his 23d year, he married Maria de Wolf, to whose clever management V. chiefly left his business as a hosier, while he devoted himself to study and poetry. The tragedies of V. are very numerous, and the grandest specimens of Dutch literature. His satirical writings and epigrams are full of fire, energy, and spirit. One of his most remarkable pieces is *Lucifer*, published in 1654, strikingly resembling Milton's *Paradise Lost*, which appeared thirteen years later. V. took an earnest and active part in favor of the Remonstrants, Grotius and Oldenbarneveld, drawing down on himself the anger both of the clergy and court, whom he attacked with the keenest satire.

Gysbrecht van Aemstel, Adam in Banishment, Palamedes, the Batavian Brothers, Solomon, Samson, Adonijah, Noah, or the Destruction of the Old World, Mary Stuart, &c., are splendid efforts of genius. *The Harpoon, The Horse-Comb*, and the *Decretum Horribile* are stinging satires on the ruling powers both in church and state. V.'s translations from the Greek and Roman writers are numerous, the *Metamorphoses* of Ovid having been rendered into Dutch verse when he was 84 years old. V. left no subject untouched, no measure untried. His works (9 vols. quarto) contain many sea-songs, and more than 100 odes. Many of the later poems were written with a strong Roman Catholic spirit, he having joined that church about 1640. Through the imprudences of his son, to whom he had given his business, V. fell into straitened circumstances, and in 1658 accepted a situation in the City Pawnbroking Office. In 1668, the magistrates allowed him to retire with his salary of 650 guilders yearly, which kept him above want. He was of moderate stature, well made, and had an eagle eye. After his powers of body and memory had begun to fail, he could still read without glasses. He died calmly on the 5th of February 1679, at the age of 91, and was carried to his resting-place in the new church, Amsterdam, by fourteen poets, himself Princeps Poetarum.

VOPADEVA is a celebrated grammarian of India. He wrote a grammar entitled *Mugdhabodha*, which is held in high repute, especially in Bengal, and was commented upon by *Durgadâsa*. (Both text and commentary have been edited at Calcutta in 1861; previous editions contain merely the text of V.'s grammar.) It differs from the great work of Pân'ini (q. v.) in its arrangement as well as in its terminology; and without the commentary of Durgadâsa, would not yield by far the information that may be derived from Pân'ini's grammar. It is valuable, however, on account of many later Sanscrit formations, that could not be contained in the older work. V. composed also a catalogue of Sanscrit *dhâtus*, or so-called radicals, in verse, called *Kavikalpadruma* (published at Calcutta, 1848), and a commentary on it, the *Kâvyakâmadhenu*. Another grammatical work, the *Râmavyâkaran'a* is likewise attributed to his authorship.

According to a general tradition prevalent in India, V. would also be the author of one of the most renowned Purân'as (q. v.), the *Bhâgavata-Purân'a;* and in a little treatise, the Durjanamukhachapet'ikâ, or 'a slap on the face of the wicked,' which is averse to this tradition, and maintains that Vyâsa (q. v.) was the author of this Purân'a, three other works of a religious character are assigned to V.—viz., the *Paramahansapriya, Muktâphala*, and *Harilîlâ*. A little medical work, the *S'atas'lokachandrikâ*, though written by a Vopadeva (see Professor Aufrecht's *Catalogue of the Sanscrit MSS. of the Bodleian Library*), does not seem to belong to the author of the works just mentioned. The date of V., given by some as the 12th, by others as the 13th c. after Christ, is, according to Burnouf's investigation, the second half of the 13th century.—See E. Burnouf's Preface to his edition, and French

translation, of the first nine books of *Le Bhâgavata Purâṇa*, vol. i. (Paris, 1840).

VORANT in Heraldry, a term applied to an animal represented as swallowing another; as, sable, a dolphin naiant, vorant a fish proper.

VORONE'JE, or VORONETZ (pronounced *Voronesh*), a government in the south of Great Russia, bounded on the S. by Little Russia and South Russia. Area, 25,712 sq. m.; pop. (1880) 2,340,266, consisting of Russians and German colonists. It is watered by the Don, its two navigable tributaries, the Voroneje and Khoper, and other streams. The soil, mostly a black mould, is generally fertile, and great crops of grain—wheat, rye, barley, oats, and millet (which supply the inhabitants and local distilleries, and are exported)—are produced. Cattle and horses of a good breed are reared—the best studs belong to the crown. The principal manufactured articles are brandy, beer, cloth, beet-root, sugar, skins, wax candles, soap, tobacco, and potass; and corn, tallow, hemp-seed, cattle, and horses are exported to Moscow, St. Petersburg, &c.

VORONEJE, a town of Great Russia, capital of the government of the same name, stands on the right bank of the Voroneje, 150 miles south-west of Tambov. It was founded in 1586 as a bulwark against Tartar invasion. Peter the Great, who had previously visited the town, built a fortress and a dockyard here in 1694. Besides two cathedrals, the town has many important civil, ecclesiastical, and educational institutions. The commerce of V. is extensive—the chief articles of trade being corn, hemp-seed, and tallow. Pop. (1880) 46,279.

VO'RTEX (Lat. a whirlpool). Till lately it was a reproach to Hydrodynamics that the theory of vortices or eddies in fluids had not been properly brought under the domain of mathematical analysis. Even now, the problem has only been partially solved by the labors chiefly of Stokes (q. v.) and Helmholtz (q. v.), as their beautiful investigations apply only to *perfect* fluids, that is, fluids which oppose no frictional resistance to change of shape. In ordinary motions of perfect fluids, such as currents and waves, the instantaneous change of shape of a small spherical portion makes it an ellipsoid by simple extensions and compressions *without* rotation. The essential characteristic of vortex-motion is, that it involves rotation of some parts of the fluid. Helmholtz has shown that this rotational or vortex-motion remains with the parts of the fluid which first have it, and cannot be transferred. We can conceive no process by which vortex-motion could be given to, or taken from, a perfect fluid; for to our reason fluid friction (which does not exist in a perfect fluid) would seem to be indispensable. On such abstruse subjects we cannot of course enter here; but one result of Helmholtz's investigations is so curious that we must mention it. We are all familiar with those singular smoke-rings which are produced when a mortar is fired; or when, on a smaller scale, a bubble of phosphuretted hydrogen takes fire in air, or a smoker skillfully emits a puff of tobacco-smoke. A very simple mode of producing them, on even a large scale, is to bore a hole in one side of a box, remove the opposite side, and substitute a cloth or sheet of india-rubber for it. A slight blow on this membrane ejects a vortex-ring from the hole.

To make this vortex visible, we may burn phosphorus or moistened gunpowder in the box; or still better, sprinkle its interior with ammonia, and introduce a vessel containing common salt and sulphuric acid. The sal-ammoniac cloud which fills the box is admirably adapted to display the rings. The general character of these rings, or vortex-tubes, is shown in the diagram (fig. 1); which indicates that, besides a progressive motion as a whole, the ring revolves about its own central or medial line. Suppose two such rings to follow each other, with their planes parallel, and their centers moving in the same line, Helmholtz shows that (at least in a perfect fluid) the foremost will relax its speed, and spread out into a larger ring, while its follower will contract, and quicken its pace, till it passes *through* the other, which in turn becomes the pursuer, and so on. This very curious result may be realized in a tea-cup, by drawing the half-immersed bowl of a tea-spoon along the surface of the tea for a short way, and withdrawing it. Two little whirlpools, or vortices, are then seen moving side by side. They are sections of the half vortex-ring which has been formed in the liquid by the spoon. A second half-ring may be at once sent after them by another stroke of the spoon, and the phenomenon above described will be obtained. When, on the contrary, two such vortex-rings *meet*, their centers moving in one line, they both spread out and relax their speed indefinitely. This is obtained in a liquid by letting the half vortex-ring impinge directly on the side of the vessel, when it spreads out, and relaxes its speed; just as if there were no boundary of the fluid, but a second vortex-ring occupying the place of the image of the first which would be formed by a plane mirror substituted for the side of the vessel. When one vortex-ring impinges obliquely on another, it rebounds from it, and both are thrown into vibration, their form of equilibrium being circular. They act in fact in this respect like solid india-rubber rings. By forming them from an elliptic aperture, they are produced in a state of vibration. A square aperture gives them in a different state of vibration.

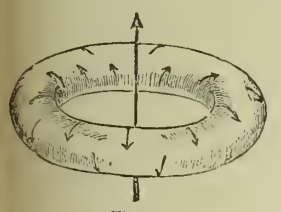


Fig. 1.

The impossibility of producing or destroying vortex-rings in a perfect fluid—save by creative power—has led Sir W. Thomson (q. v.) to regard the ultimate parts of matter as vortices of various kinds in a perfect fluid. Two such indestructible *vortex-atoms* are here sketched (fig. 2).

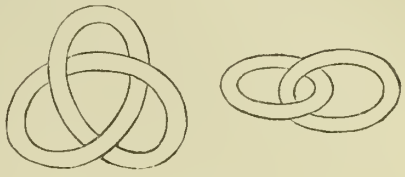
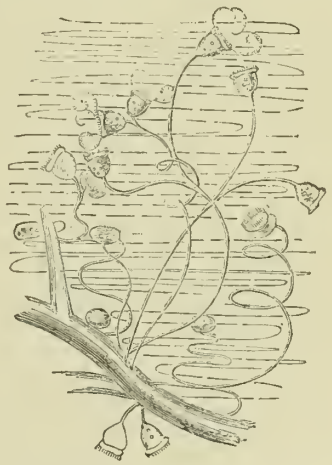


Fig. 2.

The word vortex has also come into use in connection with Descartes's once celebrated theory of the universe, given in his *Principia Philosophiæ*. In this the rotation of the planets about the sun, the satellites about the planets, &c. were explained (1) by the hypothesis of vortices for ever whirling about the central body. Descartes was a good mathematician, but in Natural Philosophy he preferred metaphysics to experiment, and of course erred enormously. But he is not to be laughed at: mistakes more ridiculous than his are gravely propounded at the present day.

VORTICE'LLIDÆ, a family of *Infusoria*, remarkable for beauty, and containing a great number of species, to which, from their form, the name of *Bell* or *Bell-flower Animalcules* is often given. The genus *Vorticella* consists of minute cup-shaped or



Group of Bell-flower Animalcules (*Vorticella nebulifera*): Very highly magnified.

bell-shaped creatures, each placed at the top of a long flexible stalk, the other end of which is attached to some object, as the stem or leaf of an aquatic plant. Around the edge of the bell or cup is a fringe of rather long cilia, the motion of which brings food to the mouth. The stem is flexible, and is sometimes stretched out to its full length, sometimes contracted in a spiral form. The contraction takes place instantaneously upon any alarm, the cilia at the same time vanishing; and it is very interesting to watch a group of *Vorticellæ*, which may often be easily done with a Coddington lens, when they adhere to the inside of the glass of an aquarium. The stem is often beautifully branched, the *Vorticella* becoming a compound animal, like many zoophytes, and the whole contracts or is extended at once. The stem, slender as it is, is a tube, through the whole length of which runs a minute muscular thread.

A cup or bell of a *Vorticella* sometimes develops a new fringe of cilia at its point of junction with the stem, becomes detached from the stem, and begins to move freely through the water, till it finds a new place on which to fix itself, reproduction thus taking place by gemmation. Reproduction also takes place by encapsulation. See INFUSORIA. To the family V. belongs the genus *Stentor*, having a trumpet-shaped body, and therefore receiving the popular name of Trumpet Animalcules. They swim freely through the water, at the same time rotating on an axis, and attach themselves to objects by a sucker at the lower or narrow end.

They have a fringe of cilia round the mouth, and the body of some species is covered with cilia. They are very voracious. They may often be found adhering to a twig or the stem of an aquatic plant, collapsed into minute masses of green jelly.

VOSGES, a dep. in the north-east of France, formed out of the south part of the old province of Lorraine, is bounded on the N. by the departments of Mense and Meurthe, and on the E. by Alsace-Lorraine. Area, 2260 sq. m.; pop. (1881) 404,212. The surface is mountainous, the territory being traversed not only by the Vosges Mountains, which run along its east border, but also by the Faucilles Mountains, which cross the dep. from east to west. The chief rivers are the Moselle, and its tributaries the Meurthe, Madon, and Mortagne, all of which flow in a north or north-west course through this department. The mountains in the east are covered with vast forests of beech and fir, and at the base of the mountains are tracts of pasture or rolling infertile plains. The west part of the dep., called the *Plaine*, is very fertile in cereals, vegetables and fruits. Among the hills, the climate is cold; on the Plaine, it is humid. About 4,400,000 gallons of wine are produced annually. Mineral riches abound, there being iron, lead, copper, cobalt, and antimony mines. Of the kind of cheese called *Géromé*, 23,600 cwts. are made annually. The dep. is divided into the five arrondissements, Épinal, Mirecourt, Neufchâteau, Remiremont, Saint-Die. The capital is Épinal.

VOSGES MOUNTAINS (Lat. *Vogesus*, Ger. *Vogesen* or *Wasgau*), a range of mountains in the north-east of France and the west of Germany, run from south to north, on the left bank of the Rhine, from the borders of the departments Haute-Saone and Doubs, north to Mainz, and separate Alsace from the French departments of Vosges and Meurthe and the German Lorraine. The range runs parallel with the Schwarzwald or Black Forest in Baden and Würtemberg, on the right bank of the Rhine, and forms the western border of this part of the Rhine basin. The summits are rounded and regular in outline, and are called *ballons*. The chief of them are the Ballon de Guebwiller, 4690 feet; le Hobeneck, 4429 feet; and the Ballon d'Alsace, 4101 feet. They are covered with forests, and abound in rock-salt, silver, copper, lead, and coal.

VOSS, JOHANN HEINRICH, one of the foremost classical writers of Germany, was born in 1751 at Sommersdorf in Mecklenburg, of poor parents. In 1772, he went to the university of Göttingen, and there joined the 'Hainbund,' an association of young poets, at the head of whom stood Bürger and Boje. V. first intended to devote himself to theology, but soon exclusively turned to Greek and Roman antiquities, under Heyne's auspices. In 1778, he went from Wandsbeck, whither he had gone for the purpose of editing the *Musenalmanach*, to Otterndorf, in Hadeln, where he prepared his translation of the *Odyssey*. This appeared in 1781, and was received with universal applause. In the next year he became rector of Eutin, whence, in 1789, he issued his German translation of Virgil's *Georgics*. This was followed, in 1793, by a new and revised edition of the German *Odyssey* and *Iliad*, which, however, did not meet with as favorable a reception as the first. His contests with Heyne (q. v.) gave also rise chiefly to his *Mythological Letters*, which appeared in 1794.

Among his purely German poetical works, *Luise*, an Idyll (1783, revised 1795), takes a foremost place. In 1899, he issued the whole of Virgil in a German translation. In 1802, he went to Jena, where he wrote the celebrated review of Heyne's *Iliad*. In 1805, he was called to Heidelberg, where he wrote annotated German translations of Horace, Hesiod, Theocratus, Bion, Moschus, Tibullus, and Lygdamus. In 1821, he published a translation of Aristophanes, and a new edition of Horace and Virgil. Among other literary labors must also be mentioned his translation (with the aid of his two sons) of Shakspeare's works, which, however, is very inferior to Schlegel's. In opposition to Crenzer's *Symbolik*, he wrote an *Antisymbolik* (1824), in which he lifted up his voice against exaggerated praises of heathen mysticism; and one of his last papers was a violent denunciation of his former friend Stolberg, who had turned Roman Catholic. He died at Heidelberg in 1826. Among his translations from modern languages may be mentioned that from Galland's *Arabian Nights*, and that of Shaftesbury's works. A brief mention may also be made of his two sons: (1) HEINRICH, born 1779, a philologist of merit, who assisted his father in his Shakspeare translation, and who was a great friend of Jean Paul's. He had intended to edit the latter's works, but died before him, in 1822. (2) ABRAHAM, born at Eutin, Professor of the Gymnasium at Kreuznach, who completed the Shakspeare translation. He died in 1847.—See Paulus, *Lebensund Todeskunden von J. H. Voss* (Heidel. 1826).

VOSSIUS, GERARD, one of the most distinguished scholars of the first half of the 17th c., was born of Dutch parents near Heidelberg, where his father was a Protestant minister. His father's name was John Voss, but he, after the fashion of the time, had Latinized it into Johannes Vossius, and hence his son called himself Gerardus Johannis V., that is, Gerard, the son of John. In 1578, the family returned to Holland, and settled at Dordrecht, where V. went to school. He afterwards distinguished himself at the university of Leyden; and when 22, he returned to Dordrecht, to become the principal of the school, of which he was the most distinguished pupil. He married shortly afterwards, but his wife died in 1607, leaving a family of three children. In the same year, he again married, and by his second wife he had two sons and five daughters.

In the earlier part of his life, V. does not appear to have published much, but he became known to his countrymen as a scholar and theologian; and his assiduity in study may be inferred from the fact that he would never allow a friend to stay with him more than a quarter of an hour. In 1614, he became principal of the theological college of Leyden, and while holding this appointment, published a work on Pelagianism (*Historia Pelagiana*). In it he spoke of the Arminians in an apologetic tone, and thereby brought down upon himself the wrath of a large section of the Dutch clergy; which caused him to be deprived of his office in the theological college, and of the income derived from it. His work had attracted attention in England, and it was some compensation to him that he received from Archbishop Laud an office which brought him £100 a year without its being necessary he should live out of Holland. Chiefly, it appears, to secure the means of supporting his family, he retracted the opinions he had expressed, in his book *De Historicis Latinis*, published in 1627, and he became reconciled to the church. In 1633, he was appointed Professor of History in a new university at Amsterdam, where he seems to have devoted himself to the completion of the great works on which his fame rests. Among the most important of these not mentioned above were: *Aristarchus sive de Arte Grammatica, Libri VII.; De Historicis Græcis, Libri IV.; Commentariorum Rhetoricorum sive Oratoriarum Institutionum, Libri VI.; De Veterum Poetarum Temporibus, Libri II.* In 1649, V. was climbing the ladder of his library when it broke; he fell under the shelves and books, and died of the injuries he received.

The children of V. were remarkable for beauty, accomplishments, and learning. Grotius said of V. in epigrammatic Latin, that it was doubtful whether by his books or his children he had contributed most to adorn the age. Five of his sons, Denis, Francis, Gerard, Mathew, and Isaac, are known as authors.

VOSSIUS, ISAAC, a scholar and theologian, was the only son of Gerard Vossius who survived him. He was born at Leyden in 1618. When 21, he published an edition of the *Periplus* of Scylax, the Greek geographer, with a Latin translation and notes. He afterwards traveled in Italy, collecting valuable manuscripts. In 1648, he took up his abode at the court of Queen Christina of Sweden; but in 1658, in consequence of a quarrel with Salmasius, he returned to Holland. In 1670, he came to England, and here, although he openly scoffed at religion, he was appointed by Charles II. a canon of Windsor, and had apartments assigned him in the Castle. He died there in 1688, and it is recorded that on his deathbed he refused to take the sacrament, until one of his colleagues argued that he ought to do so for the honor of the chapter. His works are numerous, but not so important as those of his father.

VOTERS, ABDUCTION OF, is an offence punishable by fine or imprisonment, and by a penalty of £50 besides, which may be sued for by an informer. The offence is included under the head of undue influence, and by the 17 and 18 Vict. 102, s. 5, is defined to be, the directly or indirectly making use of, or threatening to make use of, any force, violence, or restraint, in order to induce or compel such voter to refrain from voting at any election.

VOTIVE (Lat. *votivus*, given in virtue of a vow; Fr. *votum*, a vow), in ecclesiastical use, signifies the class of actions, offerings, or memorial records or observances, which are intended either as the fulfillment of a vow, or as a commemoration of the accomplishment of the prayer which accompanied the vow. Of such votive engagements there are numerous examples in the Old Testament (Levit. xxii. 18, Deut. xii. 6), as well as in the ancient religions of the Gentile world; and the ecclesiastical historian Theodoret (*De Cur. Græc. Affect.*, i. 8) alludes to the practice in his own day of hanging up, in the churches dedicated to the saints, little models of hands, feet, eyes, &c., in votive commemoration of the cure of lameness, blindness, and other maladies supposed to have been obtained through their intercession. The same practice continued throughout the succeeding centuries and throughout the medieval period, and still prevails in Roman Catholic countries, especially in Italy and Southern Germany.

Votive offerings, often of very considerable value, may be seen in the churches of most of the great Sanctuaries (q. v.), and in other churches in special repute as places of devotion. The offering very frequently takes the form of a votive tablet, with an inscription detailing the event on which it is founded. Sometimes the offering is simply marked with the words *ex voto*, 'in fulfillment of vow;' sometimes it is accompanied by a model in wax, in

wood-carving, or even in precious metals, similar to those alluded to by Theodoret; and occasionally by a model of some object, which is meant to recall the memory of the favor received, as of a ship, in case of escape from shipwreck, &c. Many of the great churches, hospitals, monasteries, and other religious monuments of the middle ages and of later times, were built *ex voto;* and the treasuries of most of the rich cathedrals and other churches abroad contain objects of great value, the result of votive engagements on the part of the donors. The name *votive* is also applied in the Roman Catholic Church to the mass or other service, when it is celebrated—as is permitted on certain days and in certain seasons—not according to the rite prescribed for the day itself, but according to a rite selected by the celebrant himself from a number of such 'votive masses' and 'votive offices,' as 'of the Passion,' 'of the Holy Trinity,' 'of the Blessed Virgin Mary,' &c., which are contained in the Missal and Breviary.

VOU-CHA'NG, or WOO-CHANG, a city of China, in the province of Hoo-pe, on the Yang-tse-kiang, at the influx of the Han-kiang, about 350 miles south-west of Nanking. This is said to be one of the finest cities of China, famous for its learning and for its manufactures in metals. The pop. is stated at nearly 2,000,000.

VOUSSOIRS, the individual stones forming an arch, and of which the central one is the keystone. They are always of a truncated wedge-form.

VOW (Fr. *vœu*, from Lat. *votum*), a promise made to God of a certain thing or action good in itself, and within the dominion and right of the person promising. The practice of vows appears to have formed part of the religious observance of almost all races in any degree civilized; and it largely pervaded the whole ceremonial system of the Mosaic dispensation (Gen. xxviii. 20, Lev. xxvii. 2, 1 Chron. [I. Paralip. Vulg.] xxix. 9, 2 Chron. xxxi. 6, Judges xi. 30, Num. xxx. 2. Judith xvi. 19, Jon. i. 16). The stringency of the obligation of fulfilling a vow when once made, is distinctly laid down (Deut. xxiii. 21; Eccles. v. 4, 5); but it is equally clearly stated, that it is by no means a matter of obligation to make a vow (Deut. xxiii. 22). The practice of making vows continued among the Jews in the time of our Lord; and St. Paul, after his conversion to Christianity, continued to conform to this usage (Acts xviii. 18). It would be out of place to enter here into the question, whether this observance was meant by our Lord to form part of his new dispensation, or to discuss how far the practice of vows, especially of chastity, can be traced as in use among the Christians of the first and second century; but it appears quite clear that in the end of the third, and all through the fourth, the monastic life became general in the East, and soon afterwards spread all over the church. See ANTONY, PAUL, MONACHISM. It is unnecessary to add, that vows, while discarded as a religious observance by the Reformers, enter largely into the system of the Roman Catholic Church. The objects of these engagements among Catholics are very various; but they are drawn, for the most part, from what are called the evangelical 'counsels,' in contradistinction to 'precepts' or 'commands'—the most ordinary subject of vows being the so-called 'evangelical' virtues of poverty, chastity, and obedience.

Pilgrimages, however, acts of abstinence, or other self-mortifications, whether of the body or of the will, special prayers or religious exercises, are frequently made the object of vows; and there is another large class of more material objects, as the building of churches, monasteries, hospitals, and other works of public interest or utility, to which medieval Europe was indebted for many of its most magnificent memorials of piety and of art. Vows in the Roman Church law are either 'simple' or 'solemn.' The principal difference between them consists in the legal effects of the 'solemn' vow, which, where the subject of such vow is chastity, renders not merely unlawful, but null and void, a marriage subsequently contracted. A 'simple' vow of chastity makes it unlawful to marry, but, except in the Jesuit Society, does not invalidate a marriage, if subsequently contracted. Catholics acknowledge in the church a power of dispensing in vows; but this is held to be rather declaratory than remissory, and it is not acknowledged in the case of vows which involve any right of a third party. Bishops are held to possess the power of dispensing in simple vows generally; but the power of dispensing in solemn vows and in certain simple vows, as, for example, that of absolute and perpetual chastity, and of the greater pilgrimages, is reserved to the pope. The practical operation of the canon law regarding vows has evidently been much modified, even in Catholic countries, since the French revolution, and the subsequent political changes; but this must be understood to regard chiefly their external and purely juridical effects. So far as concerns their spiritual obligation, the modern Roman theology recognizes little if any change.—See Ferraris, *Bibliotheca Canonica;* André, *Cours de Droit Canon;* Welter and Wetse's *Kirchen-Lexicon.*

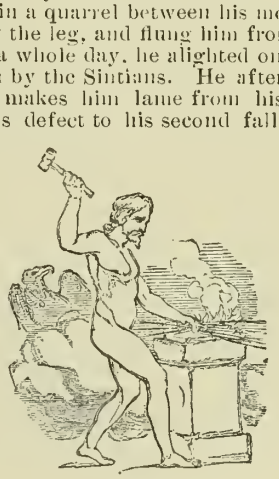
VOWEL. See LETTERS.

VR'IHASPATI, or, as the word is written in Vedic works, BR'IHASPATI (from *br'ih*, probably hymn, prayer, and *pati*, protector, lord), is, in Vedic Mythology, the guardian of the hymns or prayers addressed by the pious to the gods, and he is therefore considered as mainly instrumental in insuring the efficacy of the sacrifice. In consequence, he is 'the first-born in the highest heaven of supreme light,' because the prayers reach him first; he is 'seven-faced,' because his faces are the seven Vedic meters; and he is 'attended by all the companies of gods,' or 'represents all gods,' when the sacrifice is performed. Being thus the 'first sharer of the offering,' he is sometimes also identified with *Agni*. His function of guardian of the hymns being similar to that of a priest and spiritual teacher, he is further represented as a priest of the gods, who himself 'celebrates worship;' as 'the observer of truth,' and as imparting 'virtuous instruction.' In the epic and Purânic mythology, V. figures especially as preceptor of the gods and R'ishis, and as such he also causes them to perform sacrifices. A new character, however, in which he appears at that period is that of regent of the planet Jupiter; and in the ceremonies performed in honor of the planets and described in several Purân'as, a special worship is paid him in this capacity.

VR'ITRA. See INDRA.

VU'LCAN (the name is probably connected with *fulgere* and *fulgur*, and may be translated the 'bright or shining one') was the old Italian god of fire. The various myths in connection with V. prove the great antiquity of his worship. Latterly, the character, attributes, and history of the Greek Hephæstus were transferred to V., and the two thus became identified. According to Homer Hephæstus was the son of Zeus and Hera; later accounts, however, asserting that the latter gave birth to him without any co-operation on the part of her husband. He appears to have been twice violently expelled from Olympus—the first occasion was shortly after his birth, when he was dropped upon the earth by his mother, who was disgusted with his sickly deformity; he was received by the marine divinities, Thetis and Euronyme, with whom he dwelt for nine years. He afterwards returned to Heaven, and on interfering in a quarrel between his mother and Zeus, the latter seized him by the leg, and flung him from Olympus.

After falling for a whole day, he alighted on Lemnos, where he was kindly received by the Sintians. He afterwards returned to Olympus. Homer makes him lame from his birth, while later writers attribute this defect to his second fall on Lemnos. The



Vulcan.

popular notion of V. or Hephæstus appears to have been that of a burly, lame, good-natured, awkward god, often made the butt and laughing-stock of his fellows. He had a magnificent palace of his own in Olympus, 'immortal, brazen, shining like stars,' in which was his workshop, containing an anvil and 20 bellows, which worked at his command. Later accounts locate his workshop in the interior of some volcanic isle, such as Lemnos, Lipara, Sicily, &c., and give him as workmen the Cyclopes, Brontes, Steropes, &c. Many wonderful works of art are ascribed to V. by the ancient poets, and as an artist or artificer, he appears to have been regarded as corresponding in some respects to Athene: both instructed men in the useful and ornamental arts, had the power of healing, &c., and at Athens, had temples and festivals in common. In the *Iliad*, the wife of Hephæstus is Charis; while in the *Odyssey*, and in later writers, he is represented as being much tormented by the amours of his frail and charming sponse Aphrodite, with her favorite Ares (Mars). In the earlier statues, his lameness appears to have been indicated; but latterly, he was represented as a full-grown, vigorous man, with a beard.

VU'LCANISM, a term proposed by Humboldt to include all the evidences of internal heat, such as volcanoes, hot springs, &c.

VU'LCANITE AND VULCANIZED INDIA-RUBBER. See CAOUTCHOUC.

VU'LGATE is the name of the Latin translation of the Bible, which is the received version in the Roman Catholic Church. It

must not be confounded with the older Latin translation known as the Itala (see ITALIC VERSION). While Jerome was engaged in correcting the Itala, he conceived the plan of producing a completely new version of the Old Testament, done from the Hebrew text itself. He commenced this labor about 385 A.D., and completed it in 405. He also made an improved version of the Italic New Testament, and the two together received the name V. The discrepancies between the V. and the Itala, which had been made from the LXX., were so numerous and important, that the charge of heresy and falsification of Scripture was openly preferred against the translator by Rufinus, and even St. Augustine was doubtful for some time whether this charge might not be true. But gradually it made its way in the church, first in Gaul, then in Rome—chiefly through Gregory the Great—and finally throughout the West. About two hundred years after Jerome's death, it became the universally received version of the church. Not long, however, did it exist in its pure and unadulterated form. Partly through the influence of the emendated Itala, partly through the manifold general causes of neglect, hastiness, and the rest, which have gone so far to spoil almost every ancient MS., the text of the V. had become so corrupted, that in 802, Charlemagne commissioned Alcuin to revise it by old MSS., and to compare it with the original texts. This revision, however, to which afterwards came other 'emendations,' in the 11th and 12th c. (by Lanfranc, Archbishop of Canterbury, and Cardinal Nicolaus respectively), completely changed the original character of the work. Nor did the 'Correctoria Biblica' (i. e., certain collections of commentated and revised texts issued at the period), do much for the improvement of the corrupted MSS.

The confusion between the different codices was chiefly remarked, when the Tridentine Council, in 1546, first declared the V. the authorized version of the Roman Church, and decreed the preparation of an authenticated edition. In 1564, the Papal Chair undertook the task; but not before 1590 did Sixtus V. produce the work. This, however, turned out to be so utterly incorrect and faulty throughout, that the copies were speedily suppressed; and another edition, which appeared in 1592, was prepared under Clement VIII., to which in the next year (1593) that other edition succeeded, which has since remained the normal edition of the Church of Rome, and has been reprinted unchanged ever since. We may add, that the Anglo-Saxon translation of the Pentateuch and Joshua, by Aelfric (10th c.), has been made from the V., and not, as has been erroneously supposed, from the Septuagint; and that the V. has also been repeatedly translated into Arabic (the Psalms even into Persian) for the use of the Roman Catholics in the East.

VU'LNED, a heraldic term, applied to an animal, or part of an animal—as, for example, a human heart, wounded, and with the blood dropping from it. A pelican in her piety (see PELICAN) is sometimes described as vulning herself.

VU'LTURE (*Vultur*), a Linnæan genus of rapacious birds, now forming the family *Vulturidæ*, to almost all the species of which the name V. is popularly given. The *Vulturidæ* have a longer beak than the *Falconidæ*, and it is straight at the base, slightly or not at all toothed, the upper mandible longer than the lower, and hooked at the tip, the head generally bare, or covered only with a short down, which in most of the species is the case also with the neck—a ruff or collar of soft feathers surrounding the lower part



King Vulture (*Vultur papa*).

of the neck, into which the upper part, and even most of the head, can be withdrawn. The legs and feet are large, but the claws are not nearly so large and strong as in the *Falconidæ*, and are but slightly hooked. The middle toe is very long. The wings are long, and their expanse consequently great. Vultures have great powers of flight, and many of them soar to a very great height in the air. Their plumage has not the neat and regular appearance of that of the *Falconidæ*, but it is dense, and not easily penetrated by shot. Vultures are mostly found in warm climates, and many of them are inhabitants of mountainous regions. They feed on carrion, which it seems to be their office in nature to remove from the face of the earth, that the evil consequences of its corruption may be prevented. They seldom attack a living animal, but they have been seen to sit and watch the approach of death, waiting for their feast. They are not in general courageous birds, and are often put to flight by birds much smaller than themselves; yet, if unmolested, they readily become familiar with the presence of man, and some of them seek their food even in the streets of towns, in which they are useful as scavengers. They gorge themselves excessively when food is abundant, till their crop forms a great projection, and sit long in a sleepy or half-torpid state to digest their food. They do not carry food to their young in their claws, but disgorge it for them from the crop. The bareness of their head and neck adapts them for feeding on putrid flesh, by which feathers would be defiled; and they are very careful to wash and cleanse their plumage. The question has been much discussed, whether vultures discern dead animals by the eye, or are attracted to them by the smell. It is certain that they possess great powers both of smell and of vision, and the reasonable conclusion appears to be that both are of service in directing them to their prey. The rapidity with which they congregate to a carcass has been remarked with admiration, and vast numbers have often been seen assembled on a battle-field to devour the dead.

The *Vulturidæ* are divided into several genera, of which one, *Gypaëtos*, approaches to the *Falconidæ* in its characters and habits, having the head feathered, and not always feeding on carrion, but often attacking living animals. The Lämmergeier (q. v.) is one of this group. The feet are feathered to the toes, whilst the other vultures have the tarsi bare.

Some of the most notable species of V. have already been described, as the Condor and the Egyptian Vulture. The generic name *Vultur* is now restricted to those which have the head and neck without feathers and without carnuncles, and a ruff of long feathers or of down at the lower part of the neck. To this genus belongs the TAWNY V., or GRIFFON (*V. fulvus*), found in the south of Europe, the north of Africa, and the west of Asia. It makes its nest on the most inaccessible rocks of high mountains, as in the Alps and Pyrenees, and sometimes in tall forest trees. It is a very large bird, more than four feet in length. Its plumage is yellowish brown, the quills and tail-feathers blackish brown, the down of the head and neck white, the ruff white. When it has found a carcass on which to feed, it remains on the spot, gorging and torpidly resting by turns, till no morsel remains. This V. has been seen in England, but only as an accidental visitor. The mountains and forests of the south of Europe, as well as of the north of Africa, and great part of Asia, are also inhabited by the CINEREOUS V. (*Vultur* or *Gyps cinereus*), another large species, which departs from the typical character of the vultures in having the greater part of the neck feathered, and comparatively large and powerful claws. It does not, however, attack living animals. India, Africa, and almost all warm countries, abound in vultures of different species, which it is unnecessary to describe.

In the southern states of North America is found the BLACK V. (*Cathartes atratus*), there generally known as the CARRION CROW, a comparatively small species, not quite two feet in entire length, of a deep black color, the head and neck covered with



Turkey Buzzard (*Cathartes aura*).

warty excrescences, and a few hair-like feathers. This bird is also very abundant in many parts of South America, where it is called the GALLINAZO. Very nearly allied to it, and found in the same regions, is the TURKEY BUZZARD, or RED-HEADED V. (*Cathartes aura*). These vultures are more or less gregarious, not only assembling where food is to be found, but flying in flocks. They make their nests in hollow trees, and sometimes in the chimneys of deserted houses, or on the roofs of houses. In

some of the towns of tropical America, they may be seen in great numbers, perched during the heat of the day on the tops of houses or on walls, asleep with their heads under their wings. The CALIFORNIAN V. (*Cathartes Californianus*) is the largest rapacious bird of North America, being fully four feet long, and about ten feet in extent of wings. It is black, with a white band on the wings. It is found only on the western side of the Rocky Mountains. It much resembles the condor in its habits.

VYASA is the reputed arranger of the Vedas (q. v.), and the reputed author of the Mahâbhârata (q. v.), the Purân'as (q. v.), the Brahmasûtras (see VEDANTA), and a Dharmas'âstra. According to tradition, he was a son of the sage *Parâs'ara* and *Satyavatî*, 'the truthful,' who was a daughter of King Vasu, and a heavenly nymph, Adrikâ. Another tradition makes him also the father of *Dhr'itarâsht'ra*, *Pân'd'u*, and *Vidura*. On account of his dark complexion, he was called *Kr'ishn'a* (black); and because he was born in an island (*dvîpa*) of the Yamunâ (Jumna) river, his second name was *Dvaipâyana*. That the immense bulk of literature comprised by the above-named works, and relating to different periods, cannot belong to the authorship of one and the same personage, is no matter of doubt. But the name itself of the individual to whom it is attributed conveys the meaning which must be sought for in some of the legends connected with his history. *Vyâsa* (from the Sanscrit *vi* and *as*, literally, 'throw in different directions,' hence 'distribute') means the person who arranges a subject-matter in a diffuse manner, or the act itself of such a diffuse arrangement, and is often contrasted with *samâsa* (from *sam* and *as*, con-tract), the act of making a concise arrangement, or of abridging (compare the Greek *omero-*, from *om* = *sam* = *sun* and *ar* = *as*). Vyâsa is, therefore, a symbolical representation of the work of generations, as embodied in the Vedas, the Mahâbhârata, and the Purân'as, and of the order which gradually was brought into this literary mass. When, therefore, the Vishn'u-Purân'a speaks of 28 Vyâsas who in the reign of the present Manu arranged the Vedas, it is not impossible that some historical truth may underlie this statement, implying, as it does, a different arrangement of the Hindu scriptures at various times: and that the Mahâbhârata, and the Purân'as too, may have undergone various arrangements and recensions, until they settled down in their present form, sufficiently results from their contents. Regarding the Brahmasûtras, tradition itself seems only loosely to connect their author with the Vyâsa of the foregoing works, for it says that he was in a former life a Brâhman, *Apântaratamas*, who, after having attained final beatitude, 'by special command of the deity, resumed a corporeal frame and the human shape, at the period intervening between the third and fourth ages of the present world, and was the compiler of the Vedas.' (See Colebrooke's *Miscellaneous Essays*, vol. i. p. 327, Lond. 1837). As the author of the Dharmas'âstra, V. is possibly a personage distinct from the legendary individual bearing this name, as is the case with other Vyâsas who occur as authors of other works.

W.



THE twenty-third letter of the English alphabet, 'is a letter which performs the double office of a consonant and a vowel.' According to the decisive experiments of Professor Willis (*Cambridge Phil. Trans.*, iii. 231), the natural order of the vowels is *i*, *e*, *a*, *o*, *u*, or the reverse; in which the sounds must be understood to be those which prevail on the continent. The sounds, then, of *i* (that is, *ee*) and *u* (that is, *oo*) are the most remote, and the attempt to pass with rapidity from either of these to the others, more particularly to the other extreme, gives an initial breathing which has the character of a consonant, viz., in the one case, *ee-oo* or *you;* in the other, *oo-ee* or *we*.' See Key's *Alphabet*. This acute analysis of the articulations denoted by the characters *w* and *y*, throws a clear light on the double function they perform as consonants and as vowels. The letter *w*, which originated in the middle ages, is merely one *v* joined to another, as its English name imports. It is peculiar to the English, German, and Dutch alphabets. It would appear from a variety of phenomena in Latin and Greek, that the Lat. *v* or *u*, used as a consonant, as well as the old Greek digamma (F), were more of the nature of the modern *w*, than of the decidedly consonantal English *v* (see U and V). The French, having, like the other Romanic nations, no character *w*, express the sound by prefixing *ou* to the vowel; as *oui* (pron. *wee*), Edouard = Edward. In the beginning of proper names they substitute *gu;* e. g., Guillaume = William. The Spaniards also use *gu*, as in the many names compounded of the Arabic *wadi;* e. g., Guadalquivir; but more frequently *hu*, as in Chihuahua (pron. *Chiwawa*). In High-German, which has become classical German, *w* is confounded with *v*, and *v* with *f;* thus, Wellington is pronounced *Vellington*. In London, *w* is substituted for *v*, and *v* for *w*, with 'a most amusing perversity.'

WAAL, THE (Lat. *Valis* or *Vahalis*), an arm of the Rhine, thrown off near the village of Pannerden, in the Netherlands, flows thence to Nijmegen, Tiel, Nieuw-St.-Andries, between the Boemmeler- and Tieler-waard, and unites with the Maas below Fort Loevestein (Luvestein). The united rivers then take the name of the Merwede, which, flowing past Gorinchem and Dordrecht, becomes the Oude, or Old Maas. See MAAS.

WA'BASH, a river of the U. S. of America, rises in Western Ohio, runs west and south-west through Indiana, forming the southerly half of its western boundary, on the borders of Illinois, to the Ohio River, 146 miles from its mouth, is 550 miles long, and navigable by steamers at high-water 300, and has for its principal branches the Tippecanoe, Big Vermilion, Embarras, and White River—the last 200 miles long. The Wabash and Erie Canal connects the lakes with the Mississippi.

WACE, ROBERT, an Anglo-Norman poet of the 12th century. Many different versions of his name are given in his own books, as well as in the other books which mention him. He is styled Vace, Wace, Waece, Waice, Waicce, Waze; Gasse, Gaice, Guace, Guazi, Guaze, Guascoe, Gazoe; and, again, Wistace, Huistace, Huace. It has been supposed that there were really two poets, the one named Wace or Guace, the other named Wuistace; the one the author of *Le Roman du Rou*, the other of *Le Roman du Brut*. But variety in writing names was very common in the middle ages, and it does not seem necessary to resort to this supposition. About his Christian name there is even more doubt than about his surname. It is never mentioned in his poems, from which the little that is known about him is mostly derived. An old writer speaks of him as Matthew; and it seems that he was first called Robert in the *Origines de Caen* by Huet, whom subsequent authors have followed.

W. was born in Jersey, in the reign of Henry I., and it is probable that the date of his birth lay between the years 1112 and 1124. He was taken to Caen as a child, and there he received the early part of his education. He was afterwards sent into the neighboring kingdom of France; but he returned to Caen, and having entered into holy orders, became a reading-clerk in the Royal Chapel there. At Caen it was that he composed his works. Henry II., to whom he dedicated *Le Roman du Rou*, gave him a canonry at Bayeux, apparently about the year 1160. He died in England about the year 1180, certainly before the year 1184.

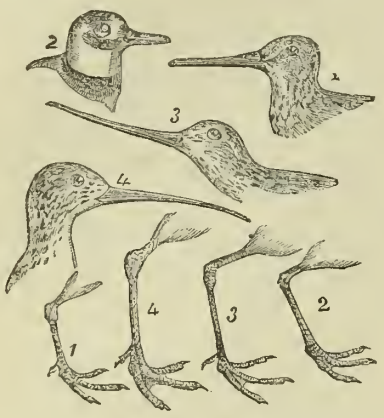
Five separate works are attributed to W.; but three are slight, short performances, and it is only necessary to notice the two principal—*Le Roman du Brut d'Angleterre*, and *Le Roman du Rou*. The former premises that a certain Brutus, a son of Ascanius, and grandson of Æneas, settled in Britain, and became its first king. The book continues the history of the British kings from Brutus to Cadwallader, who died at Rome shortly before the year 700. It is little more, however, than a literal translation into the French from the Latin of Geoffrey of Monmouth (q. v.). This poem seems to have been completed in the year 1155. *Le Roman du Rou* (Rollo) is a sort of history of the Dukes of Normandy and of the Norman monarchy in England. Neither of these works has the slightest poetical merit. They are both interesting only as showing the state of the French language in the 12th c., and as supplying occasional facts and social traits to the historian.

WA'CKE, a German miners' term, introduced by Werner, to designate a soft variety of trap, that has an argillaceous aspect, and a greenish-gray color. It resembles indurated clay, but has been formed of volcanic ashes or mud. It is often vesicular, and when the cavities are filled, it becomes an amygdaloid. It is associated with trappean rocks, and, indeed, often passes into basalt or greenstone.

WAD, the popular name given in some parts of England, as in Derbyshire, to an ore of manganese, which is a hydrated peroxide, united with nearly its own weight of oxide of iron. Wad is also the provincial name of black lead or plumbago in Cumberland.

WAD, in Gunnery, a compressible disc forced home in the barrel after the powder, to confine the latter to the least possible space before its explosion. For great guns, the wad is commonly made of rope; for small-arms, of pasteboard.

WADERS, or WADING-BIRDS. a designation often applied to the whole order of birds *Grallæ* (q. v.), or *Grallatores*, but really



Characteristic Features of Wading-birds:
1, Head and foot of Common Snipe; 2, Head and foot of Ringed Dotterel; 3, Head and foot of Common Godwit; 4, Head and foot of Curlew.

appropriate only to some of them, the more aquatic in their habits, as Herons, Snipes, and Rails.

WADHAM COLLEGE, Oxford. In the year 1610, James I. issued a license to Dorothy Wadham, acting as executrix of the will of her deceased husband, Nicholas Wadham, Esq., to found a 'College of Divinity, Civil and Canon Law, Physic, good Arts and Sciences, and the Tongues.' Dorothy Wadham purchased the site and ruins of the priory of the Austin Friars, in the suburbs of Oxford, and built the present college for a warden. 15 fellows, 15 scholars, and 2 chaplains. The fellows were formerly elected from the scholars, and the tenure of the fellowships was limited to 22 years; nine of the scholarships were limited to certain counties, and to the founder's kin. By the Commissioners under 17 and 18 Vict. c. 81, the fellowships and scholarships were thrown open—the former to all persons who had passed the examinations for a B.A. degree; the latter to all persons under 20 years of age. The Commissioners also abolished the limitations on the tenure of the fellowships. At present, the number of fellowships is fourteen, one of them having been appropriated to the professor of experimental philosophy. The scolarships are worth £80 a year, besides rooms, and are tenable for five years. There are several good exhibitions, especially those founded by Dr. Hody—four for Hebrew, and six for Greek, value £45 a year, and tenable for four years; also a law exhibition for a fellow, value £90 a year; and a medical exhibition for a fellow, of the same value. There are thirteen benefices in the gift of this college.

WA'DI, an Arabic word, signifying a river, a river-course, a ravine, or valley. It is supposed that the Greek *oasis* is a corruption of *wadi*. It is of frequent occurrence in the names of places; e. g., Wadi-Musa (i. e., the Valley of Moses) in Arabia. In Spain, where most of the rivers bear names given them by the Arabs, *wad* has been transformed into *guad;* e. g., Wadi-l-abyadh (the white river) has become Guadalaviar.

WA'DSET, in Scotch Law, is the old name for a Mortgage (q. v.). The modern name is Bond and disposition in Security. See HERITABLE SECURITIES.

WAFER, in relation to the Roman Catholic usage of the Eucharistic communion, is the name given (chiefly by non-Catholics) to the thin circular portions of unleavened bread which are used in the Roman Church in the celebration and administration of the Eucharist. In ancient times, the bread and wine for the Eucharist were contributed by the faithful; and a place is found in the Eucharistic service of every known liturgy for this offering, still known by the name of Offertory (q. v.). But in the Latin Church, for many centuries, the bread (which, as being unleavened, and different from that in common use, needed special preparation) has been provided by the clergy; and the practice has been followed of preparing it in the form of thin cakes, commonly, although not necessarily circular, and frequently impressed with sacred representations or emblems, as the Crucifixion, the Lamb, the Christian monogram, the Cross, and other sacred symbols. The circular form itself is by some ritualistic writers regarded as symbolical, the circle being a figure of perfection. The wafers used in the Roman Catholic Church are made of different sizes, the smallest about an inch in diameter for the communion of the people, a second considerably larger for the celebration of the mass, and a third still larger to be placed in the Monstrance (q. v.) for the service of benediction or exposition. See LORD'S SUPPER.

WAFERS, thin discs of dried paste, mostly colored, used for sealing letters, or for attaching papers together. They are made by mixing fine wheaten flour with water and any non-poisonous coloring materials, so as to form a mixture not thicker than thin cream. A small quantity of this is poured on the lower limb of a pair of wafer-irons, which are formed like a pair of pincers, but with flat blades about 12 inches long by 9 in breadth, the inner surface of which is kept well polished. Before being used, they are heated over a charcoal or coke fire; and the liquid paste being poured on the lower blade, the pressure of the two blades distributes it equally in a thin sheet between them, the superfluous material being squeezed out at the sides, from which it is shaved off by means of a knife. In a few seconds of time, if the blades are hot enough, the sheet of paste becomes dry and half baked. The sheets so formed are then stamped out into discs of the sizes required. Formerly, wafers were very extensively used, and their manufacture was one of considerable importance; but the introduction of gummed envelopes has almost driven them out of use.

WA'GENINGEN, an old but well-built town in the Netherlands, province of Gelderland, is situated near the Rhine, to which access is had from it by a canal. Pop. (1880) 6320. W. has good schools and other useful institutions. The environs are beautiful, and the Wageningsche Berg, now formed into a burying-place, is especially picturesque.

Ship-building, brick and tile making, tanning leather, rope-spinning, &c., with agriculture, are the chief sources of wealth. W. received the rights of a town in 1263. It is a neat, purely Dutch town, selected as a residence by many who wish to live quietly, comfortably, and economically.

WAGER OF LAW, in the Law of England, was an old form of giving sureties that at some future time the party would wage his law—that is, put it to the oath of the defendant, who swore in presence of eleven compurgators as to the debt claimed. The action was used in causes where there was some secrecy as to the origin of the debt, or where the defendant bore a fair character. That form of action had long been in disuse, but was not formally abolished till the statute of 3 and 4 Will. IV. c. 42.

WAGERS, in the Common Law of England, were held good, if they were not against the principles of morality, public decency, or sound policy; and a wager or bet was defined to be, a contract entered into without color or fraud between two or more persons for a good consideration, and upon mutual promises to pay a stipulated sum of money, or to deliver some other thing to each other, according to the result of some contingency. A wager has been held void which was made on the life of Napoleon I., on the result of an election of a member to serve in parliament, &c. Before the statute of 8 and 9 Vict., c. 109, wagers above a certain amount were declared to be illegal, but now wagers on a race are not illegal. That statute provides that all contracts or agreements, whether by parol or in writing, by way of gaming or wagering, shall be null and void, and the money due thereon cannot be recovered in any court of law; but that enactment does not apply to any subscription or contribution or agreement to subscribe or contribute for any plate, prize, or sum of money to be awarded to the winner or winners of any lawful game, sport, pastime, or exercise. If a sum of money has been deposited with a stakeholder, not as a stake, but by way of wager, it may be recovered back if notice is given to the stakeholder before the event comes off. As no wager can be recovered in a court of law, it is merely a debt of honor, and if paid, it is in the eye of the law the same thing as giving a gratuity. If a promissory-note or bill of exchange be taken as security for money either won by betting or knowingly lent for betting, the consideration is illegal, and the money cannot be recovered. A recent act was passed for the suppression of betting-houses, and imposes penalties on persons keeping or using houses for betting-purposes (17 and 18 Vict. c. 119); and justices may authorize constables to break into such houses, and arrest all persons found therein. Whoever by a cheating wager wins money from another, is liable to be indicted for obtaining the money by false pretences.—In the Law of Scotland, wagers are treated as *pacta illicita*, which it is beneath the dignity of any court to entertain questions about, and so they are not recoverable by action. The act 8 and 9 Vict. c. 109 does not apply to Scotland, but there are older statutes of a somewhat similar effect.

WAGES means the money given for personal services, as distinct from the price of anything sold, whether made by the seller or not. When a man makes a basket, and sells it, the price is

not wages, though it may be the same thing to him. The term has by general usage been limited to the remuneration of hand-working. A manager of a bank or railway—even an overseer or a clerk in a manufactory, is said to draw a salary. It is generally a feature of wages, too, that they are paid at short intervals, as being necessary for immediate support. This division is connected with social distinctions which have exercised a baneful moral influence in the direction of improvidence. The clerk at a hundred a year is supposed to be a gentleman who dresses decently, and so adjusts his expenditure that he can draw it quarterly. The puddler or shingler who can make a guinea a day is, by traditionary usage, a member of the needy classes, who requires to draw his wages weekly, and is expected to spend them at once. Wages are more absolutely ruled by their value in the market than other services. A writer of poems or a painter of pictures does work which is exceptional—if people are willing to pay him any price he may ask for his work, there is probably no one who can compete with him and undersell him. A lawyer or a physician may also have special qualities to a great extent excluding competition; and in appointments to offices requiring trust, judgment, and skill, a great many things have to be considered besides the question, who will do the duty cheapest? But in the staple hand-works—the making of clothes, the baking of bread, and the like—there are uniform functions of the hand which a certain number of persons will always be found ready to give for a price. Strong efforts are made from time to time—by combinations, strikes, &c.—to make wages fictitiously high. These efforts are of course often successful for a time, bringing profit to some members of the working-classes, though injury to others, and a general loss of the wealth of the community. But the great law of political economy, that labor as well as all other things, will bring what it is worth, ever prevails in the end in a country where trade and labor are free. See CAPITAL, COMBINATION, LABOR, TRUCK-SYSTEM.

WAGNER, RICHARD, an illustrious German operatic composer. He was born at Leipzig in 1813, and was educated at Dresden and Leipzig. In 1836, he was *Kapellmeister* at Magdeburg, and after spending some time in Königsberg, Dresden, and Riga successively, he came to Paris in 1841, where he composed his two earliest operas, *Rienzi* and *Der fliegende Holländer*. *Rienzi* obtained for him the post of Kapellmeister at Dresden. His next opera, *Tannhäuser*, appeared in 1845. Being involved in the political schemes of 1848, W. had to quit Saxony, and resided for a time in Switzerland, where he composed *Lohengrin*. He spent the season of 1855 in London, where he undertook the direction of the Philharmonic Society's concerts. In 1865, he was invited to Munich, and greatly befriended by the young king of Bavaria, who appointed him Director of the Opera-house; and he there produced his opera of *Tristan und Isolde* the same year; and, in 1868, *Die Meistersinger von Nürnberg*, at the first performance of which W. sat beside the king in the royal box. After that time, his energies were mainly devoted to the securing of such representations of his works as he and his admirers regarded as proportionate to their merits. W. kept his views constantly before the public by pamphlets and articles. He died at Venice, 13th February 1883. W. unions were formed in the principal towns of Germany; and Baireuth, in the north of Bavaria, was selected as the most suitable center for a grand W. theater, of which the foundation stone was laid with great ceremony, in May 1872, by the great composer himself, in the presence of a host of his admirers, and for the opening of which (1876) he prepared a great operatic tetralogy, *Der Ring des Nibelungen*. In all his operas, the words of the libretto, W.'s own composition, are adapted to a declamatory style of recitative, relieved by harmonies and instrumentation in accordance with the spirit of the situation. They are often magnificent in spectacle, but are purposely deficient in what is commonly understood as melody. W.'s position amounts to this, that the highest mission and true end and object of music is only realized when it is the exponent of poetry; and that instrumental music is practically dead. A specially magnificent representation of the *Ring des Nibelungen* (in all its four parts, *Rheingold*, *Die Walküre*, *Siegfried*, *Götterdämmerung*) was given in London in 1882. The text of *Parsifal*, a later opera, was published in 1878. W. has written numerous books, mostly on musical subjects, and often highly polemical; *Die Kunst und die Revolution* (1849); *Oper und Drama* (3 vols. 1852); *Beethoven* (1870, transl. by Dannreuther, 1880), in which he explains his relation—an interesting one—to Schopenhauer's philosophy. See Hueffer's *Wagner* (London, 1881).

WAGON, a vehicle for conveying goods or passengers, is mounted on four wheels, but varies in construction according to the traffic in which it is employed. Two pairs of shafts, hinged to the forepart of the frame, are generally employed; and when three horses are yoked abreast, the center one is the shaft horse, the right and left 'wheelers' are yoked by traces to the wagon-frame. Most wagons are set on springs. For facility in turning, the fore-wheels are occasionally smaller than the hind ones; and in addition, the fore-axle of the lighter kinds of wagon is attached to the body of the wagon by a swivel-joint, the shafts or pole being in this case attached to the fore-axle; but the diminution of the size of the wheels is open to grave objection, on account of the greater friction. It being almost impossible for the beasts of draught to control and subdue the momentum of a heavily-loaded wagon descending a slope, it is necessary to employ a drag of some sort; the rudest forms of which are a thick cylinder of tough wood inserted between two spokes of the wheel, which, being carried upwards in the wheel's revolution, is 'jammed' against the under side of the wagon-frame, and stops the wheel's rotation; and the *chain-drag*, which was merely a chain firmly fastened at one end to the wagon-frame between a fore and hind wheel, and furnished at the other end with a large hook, to hold the tire of the hind-wheel; the method of chaining the fore and hind wheels together was also employed. But in the better class of wagons, the *shoe* and *break* (see DRAG) are now employed. The various forms of wagon in common use are the brewer's *dray*, the railway *lorry*, the agricultural *wain* (in common use in England and on the continent), and the *bullock-cart* of South Africa. The comparative merits of a vehicle in which the horse has merely to draw, and one, as the cart, in which he has to carry as well as draw, have often been discussed, though never sufficiently tested; but it seems to be generally believed that, despite the distress arising from his confined position in the comparatively immovable shafts of a cart, a horse can transport a greater weight to a moderate distance by the same exertion of muscular force in a cart than in wagon.

WAGON-TRAIN, an indispensable companion of an army under this or some other title. It serves to convey the ammunition, provisions, sick, wounded, camp-equipage, &c. At the present time, in the British army, the Army Service Corps performs this function, although in China (1860) and New Zealand (1862—1865) the commissariat provided and organized its own wagon-service.

WA'GRAM, or DEUTSCH-WAGRAM, a village of Lower Austria, on the left bank of the Russbach, ten miles north-east-by-east from Vienna, is of little importance, except as the site of the great battle between the French and Austrians in the campaign of 1809, which forced Austria to bow before Napoleon, and submit to the onerous conditions of the fourth treaty of Vienna (q. v.). After the capture of Vienna, Napoleon resolved to pass the Danube, and complete the prostration of Austria's military strength by the destruction of her last army—that under the Archduke Charles; and with this view, he called in the Italian army, under Eugene Beauharnois, and all his outlying corps, concentrating them in and about the island of Lobau; and after a few feints, calculated to mislead the Archduke, who, stationed on the north bank, was vigilantly guarding the various crossings, succeeding in effecting a most extraordinary passage, on the morning of July 5, 1809, from the island of Lobau to the north bank, opposite Enzersdorf, landing 150,000 infantry, 30,000 cavalry, and 600 pieces of cannon before six in the morning. When the morning light showed the Austrians how they had been out-manœuvred, they retreated across the plain of the March-field to its northern extremity, and took up a formidable position at W., and being closely followed up, were, on the evening of July 5, attacked by a part of the French army. By the vigorous exertions of the Archduke in person, the assailants—after a temporary success—were completely repulsed, and the Austrians, exulting in their second victory over Napoleon, waited in sanguine expectation the events of the next day. In the morning, the Archduke resolved to assume the offensive, and succeeded at first in defeating the French center under Massena, and in forcing their left into inextrieable confusion, followed by total rout; but at the same time his own left was turned by Davoust, and this success followed up by a successful attack of Macdonald on their center, forced the Austrians to retreat, which they did in the most orderly manner, carrying with them 5000 prisoners, and leaving 25,000 dead or wounded on the field of battle—the French loss being about equal. This drawn battle (the Archduke having, as Savary says, 'in reality no reason for retiring') had all the moral effects of a victory for the French; and was followed on July 11 by the armistice of Znaim, which resulted in the fourth treaty of Vienna.

WA'GTAIL (*Motacilla*), a genus of birds of the family *Motacillidæ*, which is now very generally regarded as a sub-family (*Motacillinæ*) of *Sylviadæ*, distinguished by a lengthened and slender bill, long and pointed wings, rather long and slightly curved claws, and a long narrow tail, which the bird incessantly wags up and down, with a jerking motion. The genus *Motacilla* of Linnæus included many *Sylviadæ* not of this group, as the Red-breast, Nightingale, Black-cap, and Blue-throated Warbler. The genus *Motacilla*, as now restricted, has a slender awl-shaped, straight bill; the nostrils oval, on the sides of the bill near the base, partly covered by a naked membrane; the wings of moderate size, the first quill-feather the longest, the second and third nearly as long

as the first, the tertials very long; the tarsus much longer than the middle toe; the tail of twelve feathers, long, and nearly equal at the end.—The wagtails run with great celerity, and seek their food on the ground. Their food consists chiefly of insects and small seeds. They frequent the margins of rivers and lakes, inundated fields, and other moist grounds. 'While the cows are feeding, in moist low pastures,' says White (*Nat. Hist. of Selborne*), 'broods of wagtails, white and gray, run round them, close up to their noses, and under their very bellies, availing themselves of the flies that settle on their legs, and probably finding worms and larvæ that are roused by the trampling of their feet.' Wagtails make their nests on the ground, among moist herbage, or in stony places. Their flight is rapid and undulatory. They are natives of the temperate regions of the Old World. No species is found in America.

A common British species is the PIED W. (*M. Yarrellii*), which is from seven to eight inches in length, the long tail included, and has prettily varied white and black plumage. It is abundant over the whole south of Europe, and is found there at all seasons of the year, which is the case also in the south of England; but in more northern regions it is only a summer visitant, as in the Orkney Islands, where it is the first of the migratory birds to depart southward, the migration taking place almost as soon as the young are able for flight. The Pied W. is incessantly in motion, jerking



1, Yellow Wagtail (*Motacilla flava*); 2, Pied Wagtail (*M. Yarrellii*).

its tail, running quickly along the ground in quest of insects, and making short flights from place to place, chirping as it flies. It is often to be seen wading in shallow water, in pursuit of aquatic insects, and catching also small minnows when they approach the surface of the water. This species was long confounded with the WHITE W. (*M. alba*), of the continent of Europe, common from Sweden to the Mediterranean, as also in many parts of Asia, and in elevated situations in India and the north of Africa, but not a native of Britain. The two species are, however, very similar.—The GRAY W. (*M. boarula*) is bluish gray above, with the rump and lower parts yellow; a black patch on the throat in summer. It is abundant on the continent of Europe, as well as in Britain, and is commonly seen on pastures, often in close attendance on cattle or sheep, whence the French name, *bergeronette*, given to this and other species of W. of similar habits.—The YELLOW W. (*M. flava*) and the GREEN-HEADED W. (*M. Rayi*), also British species, of which the latter is the more common, belong to a subgenus, by some regarded as a distinct genus, *Budytes*, having the hind-claw very long and sharp, and thus approaching in character to the Pipits (q. v.) or Titlarks.

WAHA'BIS, or WAHA'BITES, a recent Mohammedan sect, now dominant throughout the greater part of Arabia. The movement may be considered a puritanic reform, which seeks to purge away the innovations and corruptions introduced in the course of ages, and to bring back the doctrines and observances of Islam to the literal precepts of the Koran and of the Sunna (q. v.), or oral instructions of Mohammed himself. This purified faith the W. consider it their duty to impose at the point of the sword—in this, too, following strictly the precepts and practice of Mohammed and the first califs. The founder of the sect, Ibn-abd-ul-Wahâb, was the son of an Arab sheik, or chief, and was born in Nejed or Nejd (the Central Highlands of Arabia), about the end of the 17th century. He is said to have visited various schools in the principal cities of the East, and to have lived some years in Damascus; and here he is represented as forming the resolution to restore in its primitive shape the ruined structure of Islam. Nor was the task an easy one. Throughout the Mohammedan world, the precepts of the Koran had fallen into abeyance, more especially among the Turks; and religion was little else than a round of external ceremonies—prayers, ablutions, fastings, the worshiping of the holy sheiks or saints at their tombs, and other superstitious innovations. In Central and Eastern Arabia, where the faith of Mohammed had never taken deep root, matters were even worse. According to Palgrave, 'almost every trace of Islam had long since vanished from Nejed, where the worship of the Djann (genii), under the spreading foliage of large trees, or in the cavernous recesses of Djebel Toweyk, along with the invocation of the dead and sacrifices at their tombs, was blended with remnants of old Sabæan superstition, not without positive traces of the doctrines of Moseylemah and Kermut. The Koran was unread, the five daily prayers forgotten, and no one cared where Mecca lay, east or west, north or south; tithes, ablutions, and pilgrimages were things unheard of.' Central Arabia was at that time divided among a multitude of virtually independent chiefs.

One of these chiefs, named Sa'u'd (or Saoo'd), a young man of ardent and capacious mind, who ruled over the small territory around the stronghold of Deraijeh, or Dureeyeh* (in Nejed), was the first important convert made by Ibn-abd-ul-Wahab after his return home; and the example of the prince was followed by his kindred and retinue. The Wahabi is said to have promised Sa'ud that if he would draw the sword in the cause of pure Islam, he would make him sole ruler of Nejed, and the first potentate in Arabia.. The propheey was fulfilled; partly in Sa'ud's reign, and fully in that of his son; and the Sa'ud dynasty is at this day the chief power in the peninsula; while the descendants of Ibn-abd-ul-Wahab (who lived till 1787) continue to act as spiritual directors, though without any acknowledged authority. It was about 1746 that Sa'ud began to act as apostle militant of the new, or rather revived Islam. One after another, he subdued his heretical neighbors, offering them the alternative of conversion or extermination. Dying in 1765, he was succeeded by his son, Abd-ul-Aziz, who carried on the same policy with vigor and success. Extending his sway to Hasa (Al-Ahsa, as Colonel Pelly spells it, and anciently Hajr), and other places on the Persian Gulf, he was brought in hostile contact with the Turkish authorities of Bagdad, and from that place an expedition was sent in 1797 against the W. by way of Hasa; but it failed to genetrate into Nejed, and proved fruitless. The W. now grew bolder in their plundering excursions towards the Euphrates, and in 1801, Sa'ud, the son of Abd-ul-Aziz, led an army against the holy city of Meshed Hussein, or Kerbela, took it, massaered the greater part of the inhabitants, destroyed the tomb of Hussein, the grandson of Mohammed, and carried off the treasures. On this, a second Turkish army was sent from Bagdad against Nejed, but was routed, and the greater part slain. The conquest of Hejaz was next undertaken by the Wahabis. For two or three years, Ghaleb, the ruler of Mecca, had been more and more hemmed in by neighboring chiefs who had joined the W., and now, in 1803, Sa'ud collected a large army, and defeating Ghaleb in several battles, laid siege to Mecca, which, after a resistance of two or three months, surrendered at discretion. Not the slightest excess was committed, but the people had to become W.—'that is, they were obliged to pray more punctually than usual, to lay aside and conceal their fine silk dresses, and to desist from smoking in public. Heaps of Persian pipes, collected from all the houses, were burned before Sa'ud's head-quarters, and the sale of tobacco forbidden.'—Burckhardt.

Failing to take Jiddah, into which Ghaleb had thrown himself, the Wahabi forces went northwards, and, in 1804, took Medina, where they stripped the tomb of Mohammed of its accumulated treasures, and prohibited the approach to it of all but W., as they considered the reverence paid to it by the Turks and others as idolatrous. At Medina, 'the Wahabis enforced with great strictness the regular observance of prayers. The names of all the adult male inhabitants were called over in the mosque after morning, mid-day, and evening prayers, and those who did not obey the call were punished. A respectable woman, accused of having smoked the Persian pipe, was placed upon a jackass, with the pipe suspended from her neck, round which was twisted the long flexible tube or snake: in this state she was paraded through the town.'—Burckhardt.

During these events, Abd-ul-Aziz had been assassinated, in the end of 1803, by a fanatical Persian, whose family had been murdered by the W. at Meshed Hussein. He was succeeded by his son, Sa'ud II., who had for some time conducted the wars, and was perhaps the ablest ruler and warrior of the dynasty. For several years after the conquest of Hejaz, he continued to extend and consolidate his power. Plundering incursions were made to the very vicinity of Bagdad, Aleppo, and Damascus; while the Wahabi sheik of Asir (lying south of Hejaz) imposed the new faith on a great part of Yemen. On the east, Sa'ud took the islands of Bahrein, annexed a part of the Persian coast on the

* Nothing is more perplexing than the orthography of Arabic proper names; every traveler spells them in a way of his own. In comparing Burckhardt, Palgrave, and Colonel Pelly, it is often difficult to identify the places and persons spoken about.

east side of the Gulf, and exacted tribute from the sultan of Oman. This brought him into conflict with Great Britain, which sent (1808) a force, and severely chastised the Wahabi pirates that infested the commerce of the Persian Gulf.

While these external struggles were going on, several of the southern provinces of Nejed broke out in revolt, instigated mainly, perhaps, by the local chiefs, whose power, formerly independent, was now circumscribed, or altogether taken away by the central government; but the rising was speedily suppressed, and a terrible example was made of the province of Harik and the town of Hutah, which last was completely demolished, and its inhabitants (the male inhabitants were reckoned at 10,000) butchered almost to a man.

From 1802, the W. had prevented the great pilgrim caravans from reaching Mecca, both because they held the observances of the Turk and Persian hajjis to be idolatrous, and also because they were scandalized at the gross immorality and indecency which were openly practised by these pilgrims. It may easily be conceived what horror spread through the Mohammedan world when it was told that the tomb of the Prophet had been despoiled by heretics, who prevented the faithful from performing the most sacred duty of their religion. Accordingly, the sultan of Constantinople, the acknowledged protector of Mohammedanism, as early as 1804, imposed on Mehemet Ali, the newly appointed pasha of Egypt, the task of recovering the holy cities. With the dilatoriness, however, characteristic of the East, nothing was done till 1811, when an expedition was sent against them, under the command of the pasha's son, Túsún-Bey. Medina was taken by the Egyptian forces in 1812, and Mecca in the following year; and a protracted and desultory warfare, with varying success, was kept up with the W. in Hejaz and around its confines. At last, in 1815, Ibrahim Pasha (q. v.) undertook to penetrate into Central Arabia, and crush the hornets in their nest. The enterprise was facilitated by the death of Sa'ud in 1814. He was succeeded by his son Abdallah, who, though an able warrior, was less adroit in securing unity of action among the numerous tribes under his sway. It was not, however, till 1818, and after repeated conflicts, that Ibrahim succeeded in decisively breaking the Wahabi force, and capturing their capital, Deraijeh, which was laid in ruins. Abdallah-ibn-Sa'ud was sent to Constantinople, where he and some of his ministers were beheaded (1818). Ibrahim continued some months in Arabia, consolidating his conquests throughout Nejed and the adjoining provinces. His policy was one of gentleness and conciliation towards the chiefs and common people, and of stern repression towards the fanatical religious teachers; and except among these, his name is said to be yet popular throughout Central Arabia. But the folly and tyranny of the vice-governors whom he left soon caused a general insurrection; the Egyptians had to retire to Kasim; and Turki, a son of Abdallah, was proclaimed sultan of Nejed, Riad being now chosen as the capital. Renewed expeditions were undertaken by the Egyptian commanders, driving, first, Turki from his capital for a time, and then his son and successor, Feysul; instead of whom, a chieftain favorable to Egyptian rule was appointed. But soon after the death of Mehemet Ali (1849), the Egyptians gave up the struggle; Feysul was recalled from exile; and under him and his son and vicegerent, Abdallah II., the Wahabi sway had become more powerful and extensive than ever. In 1870 Feysul was assassinated, and the dissensions between his two sons Abdallah and Sa'ud led to a civil war. This gave occasion to the Ottoman government to send a military force into the Persian Gulf, which occupied Hofhuf, the capital of Hasa, but was unable to penetrate further into Nejed.

According to Burckhardt, there is not a single new precept in the Wahabi code. The only difference between the sect and the orthodox Turks (improperly so termed) is 'that the Wahabis rigidly follow the same laws which the others neglect, or have ceased altogether to observe. To describe, therefore, the Wahabi religion, would be to recapitulate the Mussulman faith; and to show in what points their sect differs from the Turks, would be to give a list of all the abuses of which the latter are guilty.' One peculiarity of the W. is their zeal against gaudy dress—silk and gold ornaments—and tobacco. In their wars of conversion, 'No Smoking,' has been a kind of battle-cry. The recent traveler,



Arabia, showing the Territory of Wahabis.
(From the map in Palgrave's work on Arabia; by permission of the publishers, Messrs. Macmillan.)

Palgrave, who came into more intimate contact with the W. than Burckhardt, has a much less favorable opinion both of their doctrines and their practice. He describes their empire as 'a compact and well-organized government, where centralization is fully understood, and effectually carried out, and whose mainsprings and connecting links are force and fanaticism. It is capable of frontier extension, and hence is dangerous to its neighbors, some of whom it is even now swallowing up.

'Incapable of true internal progress, hostile to commerce, unfavorable to arts and even to agriculture, and in the highest degree intolerant and aggressive, it can neither better itself nor benefit others; while the order and calm which it sometimes spreads over the lands of its conquest are described in the oft-cited *Ubi solitudinem faciunt, pacem appellant* of the Roman analist. We may add, that its weakest point lies in family rivalries and feuds of succession, which, joined to the anti-Wahabian reaction existing far and wide throughout Arabia, may one day disintegrate and shatter the Nejdean Empire, yet not destroy it altogether. But so long as Wahabiism shall prevail in the center and uplands of Arabia, small, indeed, are the hopes of civilization, advancement, and national prosperity for the Arab race.' Colonel Pelly characterizes the W. as 'warlike Mohammedan Quakers.'

Of late years, the tenets of these puritans have taken root among the Mussulman population of India, and caused very considerable uneasiness.

The following statistical table of the W. Empire was drawn up by Palgrave, mostly from the official registers at Riad:

Provinces.	Towns or Villages.	Population.	Military Muster.
1. Aared	15	110,000	6,000
2. Yemamah	32	140,000	4,500
3. Harik	16	45,000	3,000
4. Aflaj	12	14,000	1,200
5. Wadi Dowasir	50	100,000	4,000
6. Seley'yel	14	30,000	1,400
7. Woshem	20	80,000	4,000
8. Sedeyr	25	14,000	5,200
9. Kasim	60	300,000	11,000
10. Hasa	50	160,000	7,000
11. Katif	22	100,000	
	316	1,219,000	47,300

The Bedouin populations within the territories number upwards of 70,000. A good many of the towns are large, and populous to a degree that the current notions of Central Arabia would hardly lead us to look for. The following are among those of which Palgrave estimates the population: Eyun, 10,000; Bereydah, 25,000; Oneyzah, 30,000; Toweym, 12,000—15,000; Horeymelah, 10,000; Mejmaá, 10,000—12,000; Riad, the capital (which Colonel Pelly has ascertained to be in lat. 24° 38′ 34″, long. 46′ 41′ 48″), has probably about 40,000; Kharfah, 8000; Hofhuf (Al-Hufhuf), 24,000. Katif (Khutif) is the most direct port of the W. dominions; and the province of Hasa in which it is situated is the richest.

To the north of Nejed and its dependencies, lies a kingdom formerly ruled over by a half-hearted ally of Feysul's, Telal, the chief of Djebel Shomer, and consisting of five provinces—Djebel Shomer, Djowf, Kheybar, Upper Kasim, Teymar—with a settled pop. of 274,000, and 166,000 Bedouins. Hayel, the capital, has a pop. of 22,000. This part of Arabia was overrun and converted during the first outbreak of Wahabi propagandism; but the conversion was only seeming, and during the interference of Egypt in Arabian matters, the country regained a kind of independency. Since the death of Telal, Ottoman interference has been attempted. The great majority of the people are averse to Wahabiism. Still, the W. have numerous partisans and missionaries and spies in all the towns, and their influence is hated and feared by prince and people. Even Oman, where the new Islam is said to be still more distasteful, has been brought in some degree under the political sway of the Wahabis, and pays a small yearly tribute.

Karsten Niebuhr (q. v.) is the first European writer who mentions the W.; Burckhardt. *Notes on the Bedouins and Wahabis* (1830) gives a sketch of the Wahabi doctrines and of their history down to 1815; Sir Harford Jones Brydges, for many years resident at Bagdad, to his *Account of the Transactions of His Majesty's Mission to the Court of Persia*, appends a 'Brief History of the Wahauby;' Mengin, *Histoire de l'Egypt sous le Gouvernement de Mohammed Ali;* Corancez, *Histoire des Wahabis*, with Maps. The most recent authorities on the subject are W. G. Palgrave's *Narrative of a Year's Journey through Central and Eastern Arabia*, 1862—1863 (Macmillan & Co., 1865); and 'A visit to the Wahabee Capital,' by Lieut.-Col. L. Pelly, H M. Political Resident, Persian Gulf, in *Geog. Soc. Journal*, 1865.

WAHOO. See ELM.

WAI'BLINGEN, a town of Würtemberg, on the Rems, in the circle of the Neckar; pop. (1880) 4118. It usually gets the credit of having given to the family of the Hohenstaufen the title which became Italianized into Ghibellines (see GUELPHS AND GHIBELLINES); but Raumer (q. v.), the historian of the Hohenstaufen dynasty, upholds the claim of another Waiblingen in Würtemberg, on the Kocher, in the circle of Jaxt.

WAIFS, in English Law, are goods stolen, and waived or abandoned by the felon on being pursued. The goods belong to the crown, but the owner, on doing diligence to prosecute and convict the thief, can have them again.

WAI'NSCOT (Sax. *wag*, a wall, and *scot* or *schot*, corresponding to Ger. *Scheit*, a split or cut piece of timber—from *scheiden*, to divide; the word would thus mean wall-timber or boards), the name given to boards lining the interior walls of apartments. Such lining, usually in panels, is very common in Elizabethan architecture. The name is frequently applied to the best kinds of oak-boards, from oak having been so much used for paneling.

WAIST, in a Ship, is that portion of the upper deck lying between the fore and main masts. In it the larger boats are stowed, and along its gunwale the crew pile their hammocks during the day. In a steamer, the waist is much broken into by the engine-room.

WAITS (anciently spelled *Waightes*) is a name which has at successive periods of our history been given to different classes of musical watchmen. The word is one, in slightly varied forms, common in the sense of guard or watchman to all the Germanic languages. It is the German *Wacht* or *Wache*, Dutch *wagt*, Danish *vaght*, Swedish *wakt*, Scotch *wate*, and the English *watch*. How the word in the form of waits came to be exclusively applied to musical watchmen in England and Scotland, it is impossible to say. In the time of Edward IV. the waits appear to have formed a distinct class from both the watch and the minstrels. It was their duty, we learn from Rymer's *Fœdera*, to pipe the watch nightly in the king's court from Michaelmas to Shrove-Thursday four times, in the summer nights three times, and to make 'the bon gayte' at every chamber-door and office, for fear of pyckeres and pillars. The waits were not confined to the court; there were musical watchmen at an early period in many provincial towns. In Exeter, a regular company existed in 1400. Beaumont and Fletcher (*Knight of the Burning Pestle*) speak of the 'waits of Southwark as rare fellows as any in England.' The word in the provinces was afterwards sometimes applied to the town musicians, who may have represented the old waits, but who had no duties to perform as watchmen. The name was also given to the town-band or to private musicians when employed as serenaders. In this sense it is used in the *Tatler* (No. 222). The writer says that it had become so much the custom for lovers to employ the waits to help them through their courtship in Nottingham, that the ladies of that place could get no sleep, by reason of riotous lovers who infested the streets with violins and bass-viols between 12 o'clock and 4 in the morning. Till recently, the waits were officially recognized in London and Westminster. In London, the post of leader of the waits was purchased; in Westminster, the appointment was in the gift of the High Constable and Court of Burgesses.

In 1820, a Mr. Munro obtained the post of official leader of the waits for Westminster, with the exclusive right to serenade the inhabitants, and make application for Christmas-boxes. His prerogatives were invaded by other musicians, and he prosecuted several persons before the police courts. At present, in the metropolis, the waits are musicians who play during the night or early in the morning for two or three weeks before Christmas. They call afterwards at the houses of the inhabitants to ask for a Christmas-box. In Glasgow, there were waits at an early period. The magistrates still grant a certificate to a few musicians, generally blind men, who play in the streets during the night and morning for about three weeks previous to New-Year's Day. Like the London waits they call at the houses of the inhabitants, show their credentials, and ask a small subscription.—See Chambers's *Book of Days*, vol. ii. p. 742.

WAI'TZEN, a town of Hungary, charmingly situated among vineyards, on the left bank of the Danube, 21 miles north of Pesth, on the Vienna and Pesth Railway. It is a bishop's see, contains a noble cathedral with conspicuous dome, built in 1777, and a handsome episcopal palace. Considerable wine-culture is carried on, and there are important cattle-markets. Pop. (1880) 13,199.

WAKE (from the Anglo-Saxon *wacian*, to watch) is the English equivalent of the ecclesiastical Vigil (q. v.). In early times, the day was considered as beginning and ending at sunset; Sundays and holidays, in consequence, began not on the morning, but on the previous evening (the *eve* of the holiday), and worshipers then repaired to the churches for worship. The following day was spent in amusement. Each church when consecrated was dedicated to a saint, and on the anniversary of that day was kept the parish wake. In many places, there was a second wake on the birthday of the saint. On these occasions, the floor of the church

was strewed with rushes and flowers, and the altar and pulpit were decked with boughs and leaves. In the churchyard, tents were erected to supply cakes and ale for the use of the crowd on the morrow, which was kept as a holiday.

The second part of the festival seems to have made most impression on the popular mind, and the word wake came to be applied to it. Crowds resorted to the wakes from neighboring parishes, hawkers or merchants were attracted by the crowds, and ultimately they became mere fairs or markets, little under the influence of the church, and disgraced by scenes of indulgence and riot. In 1285, Edward I. passed a statute which forbade fairs and markets to be held in country churchyards; but it does not appear to have put an end to the evil. In 1448, Henry VI. ordained that all showing of goods and merchandise, except necessary victuals, should be discontinued on the great festivals of the church. These regulations do not seem to have been strictly enforced. An act of convocation passed in 1536, during the reign of Henry VIII., seems to have effected a more important change. It ordered the day of the dedication of the church to be kept in all parishes on the first Sunday in October, and gradually that festival ceased to be observed. The saint's-day festivals were not, however, affected, and they are still kept in many English parishes under the name of 'country wakes.' A *lyke-wake* or liche-wake is a watching of a dead body (A.-S. *lic*) all night by the friends and neighbors of the deceased. The custom no doubt originated in superstitious fear either of passing the night alone with a dead body, or of its being interfered with by evil spirits. It must at all times have led to scenes ill suited to the occasion, and it now survives only among the lower classes in Ireland.—See Brand's *Popular Antiquities*, by Ellis.

WA'KEFIELD, an important and handsome town in the West Riding of Yorkshire, overlooking the Calder, 9 miles south of Leeds, on the Lancashire and Yorkshire Railway. The town consists of three principal and many minor streets, and among the chief buildings are the parish church, conspicuous from its lofty and elegant spire; the grammar-school, a wealthy institution, attached to which there are six exhibitions to the universities; the library and news-rooms, corn exchange, &c. Its benevolent and scientific institutions are numerous and important. The town has long been famous for its manufactures of woollen yarn and cloths. The district around W. is agricultural, and the town is noted for its corn and cattle markets. Coal-mines are worked in the vicinity. W. returns one member to the House of Commons. Pop. (1871) 28,069; (1881) 30,573.

WALA'CHIA. See MOLDAVIA.

WA'LCHEREN, an island in the Netherlands province of Zeeland, at the month of the Scheldt, contains 52,000 acres; pop. (1875) 42,503. The chief places are Middelburg, Flushing, and Vere or Campvere (q. v.). One half is meadow, the other rich arable land, well wooded to the north. Where it is not protected by natural downs, strong dykes have been formed, that at West Kappelle being a magnificent work. The drainage-water is carried off by large sea-sluices at Middelburg and Vere. Agriculture is the principal employment. Ship-building, beer-brewing, rope-spinning, weaving, sawing wood, grinding corn, tanning leather, &c. are carried on, especially at Middelburg and Flushing. From the latter town, a railway has been constructed through West and South Beveland to Bergen-op-Zoom, joining the other continental lines. Flushing has a considerable shipping trade. The people are chiefly Protestants. In many parts are large artificial mounds, supposed to have been erected by the early inhabitants as places of refuge from high tides.

WALCHEREN EXPEDITION, one of the most disastrous military failures in the history of modern warfare, was undertaken, like that of Sir John Moore to Spain, with the view of helping the continental allies of Britain, by creating such a diversion as would prevent the concentration of Napoleon's strength, in overwhelming amount, against any one of his opponents. The expedition was planned in 1807, when Prussia, Russia, and Austria were all in arms against France; but it was not till early in the summer of 1809 (when Napoleon, who had meantime overwhelmed Prussia, and reduced Russia to neutrality, was gradually forcing Austria to succumb) that the British ministry resolved to carry it out. The plan was to send a fleet and army up the Scheldt, and attack Antwerp (the principal naval station and arsenal in the north of France), whose fortifications, though formidable, were much in need of repair, and whose garrison at the time only numbered about 2000 invalids and coast-guards; while there were not more than 10,000 French soldiers in Holland.

The expedition, after numberless needless delays, at last sailed on July 28; and, to the number of 37 men-of-war, 23 frigates, 115 sloops and gunboats, accompanied by transports, carrying about 41,000 soldiers, reached the Dutch coast on the following day. But, instead of obeying the orders of the minister of war, Lord Castlereagh, to *advance at once in force against Antwerp*, the commander-in-chief, Lord Chatham (the elder brother of Pitt), frittered away his time in the reduction of Vlissingen (Flushing), which was not effected till August 16, by which time the garrison of Antwerp had been reinforced by King Louis Bonaparte with the troops at his command (about 6000), and by detachments sent from France, which swelled the garrison, by August 20, to 15,000 men. About the end of August, Chatham, who, as a general, was a methodical incapable, 'found himself prepared' to march upon Antwerp, but by this time 30,000 men, under Bernadotte, were gathered to its defence, and the English army was decimated by marsh-fever, so that success was not to be hoped for. However, it was judged right to hold possession of Walcheren, in order to compel the French to keep a strong force on the watch in Belgium, and, accordingly, 15,000 men remained to garrison the island, the rest returning to England; but the malaria proved too fatal in its ravages, and as peace had been concluded between Austria and France, this force was also recalled. Thus an excellently devised scheme, through the utter stupidity of the agent chosen by royalty to carry it out, failed in every point of consequence, and ended in a loss of 7000 men dead, and the permanent disablement of half the remainder. The failure of the Walcheren Expedition was made the occasion of furious onslaughts on the ministry in the House of Commons and in the public journals.

WA'LDECK-PY'RMONT, formerly a sovereign principality in the north-west of Germany, consisting of the old county of Waldeck, enclosed between Westphalia, Hesse-Cassel, and Prussia, and the small county of Pyrmont, about 30 miles north of Waldeck. The form of government was a constitutional and hereditary monarchy; but since 1868, the administration has been under the control of Prussia, by which power a lieutenant-governor (Landes director) is appointed. The scenery, continually alternating between mountain and valley, forest and plain, comprises scenes of much natural beauty. Among the minerals found are gold, copper, iron, and lead; and mineral springs occur. Agriculture and cattle-breeding are by far the most common pursuits of the people, and with the exception of leather, no articles are manufactured to any extent. An important article of export, and one from which the prince derives a considerable portion of his revenue, is the mineral water of the Pyrmont spa, annually visited by about 13,000 people.

The country is hardly solvent, about one-third of the public revenue of about £500,000 having to be contributed by Prussia. The area is about 450 square miles. The population in 1880 was 56,548; chief town, Arolsen, with (1880) 2476 inhabitants. The noble house of W., which till 1350 owned wider domains, is one of the oldest in Germany. In 1882 the Duke of Albany (Prince Leopold) married a daughter of the prince of W.-Pyrmont.

WALDE'NSES (VALDENSES, VALDESI, VALESI, VAUDOIS) are a Christian community who inhabit a mountain tract on the Italian side of the Cottian Alps, south-west from Turin. The district is bounded on the N. by the Dora Ripaira, on the S. by the Po. It is enclosed on all sides by spurs of the Alps, which divide it into three valleys—that of Perosa, drained by the Clusone; that of San Martino, drained by the Germanasca; and that of Lucerna, drained by the Pelice, all tributaries of the Po. These valleys lie between France and Italy, and immediately south of the great western route into Italy by the passes of Mont Cenis and Genevre. The inhabitants are thus brought into communication with both countries; indeed, they speak a dialect more closely allied to those of Dauphiné than to those of Piedmont; and they have used French as well as Italian as the language of their liturgy.

The religious doctrines of the W. are now similar to those of the Reformed churches. There is a minister in each parish, called a *barbe*, and the synod is presided over by an elected *moderator*. The W. had at one time bishops, but that was when the sect was more widely spread than it now is. Much has been said of the origin of the Waldenses. Their own historians assert that the community has remained from apostolic times independent of the church of Rome, and boast that they can show a regular apostolic succession of bishops from the earliest period of Christianity till that of the Reformation. This statement has been very generally admitted by uncritical writers, but in the light of recent investigations, would seem to be no longer tenable. Dieckhoff (*Die Waldenser im Mittelalter*. Gött. 1851) and Herzog (*Die Romanischen Waldenser*, Halle, 1853) have submitted the early history of the W. to a critical examination; and the result to which they have come, after an examination of the manuscript records, is, that the W. had not the early origin claimed for them, and were not Protestant before the Reformation, although they entertained some opinions which, so far, were in anticipation of those held by the Reformers. They are also of the opinion that the W. do not take their name from *val, vallis*, a valley, as has been assumed, but from Peter Waldo of Lyon, a merchant of the 12th c., who was less the founder of a sect than the representative and leader of a wide-spread struggle against the corruptions of the clergy. The church would have tolerated Peter Waldo, as it had tolerated St.

Francis of Assisi, the founder of the Franciscans, and perhaps have allowed him to form a new order, had he not trenched upon ground dangerous to the hierarchy. But he had the four gospels translated, and maintained that laymen had a right to read them to the people. He exposed in this way the prevalent ignorance and immorality of the clergy, and brought down their wrath upon himself. His opinions were condemned by a general council in 1179, and he retired to the valleys of the Cottian Alps.

A long series of persecutions followed, but Waldo's followers could not be forced to abandon their opinions. They continued to be known as the *Leonisti*, from the place of their origin—the Poor People of Lyon, from their voluntary penury—*Sabotati*, from the wooden shoes they wore—and *Humiliitati*, on account of their humility. It was natural that a body cruelly persecuted should stand aloof from the church, and even offer armed resistance; yet we have no evidence of the manner in which the W. first became a separate community. They are now shown to have been identical with the followers of Waldo, but they must not be confounded with the Albigenses, who were persecuted at the same period. The protest of the W. against the church of Rome only related to practical questions, that of the Albigenses related to matters of doctrine.

The W. at first seem to have spread in the upper valleys of Dauphiné and Piedmont, to which Waldo retired. They were subjected to persecutions in 1332, 1400, and 1478, and driven into many parts of Europe, where their industry and integrity were universally remarked. So widely had the sect been scattered, that it was said a traveler from Antwerp to Rome could sleep every night at the house of one of the brethren. In Bohemia, many of them had settled, and they, without forsaking their own community, joined the Hussites, Taborites, and Bohemian Brethren—a connection which led to a change in the principles of the Waldenses. They adopted the doctrines of the Reformers, and this led to more serious persecutions than any they had previously undergone. Francis I. of France, in possession of Piedmont in 1541, ordered them to be extirpated. They were massacred at various places in Dauphiné, and in the valleys they still occupy, more especially at Merindol and Cabrière. Several persons who refused to abandon their faith, were burned alive, yet the sect continued to exist. In 1560, the Duke of Savoy, who had recovered possession of Piedmont, urged by Pope Paul IV., forbade the W. to exercise their faith, under the penalty of being sent to the galleys for life. The W. sent him a petition and apology for their creed, which appeared to him so plausible, that he suggested that a conference should take place between the Waldensian and Romanist divines. He was, of course, told that the proposition was monstrous, and bullied by the pope and the courts of Spain and France so effectually, that he despatched 7000 men into the valleys, who were joined by two French regiments.

The W. offered a gallant resistance, but were overwhelmed by superior force. Many prisoners were burned alive, and women and children were ruthlessly slaughtered. The duke was disgusted with these atrocities, and although denounced as no better than a heretic at Rome, granted the W. an amnesty on condition that their service should only be performed at certain places in the valleys of Lucerna and San Martino. The W. in the other districts, and especially the Marquisate of Saluzzo, were then persecuted by the Jesuits. Charles I. of England sent two embassies to the Duke of Savoy to intercede in their behalf, but without avail. Victor Amadeus I., not long after, ordered the W. of Saluzzo, under penalty of confiscation of property and death, to become Catholics; and the edict was so rigorously carried out that, in a few years, none of the sect remained in the district. Charles Emmanuel II., in 1655, directed a fresh persecution against the Waldenses. Some time before, the people of Lucerna, inflamed it is said by the discourses of Jean Leger, a popular preacher, set fire to a convent of Capuchins, and committed other excesses. An inquiry was made, and it was found that the W. had purchased property and built churches and schools in districts where no concessions had been granted them. They were ordered within 20 days to sell their property, or profess Catholicism. They resisted, under leaders named Jayer and Janavel, but they could not oppose the forces sent against them. No quarter was shown to women and children, and atrocities were committed—more especially by the French and Irish mercenaries in the service of the duke—which, recorded by Jean Leger, were heard of with indignation in all Protestant countries. Subscriptions were made in England for those who had survived the massacre. The Swiss cantons, and the states of Holland, sent envoys to the duke. Cromwell addressed Latin letters to him, written by Milton, and also sent Sir Samuel Morland, who collected numerous manuscripts connected with the history of the W., and brought them to England with him. A convention was concluded, by which the W. were allowed again to exercise their worship.

In 1685, Louis XIV. revoked the Edict of Nantes, and ordered the Duke of Savoy to compel the W. to adopt Catholicism. They were accordingly commanded to emigrate or abjure their tenets within 15 days. They resisted, and were attacked by the troops of the duke on one side, and those of Louis XIV. on the other. They were overpowered, and the survivors could make no conditions. A large number were imprisoned at Turin, where many died; others were allowed to emigrate. Their whole property was confiscated, and handed over to Roman Catholic colonists. When the Prince of Orange became king of England, the W. who had settled in Switzerland resolved to return to their valleys under the guidance of Henry Arnaud, one of their pastors. In 1689, they gathered from all quarters to the rendezvous in the great forest of the Pays de Vaud. On the night of the 16th of August, they embarked on the Lake of Geneva, landed on the opposite shore, and after encountering the most determined opposition, reached the valley of San Martino, after a perilous march of thirty-one days. During the winter, a French army of 22,000 men entered their territories, and in the following summer attacked their fortifications, but were repulsed with great slaughter. Fortunately, the French and Piedmontese at this juncture quarreled, and the latter, to secure the services of the mountaineers, granted them an amnesty. They are said to have fought not less than eighteen battles against the French, and to have lost only thirty men. This was the last persecution against the Vaudois; but it was not till 1848 that they were put on a level with their Catholic fellow-subjects. They had then 18 pastors and 15 congregations; in 1879 there were 56 regular Waldensian congregations (with 14,600 communicants), besides 24 'missionary stations' in various parts of Italy, as at Turin and Rome. The *Libera Chiesa*, a Protestant Italian church, is not connected with the Church of the Valleys. The W. have a college at Florence, and publish several denominational and missionary journals. See the works of Botta, Bender, Morland, Gelly, Muston.

WALES. See the articles ENGLAND, GREAT BRITAIN, PRINCE OF WALES, and the names of the various counties, towns, &c., of the principality; also WELSH LANGUAGE AND LITERATURE.

WALES, NEW SOUTH. See NEW SOUTH WALES.

WALHA'LLA (the Hall of the Fallen, i. e., heroes. See WALKYRIES) is, in Northern Mythology, the name of the place of residence for the fallen in battle. This brilliant hall stood in Gladsheim (the house of joy); in front of it was the beautiful grove Glasur, the trees of which bore golden leaves. Before the hall, which was so high that its summit could scarcely be seen, a wolf was hung, as a symbol of war, over which sat an eagle; the saloon itself, ornamented with shields, and wainscoted with spears, had 540 doors, through each of which 800 of the inmates (Einherjer) could walk abreast. For these Einherjer (i. e., the brave), who came after death to Odin, was it destined. Renowned chiefs, especially if they had desolated many countries, and wielded the blood-dripping sword far and wide, were met and welcomed by Bragi and Hermode as messengers from Odin. The hall was decorated to honor them; all the divine heroes stood up at their reception; the Walkyries tasted wine for them, which otherwise only Odin drank. All kings came to Walhalla, even when they did not die on the battle-field; in general, these joys seem to have been prepared only for those of high rank and the rich. As it was honorable to come to Walhalla with a great retinue, and to possess many treasures, the comrades of a leader who had fallen in battle killed themselves of their own free will, and in his grave were laid along with his horse and arms the treasures won in fight. Every morning the inmates marched out at the crowing of the cock, and fought furiously with one another; but at mid-day all wounds healed, and the heroes assembled to the feast under Odin's presidency.

Odin himself partook of nothing but wine; he gave the edibles to the wolves Geri and Freki, who sat beside him. The guests ate of the bacon of the boar Sahrimmer, and refreshed themselves with beer and mead, which flowed in abundance from the udder of the goat Heidrun; the attendant Walkyries handed them the drinking-horns, under Freyja's direction. Occasionally, the hero rode by night to his grave, where the beloved Walkyrie received him; he reposed in her embrace till, night disappearing, he exclaimed: 'It is time to make the horse tread on the white stair of the sky; I must travel towards the west to the bridge of heaven before the cock awakes the warriors in Walhalla.' The half of the fallen belonged to Freyja. The boar Sahrimmer, of which the heroes ate, was prepared by the cook Andhrimmer in the kettle Eldhrimmer. *Sa* is explained as signifying water; *and*, breath or soul; *eld*, fire; *hrim*, i. e., frost, was the primitive matter of which the world was made; from the branches of the deer Eikthyrnir, standing over Walhalla, drops fell into the well Hvergelmer, from which all rivers flowed. According to this, the heroes appear to be conceived as stars or spirits of the constellations, which draw their nourishment from the elements; and Walhalla stands for heaven.

The name WALHALLA is also given to a magnificent structure erected by Ludwig I. of Bavaria (1830—1841) as a temple of fame

for all Germany. He conceived the project in 1806, when the Fatherland was at its lowest point of degradation, and while he was yet crown-prince. The design of the building was by Klenze, and the chief sculptors of Germany have contributed to the execution of the plan. It stands on an eminence 250 feet above the Danube at Donaustauf, near Regensburg. The temple is of nearly the same dimensions and proportions as the Parthenon, and is built of marble. By means of statues, busts, reliefs, and tablets, the mythology and history of Germany are illustrated, and her greatest names commemorated. The undertaking cost 2,330,000 florins.

WALKER, Rev. George, an Irish clergyman, distinguished for the part he took in the heroic defence of Londonderry against the army of James II., was born in the county of Tyrone, of English parents, in the early part of the 17th century. He was educated at the university of Glasgow, and entering the church, became rector of Donoughmore. The early life of W. was not remarkable. When the Irish army of James II. entered Ulster, and took possession of Kilmore and Coleraine, W. sought refuge in Londonderry, the head-quarters of 'the Englishry' since the times of James I., when the confiscated lands of the county had been bestowed on the corporation of the city of London, and a Saxon colony, English and Scotch, had been planted there, who had converted a waste into the richest district of Ireland. The town was fortified sufficiently to protect it from the pike-armed Celtic peasantry, and it had resisted more than one attack. But it was not so defended as to oppose regular troops. Lundy, the governor, was in secret communication with the enemy, and prepared to hand over the town to them; but some of his own officers protested against this course, and the citizens, remarkable at the time for that high spirit which characterizes a dominant race, and the possession of those qualities which made the soldiers of Cromwell famous, determined not to yield. The bishop, Ezekiel Hopkins, in vain inculcated the doctrine of passive obedience at a conference; he was interrupted by a lad, one of a daring band known as the 'thirteen Scotch apprentices,' who called out: 'A good sermon, my lord—a very good sermon; but we have no time to hear it now.' A Scotch fanatic named Hewson urged the Presbyterians not to ally themselves with the enemies of the Covenant; but he was laughed at by his countrymen. The thirteen apprentices closed the city-gates, and defied the enemy. It was then that W., described as an aged clergyman who had taken refuge in the city, encouraged the townspeople to fight to the last. W. saved Lundy from the rage of the populace, and enabled him to quit the city in safety. Major Baker, who soon after died, and W. became joint-governors, aided by Captain Adam Campbell. The siege is the most memorable in British history. It began in April, and lasted till the end of July 1689.

The inhabitants were reduced to the greatest extremities by hunger, but they were sustained to the last by the rousing sermons preached to them by W. in the cathedral, and the example he and Captain Campbell set in heading sallying-parties. When the siege was raised by the English fleet entering the harbor, W. went to London. He was warmly received at court, thanked by the House of Commons, created D.D. by Oxford, and Bishop of Derry by the king. Portraits of him were in every house in England, and his triumph would have been complete had the Presbyterians not thought that their share in the defence of the city was overlooked and provoked useless controversy. W. could not be induced to take quiet possession of his bishopric; he would head a troop at the battle of the Boyne, and he was there killed. A lofty pillar has been erected to his memory at Londonderry, and the Walker Club and the Campbell Club have kept alive to our times the recollection of the siege. W. published in 1689 *A True Account of the Siege of Londonderry*.

WALKING-LEAF. See Leaf-insect.

WALKING-STICKS. The habit of using a stick, either for support or merely as a fashion, is of great antiquity; and in modern times, the supply of such articles constitutes a large branch of trade in European countries, especially in Britain, France, and Germany. The imports into London and others English ports of sticks in the raw state, to be afterwards dressed and mounted, is enormous, exceeding four and a half millions annually, and reaching a value of about £25,000. They chiefly consist of the small stems or canes of certain palms, as the Malacca cane; and others called Whangee and Penang Lawyers; the woody stems of some small species of bamboo are also used, besides straight shoots of orange, cinnamon, myrtle, and other shrubs. The preparation and sale of walking-sticks are extensively carried on in Hamburg, and the finer sorts are richly and tastefully mounted in Paris. London is, however, the greatest mart for all kinds of walking-sticks. Of British trees and shrubs, the oak, crab, hazel, and sloe are used to some extent for the manufacture of walking-sticks.

WALKING-STICK, the popular name of many insects of the family *Phasmidæ* (q. v.), destitute of wings, and having a long, slender, cylindrical body, like a small stick with the bark on, the delicate legs resembling little twigs. Their habits are very similar to those of the leaf-insects or walking-leaves, and their peculiar appearance is, in like manner, their protection. Most of



Walking-stick (*Phasma gigas*).

them are natives of warm climates, and they are widely distributed. Some of them attain a large size. *Phasma gigas*, an East Indian species, is seven or eight inches long. A species between three and four inches long, *P. femoratum*, is found even in the northern and north-western parts of the United States.

WALKY'RIES, beings of the Scandinavian Mythology (q. v.), the legend of whom is the most terribly beautiful in the whole system. The name is derived from the old Norse *val*, which signifies a heap of slaughtered men, and *kjora*, to choose. *Val* itself contains the notion of chosen, elect, being allied to Ger. *wählen*, Scotch *wale*, to choose. The Walkyries, also called battle-maidens, shield-maidens, wish-maidens, are charming young women who, adorned with golden ornaments, ride through the air in brilliant armor, order battles, and distribute the death lots according to Odin's commands. Fertilizing dew drops on the ground from the manes of their horses; light streams from the points of their lances, and a flickering brightness announces their arrival in the battle. With their charming glance, they rejoice the glazing eye of the hero, and lead him to Walhalla, where they act as his cup-bearers. Two Walkyries Hrist and Mist, are cup-bearers to Odin himself.

They differ in regard to their origin; some of them spring from Elves and other superhuman beings; some also are the daughters of princes, who in their lifetime are numbered among the Walkyries, showing all their qualities, and when they die, their spirits become Walkyries. They ride generally in companies of three, or of three times three, or four times three, and have the gift of changing themselves into swans. They often choose noble heroes for lovers. Whoever deprives a Walkyrie of her swan-robe, gets her into his power. But the song of the Walkyries sounds terrible, as sitting on a hill, they weave the fatal battle-web. The Walkyries were frequently confounded with the Norns or Destinies. They were also conceived under the figure of the clouds. Thus, Hrist signifies dark sky, and Mist signifies quaking. Most of the names of the Walkyries, however, relate to war and battle.

WA'LLABA TREE (*Eperva foliata*), a tree of the natural order *Leguminosæ*, sub-order *Cæsalpineæ*, a native of Guiana. The wood is deep red, often variegated with whitish streaks, hard, heavy, shining, resinous, and very durable. The leaves are pinnate, without a terminal leaflet; the flowers in panicles of numerous distinct racemes.

WALLACE, Alfred Russel, traveler and naturalist, was born at Usk in Monmouth, 8th Jan. 1822, and was educated for the profession of land-surveyor and architect, a calling he exercised until 1845, when he devoted himself exclusively to naturalistic studies and researches. He spent four years on the Amazon, and eight years amongst the Malay Islands, making extensive zoological collections. It was while living in the East that, unaware of Mr. Darwin's cognate researches and speculations, W. formed and committed to writing a theory of development by natural selection, though not using the latter term. Valuable contributions to zoology, botany, and cognate subjects are to be found in his *Travels on the Amazon and Rio Negro* (1853); *Palm*

Trees of the Amazon (1853); *The Malay Archipelago* (2d ed. 1869); *Contributions to the Theory of Natuarl Selection* (1870). *The Geographical Distribution of Animals* (1876) practically founded a new science. *Tropical Nature* appeared in 1878; *Australasia* in 1879; *Island Life* in 1880; *Land Naturalization* in 1882. In a work *On Miracles and Modern Spiritualism* he vindicates views seldom expressed by men of science.

WALLACE, WILLIAM, the Scottish patriot, was the younger son of a knight of good family in the south-west of Scotland. Neither the precise date nor place of his birth has been ascertained; but he was born about the middle of the reign of Alexander III. Nothing certain is known of his education or his early years. Blind Harry's half-fabulous poem has indeed inseparably associated his birth with Ellerslie, his boyhood with Dundee, and his youthful manhood with Ayrshire; but his true history, even in the next generation, was so obscure, that it is now impossible to separate truth from falsehood or exaggeration. He first appears, in the light of authentic history, as the chief of a band of insurgents against Edward, king of England. Taking advantage of his superior power, of his influence over the barons of Norman race, who then were the foremost persons among the nobility of Scotland, and of the position of umpire to which he had been chosen by the various claimants to the Scottish crown, Edward had established his supremacy over the northern kingdom, and afterwards deposed John Baliol, and attempted to govern in his own absolute right. See SCOTLAND, *History*. The injustice of the claim, and the cruelty with which it was enforced, roused the opposition of all classes in Scotland except the higher nobles. The gentry and the middle and lower classes of the Lowlands, had for many years identified themselves with the country in which they dwelt, rather than with the great English race from which most of them drew their descent; and what has been called the War of Independence began, which resulted in the deliverance of Scotland from foreign rule, at the cost of the comparative civilization and tranquillity which the country had enjoyed under the descendants of Malcolm Canmore. In this struggle, W. was the most successful leader; and in the course of the year 1297, the insurrection became general. Edward himself was at that time in Flanders; but his general in Scotland, the Earl of Surrey, led his army to Stirling. On the 11th of September, they encountered the Scots under W., and were completely defeated. The whole kingdom submitted to W.; who, passing the Border, ravaged Cumberland and Northumberland without opposition. On his return from this expedition, he was elected by his countrymen Governor of Scotland, in name of King John, whose title was still recognized. In the following year, Edward in person entered Scotland at the head of a numerous army. He was met at Falkirk (q. v.) by W. on 22d July; but the Scots were defeated. It is generally assumed that the jealousy of some Scottish nobles, who envied the position of the governor, had aided in bringing about the disaster, and W., in consequence, resigned his high office. With this event, his brilliant public career may be said to have terminated. All that is certainly known is, that he continued to struggle for his country's independence, and never made his submission to Edward, or took those oaths of fealty to him which were so lightly made by the Scottish nobles, and as recklessly broken. The events of this period related by modern writers under the name of 'Lives of Wallace,' are either transactions in which there is no evidence that he took any part, or the doubtful legends which, as years went on, gathered round the name of the Scottish hero. Some documents of undoubted authenticity make it probable that he was for some time in France. The close of his life forms an exception to this obscurity. When Edward offered pardon to the other Scottish leaders on certain terms, W. was excepted by name. If he chose to surrender, he might do so, but it was to be without conditions, and his life was to be at the king's mercy. Efforts were also made to discover his retreat and secure his person, and these were finally successful. In the year 1305, he was seized by some of his own countrymen, and delivered to Edward. He was carried to London, and with a mockery of the forms of justice, tried for treason. He denied the charge, asserting, with truth, that he had never been the vassal or subject of Edward; but his plea was disregarded. He was condemned and executed on the 23d of August; and his death was accompanied by acts of barbarity uncommon even in that age, and marking the merciless character which distinguished the later years of the English king.

Contradictory as are the accounts of the English and Scottish chroniclers, it is not difficult to discover the true character of Wallace. He was the true leader of a national insurrection against a foreign yoke. The cruelties inflicted in his invasion of England are undeniable, but he did what he could to mitigate them; and he should not be severely blamed if, under far greater provocation, he tolerated what the good King David, in his War of the Standard, was unable to prevent. His memory lives, and will ever live in the hearts of his countrymen, who know that they owe to him and to those who followed in the same course, that their history has not been as unhappy as the history of Ireland. The chief authority for the Life of Wallace, as told by popular Scotch writers, is the poem of Henry the Minstrel, who lived, however, nearly two centuries after his hero, and whose narrative is an almost unbroken series of picturesque impossibilities. The fullest modern account is that given by Mr. Tytler in the first volume of his *History of Scotland*, and in his Life of Wallace in the first volume of his *Scottish Worthies;* but Tytler is to a large extent *Blind Harry* over again, with judicious excisions. All that is really known of W. will be found in Mr. Burton's *History of Scotland*, and it is satisfactory to know that the result of a careful examination of the real facts by a writer so impartial, and so little apt to be carried away by enthusiasm, corroborates the most favorable estimate of W.'s character.

WALLACE, WILLIAM VINCENT, a British musician and composer of operas, was born at Waterford, of Scotch parents, June 1, 1814. He early attained proficiency as a performer on the pianoforte and violin—his performances on the latter instrument bringing him under the notice of Paganini. After being for some years leader of the orchestra of a Dublin theater, he emigrated to Australia, where he lived for a considerable time in the bush, and then suddenly appeared in Sydney as a musician, and gave concerts in Australia, New Zealand, India, and America. In 1845, he came to England, and wrote his first opera, *Maritana*, which was an immediate success both in London and Vienna, and still holds the stage as one of the most popular of English operas. *Matilda of Hungary* followed it in 1847.

During a sojourn of some years in Germany, Wallace added further to his musical culture; and after again visiting America, composed *Lurline*, which was brought out in London in 1860, with even greater success than *Maritana*. In 1861, he produced *The Amber Witch;* in 1862, *Love's Triumph;* and in 1863, *The Desert Flower*. W. died at the Château de Bagen, in the south of France, 12th October 1865, leaving another opera, *Estrella*, nearly completed. Without possessing genius of the very first order, W. was a highly cultivated musician; the freshness of the motives, and the brilliancy of the orchestration of his operas, particularly *Maritana* and *Lurline*, have stamped their author as one of the chief English composers of this century.

WALLENSTEIN (or, more correctly, WALDSTEIN), ALBERT-WENCESLAS-EUSEBIUS VON, Duke of Friedland, Sagan, and Mecklenburg, the most remarkable of the long series of eminent men who owe their prominence on history's page to the Thirty Years' War, was the third son of a noble though not wealthy Bohemian family, and was born at the château of Hermanèe in Bohemia, 15th September 1583. His parents, who were Protestants, intrusted the care of his education to the Moravian brotherhood of Koschumberg, who, however, made little of their stubborn and passionate pupil. On his parents' death, his uncle, Albert Slavata, a zealous Catholic, took charge of the wayward youth, and having won him over to his own creed, sent him to the Jesuit *convictorium* at Olmütz, and to the universities of Altorf, Bologna, and Padua, where his education, such as it was, was completed. W.'s course of training had not eradicated, or even moderated the prominent faults in his natural disposition; on the contrary, his wilfulness and independent spirit had gathered stability and strength from ineffective opposition; and his first prominent appearance on the stage of events showed a man of extreme individuality, gifted with great and versatile ability, but equally remarkable for obstinacy, passion, and pride. He afterwards visited Germany, France, and Holland, took service in the imperial army, then engaged with the Turks in Hungary, and, returning home at the close of the war (1606), married an aged widow of noble rank, who, at her death (1614), left him the whole of her great wealth. This, along with the fourteen domains bequeathed to him by his uncle, made him one of the richest and most influential lords of Bohemia, a position recognized by the imperial court by the bestowal on him of the title of count and the military grade of colonel.

A second marriage in 1617 with the daughter of Count Harrach, the emperor's favorite, and W.'s firm adherence to the imperial side during the Bohemian insurrection; his maintenance, at his own expense, of a large body of troops; and his brilliant and well-directed gallantry at the battle of Prague, and in various contests with Mansfeld and Bethlem Gabor, added a powerful influence at court to his hitherto only local eminence. The latter, however, was now much increased by his purchase, at much less than their value, of sixty confiscated lordships in Bohemia; and Ferdinand II. felt himself impelled to recompense the valuable services of his faithful subject by (1623) raising him to the dignity of a prince of the empire, with the title of *Duke of Friedland*. (Friedland is a town situated close to the Prussian frontier, about 60 miles north-north-east of Prague.) Two years after, when the impossibility of maintaining an army sufficient to restrain the Protestant League from uniting with the Danes against him,

threw the emperor almost into despair, W. seizing such a favorable opportunity of gratifying his ambition, offered to raise, equip, and maintain 50,000 men free of charge, provided he were intrusted with the absolute command, and allowed to appoint his own officers: a proposal greedily accepted by the emperor. W. raised 30,000 in Bohemia; adventurers from all quarters flocked to his standard; and in a short time his army far exceeded the promised number. With this motley but not ill-disciplined array, he then marched into North Germany, and acting in concert with Tilly (q. v.), routed Mansfeld at Dessau, hunted him through Silesia and Moravia, and on his junction with the army of Bethlem Gabor in Hungary, compelled, by skillful strategy, the combined forces to remain on the defensive. Released by a truce with the Transylvanian prince and the death of Mansfeld, he returned by Silesia, recovered the fortresses which Thurn had captured, forced the Elector of Brandenburg to submit to the emperor, and joined Tilly in annihilating the military power of Denmark. The value of these services to the emperor's cause was inestimable, as Ferdinand well knew, and he accordingly turned a deaf ear to the loud complaints of the North Germans, who had suffered grievously from the rapacity, oppression, and license which W.'s soldiers were allowed to exercise without the slightest opposition; and rewarded their leader by the gift of the Mecklenburg duchies, the rank of generalissimo on land, and admiral of the Baltic.

W. speedily made himself master of his new territory; fitted out a fleet of 15 sail, by the aid of which he captured Usedom and Rugen, with various Baltic ports, and laid siege to Stralsund. But the Danes annihilated his navy, and the Swedes succored Stralsund, the siege of which he abandoned in despair. But as under cover of the dread inspired by W.'s arms, Ferdinand had resumed his tyrannical and aggressive schemes (see THIRTY YEARS' WAR) in Germany, the Catholic League, headed by the Duke of Bavaria, became bitter adversaries of W., and backed by the intrigues of France (which was represented at Vienna by Father Joseph, a master of subtle and unscrupulous diplomacy), partly forced and partly cajoled the emperor to dismiss W., an act for the probable consequences of which even Ferdinand, with his extraordinary fortitude, trembled. W., however, disappointed his sovereign's fears and his enemies' hopes by obeying with apparent cheerfulness, being somewhat moved thereto by the predictions of his favorite astrologer,* who declared his star to be only temporarily eclipsed, and that it would soon shine forth again with far greater lustre; and retired to Prague, where he lived in his magnificent palace in sovereign state, surrounded by a court composed of barons, knights, and the principal officers of his army. But the insult and injury he had received were eating into his soul; the frankness and affability to his subordinates, which had hitherto distinguished him, were changed for a gloomy taciturnity; and much of his time was spent in solitude, brooding over his wrongs, and scheming for revenge on the Duke of Bavaria, whom he justly accused of being the cause of his disgrace; though all the while he kept a calm but eager watch over the changes of opinion in the court of Vienna, where several of the ministers and numerous secret agents were either in his pay, or devoted to his interests.

His eminent services, his immense popularity, and his great talents, pointed him out as the only hope of the empire after Tilly's death, and Ferdinand saw himself forced almost to kneel to his haughty subject, and beseech him again to gird on his sword; but W. for a long time affected the utmost indifference to re-engaging in active service, and at last consented only on such conditions as made him the independent ruler of the empire in military affairs. With the Swedes on the Danube, the Saxons in Bohemia, and the army of the League almost annihilated, the emperor had no choice; and W., three months afterwards, was at the head of 40,000 men, well armed and disciplined. But commands and entreaties were in vain employed to induce him to save Bavaria from the Swedes; and he lay idle at Leitmeritz, gloating over the pangs of his enemy, till, on Austria being threatened, he advanced to Eger, and by menacing at once Saxony and Nuremberg, brought Gustavus to a standstill. The two armies lay opposite each other for ten weeks, each suffering the extremities of famine, hardship, and sickness, in the hope of wearying out the other. At last, when half their numbers had succumbed, Gustavus, who had made a fruitless attempt to storm W.'s camp, retreated to the Danube, whence his skillful opponent soon drew him by marching on Saxony. The two again confronted each other at Lutzen (q. v.), and though W. was completely defeated, it was chiefly owing to the superior discipline and *morale* of his opponents. His army was recruited and reorganized in Bohemia; and, unable to make head against Saxons and Swedes combined, he found it advisible to gain time by amusing his antagonists with illusory negotiations, after repeated vain endeavors to persuade the emperor to come to terms with the Protestant princes. Meantime his old enemies of the League were in full activity at Vienna; and the emperor, chagrined at the humiliations to which he had subjected himself to gain W.'s aid, was not slow to give credit, real or feigned, to their misrepresentations; his ill-conceived dislike was developed into hatred by the stubborn pertinacity with which W. insisted on the full observance of the terms of their agreement; and on W., who was kept well informed of the state of matters at court, attempting to attach his officers permanently to himself by obtaining their signatures (January 12) to an agreement to that effect, the emperor (January 24, 1634) declared him a rebel, and ordered two of his old officers, Piccolomini and Gallas, who had for some time been acting as spies on his actions, to take him dead or alive.

W., with some devoted adherents, including a guard of 200 dragoons, took refuge in Eger, but was there assassinated, February 25, 1634. W. was tall, thin, and wiry, with lively brilliant eyes, tawny-reddish hair, and an unhealthy-looking, yellow complexion. 'He was far superior to his sovereign in true policy, liberality of sentiment, and religious toleration; but these qualities only rendered him more obnoxious to the bigoted emperor and his ministers.' As a general he holds the foremost rank, vigilance and presence of mind, great judgment and unflinching perseverance, being his prominent characteristics; and of him alone can it be said that he checked the progress and foiled the designs of the great hero of Sweden. After his death, it was seen that the treacherous murder of one who had twice saved the empire from destruction called for some justification; and accordingly a paper was published by imperial authority, in which an attempt was made, by misrepresenting every overture he had made to his opponents, and every scheme he had employed to divide his numerous enemies at court, to prove that he had constantly meditated treason from the time of his first disgrace. This view and its opposite have found numerous and enthusiastic supporters; but without going further into detail, we may observe that the overtures made by him to the Swedes and Saxons while in command were undoubtedly *ruses de guerre*, and were invariably found to be such by his opponents; that when the Saxons invaded Bohemia, and took Prague, where he was residing in disgrace at the time, he took no part on either side, except such measures as an influential citizen would adopt for the safety of the inhabitants from insult and spoliation; and lastly, that when, after he had been declared a rebel, he *did* make 'treasonable' overtures to Bernhard of Weimar, the latter, though W.'s defection would at that time have been of the utmost importance, could not convince himself that this was not another artifice; a proof that the former overtures were as above stated.—See Coxe's *House of Austria*; Harte's *History of the Life of Gustavus Adolphus* (1759); Pelzel's *Geschichte der Böhmen* (Prague, 1774, 1779, and 1782); *W.'s Briefe* (ed. by Forster, 1826); Ranke's *Geschichte W.'s* (1869); Gindely, *Neues über W.* (1876), articles by Hallwich in the *Archiv für Sächs. Geschs.* (1876), and by Lorenz in Sybel's *Historische Zeitschrift* (1878).

* W., during his attendance at the Italian universities, had deeply studied astrology; and although far too much has been made of this fact by his biographers, there is no doubt that the mystic doctrines of this psuedo-science had a strong hold on his mind, and at times much influenced his conduct.

WALLER, EDMUND, celebrated as one of the refiners of English poetry, was born at Coleshill, Herts, on March 3, 1605—1606. He was of an ancient and opulent family, and having passed through Eton and King's College, Cambridge, was returned to parliament, at the early age of 18, as member for Amersham, Bucks. In 1631, he married a London heiress, who died shortly afterwards; and the rich widower made suit to Lady Dorothy Sidney, eldest daughter of the Earl of Leicester, whom he poetically and perseveringly commemorated under the name of Saccharissa. Lady Dorothy, however, was inexorable: 'she was not to be subdued,' as Johnson says, 'by the powers of verse.' Meeting him in her old age, she asked the poet when he would again write verses upon her, and he ungallantly replied: 'When you are as young, madam, and as handsome as you were then.' In the Long Parliament, W. joined the party of Hampden (who was his cousin), and he was one of the commissioners appointed to negotiate with King Charles I. at Oxford in 1643. He was soon gained over by the royalists, and entered into a conspiracy against the dominant party in the House of Commons, for which he was fined £10,000, and banished the kingdom. His conduct on this occasion was mean and disgraceful. He not only confessed all he knew, but all that he suspected; attempted to criminate innocent persons, and humbled himself before the House of Commons in language inexpressibly abject and humiliating. After eight years' exile, spent in France and Italy, he was suffered to return to England; and he then became a supporter of the Commonwealth, and a panegyrist of Cromwell, to whom he was distantly related. When Charles II. was restored, W. was equally ready with a poetical congratulation; but his loyal strains were much inferior to those with which he had hailed the Protector; and it is said that when Charles reminded him of this fact, the poet wittily replied: 'Poets, sir, succeed better in fiction than in truth.' Up to his 80th year, W. continued a member of the House of Commons, delighting all parties by his wit and vivacity. He died at Beaconsfield, October 21, 1687.

W. began early to write verses, and published two collections of his poems—one in 1645, and another in 1664. An edition appeared in 1711, edited by Atterbury; and one in 1729, with copious 'Observations' by Fenton. Pope has eulogized the *sweetness* of W.'s verse. Some of his smaller pieces are characterized by infinite grace and harmony; he has also occasional dignity and striking imagery, as in the lines on Cromwell; and he is never involved or obscure; yet his rank among our poets is but a subordinate one, as he is deficient in passion, energy, and creative power.

WA'LLFLOWER (*Cheiranthus*), a genus of plants of the natural order *Cruciferæ*, having the siliques quadrangular from the prominence of the nerves on the back of the valves, the seeds in a single row in each cell, the stigma deely 2-lobed, the lobes bent back. The flowers are in racemes. The species are annual, biennial, or perennial herbaceous plants, some of them almost shrubs. The COMMON W. (*C. cheiri*) is found in rocky places and on old walls in the south of Europe, and also, but less abundantly, in the middle of Europe and in Britain. In its wild state, its flowers are always yellow; but in cultivation, they exhibit a considerable diversity of colors, chiefly brown, purple, and variegated; and they attain a larger size. It is a universal favorite, on account of the delicious odor of its flowers. The varieties in cultivation are very numerous; but there are among them no marked distinctions. Double and semi-double flowers are not uncommon. The plant is perennial, but in gardens is generally treated as a biennial, although fine kinds are propagated by cuttings, which soon strike root under a hand-glass. The ordinary mode of cultivation is to sow the seed of an approved kind, and to plant out the seedlings. The flowers of W. have a bitter and cress-like taste, and were formerly used as a medicine.

WA'LLINGFORD, a small, but ancient and interesting, parliamentary and municipal borough of England, mostly in the county of Berks, and on the right bank of the Thames, 13 miles north-north-west of Reading. Of its three churches, that of St. Leonard's—rebuilt in 1849—has a Norman doorway. The earthworks with which the Romans encompassed the town, are still distinctly traceable. The diversion of the London and Oxford Road from W. much injured the old town, and it is now a place of little consequence. The borough returns one member to the House of Commons. Pop. (1871) of municipal borough, 2972; (1881) 2803.

WALLIS, REV. JOHN, D.D., a very eminent English mathematician, was the eldest son of the Rev. John Wallis, incumbent of Ashford in Kent, and was born there, November 23, 1616. He was brought up with a view to the church, and was educated for his profession, to the strict exclusion of all other branches of knowledge, in accordance with the prevailing practice of the time, which was in his case carried to such an extent that even ordinary arithmetic was wholly neglected. W. never saw a book of arithmetic till he was 15 years old, and then only by accident. At the age of 16, he was entered at Emmanuel College, Cambridge, where at that time mathematics found no place in the course of study, being esteemed merely mechanical. After a brilliant career, he took his degree, was chosen a Fellow of Queen's, and took orders in 1640. On the outbreak of the civil war, he sided with the parliament, and was of great use to his party in deciphering intercepted correspondence, an art in which like Vieta (q. v.) and Battista la Porta, he was eminent. In 1644, he was one of the secretaries of the Assembly of Divines at Westminster, holding at that time the living of St. Gabriel, Fenchurch Street; and in the following year, he joined with other eminent men in the establishment of the meetings for mutual instruction, which 17 years afterwards developed into the Royal Society. It was not till 1647 that he commenced the study of mathematics; and, in 1649, he was chosen Savilian Professor of Geometry at Oxford. The rapid progress he had made in his mathematical studies was evidenced by the publication of his greatest work, the *Arithmetica Infinitorum*, with a treatise on Conic Sections prefixed, in 1655.

In the same year commenced his well-known controversy with Hobbes—regarding a quadrature of the circle, which the latter believed he had effected—which was continued at intervals till 1663, and was marked by the usual quaint caustic satire of the time. W. had, of course, the right side of the dispute; but unfortunately for posterity, his manly feeling of forbearance towards a deceased antagonist (Hobbs died in 1679) prevented him from admitting his polemical treatises into the collection of his works, which was published 1693—1699. Numerous other mathematical works, as the *Mathesis Universalis* (1657), *Commercium Epistolicum* (1658), *Cuno-Cuneus* (1663), *De Proportionibus* (1663), *De Æstu Maris* (1668), a treatise on Mechanics (1669, 1670, 1671), editions of the works of Horrocks (1673), of the Arenarius and Quadrature of Archimedes (1676), and of Ptolemy's Harmonics (1680), a treatise on Algebra (1685), an edition of Aristarchus and of Pappus (1688), &c., were the products of his originality and industry. We have besides numerous minor theological works, polemical and expository, from his pen, none of which, however, are important enough to call for mention. Of his other works, the treatise on Logic (1687) is of the highest excellence, and even at the present day is well worthy of perusal; and his English Grammar (1653), written in Latin for the use of foreigners, has only of recent years, when the true principles of grammar are becoming better understood, received the attention it merits. About 1658, W. joined the party who were in favor of a restoration of kingly government, and his talent for deciphering was now put in practice against his former friends, an act for which he has been abused with virulent injustice. At the Restoration, he was confirmed in his professorship, was appointed keeper of the archives at Oxford, and royal chaplain. In 1692, he was consulted as to the adoption of the Gregorian Calendar, and his strong disapproval decided the government to retain the old style. He died 28th October 1703.

It is exclusively as a mathematician that W.'s name has obtained permanently a niche in the temple of fame; though as an expositor of the cardinal doctrines of Christianity he was fully on a par with South and Sherlock; but his eminence in the former character has thrown into shade even his services as a scholar, and few at the present time remember that it was he who first edited the musical works of Ptolemy, Porphyrius, Aristarchus of Samos, and the later work of Briennius, though the manner in which these labors were effected indicates unquestionably an immense expenditure of labor, and a high degree of scholarship. His *Arithmetica Infinitorum* is a successful attempt to solve, by means of the summation of series to infinity, a number of the more simple problems of the calculus, such as the evaluation of all cases of $\int x^m dx$; and, in extension, to discover the limit of $\int (a^2 - x^2)^n dx$, of which the quadrature of the circle is a particular case. There are numerous other results, which are, at the present time, considered to belong to the more advanced stages of the calculus; and, in fact, W. is another example of the strange blindness which, in full possession of a principle, neglects to suit it with a generalized form of expression. The best known of W.'s results in his formula for π, which gives

$$\frac{\pi}{4} = \frac{2.4.4.6.6.8....}{3.3.5.5.7.7....} \text{ ad infinitum.}$$

WALLOO'NS, the name given to a population belonging to the great Romanic family, more especially to the French stock, and occuping the tract along the frontiers of the German-speaking territory in the South Netherlands, from Dunkirk to Malmedy. They are located more particularly in the Ardennes, in parts of the departments of Pas-de-Calais, Nord, Aisne, and Ardennes in France, but chiefly in South Brabant, as well as in the provinces of Hainault, Namur, Liége in Belgium, and in the greater part of Luxemburg, and finally in some towns and villages in the neighborhood of Malmedy in Rhenish Prussia. The W., whose numbers in Belgium, where they are principally established, are stated at 2 millions, are the descendants of the old Gallic Belgæ, who held their ground among the Ardennes Mountains when the rest of Gaul was overrun by the German conquerors, but became eventually Romanized, especially in their language, which appears now as a patois or popular dialect of French; of all the French dialects, however, the greatest number of Gallic words have been preserved in it. See Grandgagnage, *Dictionnaire Etymologique de la Langue Wallone* (continued by Scheler, 1847–50).

The name W., in Dutch, *Walen*, sufficiently shows their Gallo-Romanic origin and their relationship, partly by race and partly by language, with the Galli, Gaels, Walese, Welsh, Walachians, &c. The Walloons of the present day resemble their French, more than they do their German neighbors. They are squat and middle-sized, with powerful limbs, dark hair, deep sunk, fiery, dark-brown or blue eyes. They surpass their Flemish neighbors in adroitness, activity, and skill; and their French in earnestness, perseverance, and diligence. In impulsiveness, they resemble the latter more than the former, but their anger sooner cools than that of the more deeply feeling Fleming. It is worthy of notice that the Belgian revolution was pre-eminently the work of the Walloon districts, and the most eminent statesmen of modern Belgium are of Walloon descent. It was against the Walloon spirit and tendencies that the Flemish movement (see FLEMISH LANGUAGE AND LITERATURE) was chiefly directed.

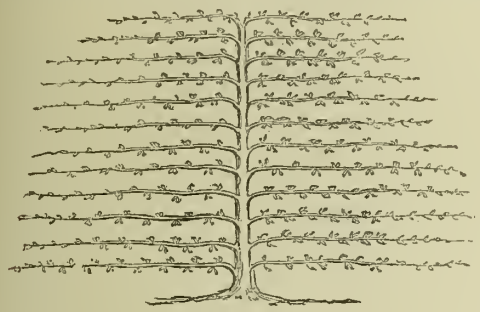
WALL-PIECE, a small cannon (or, in ancient times, an arquebuss) mounted on a swivel, on the wall of a fortress, for the purpose of being fired at short-range on assailants in the ditch or on the covert-way. There are distinct evidences that the great wall of China was originally constructed for the reception of wall-pieces.

WALL-PLATE, a piece of wood laid along the top of the wall of a building to receive the feet of the rafters of the Roof (q. v.).

WALLSEND, a parish of the county of Northumberland, England, four miles east-north-east from Newcastle, celebrated for its

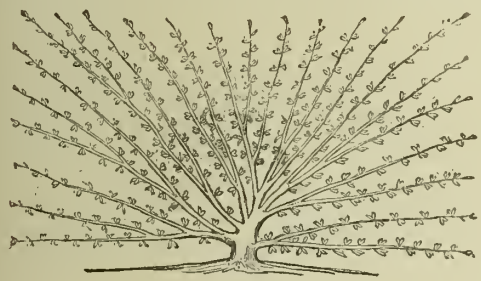
collieries, which produce a very large quantity of coal of very superior quality. About 2,000,000 tons of W. coal are annually imported into London.

WALL-TREES, in Horticulture, are fruit-trees trained on walls for better exposure of the fruit to sunshine, and for the sake of the heat radiated from the wall. Brick walls are generally preferred, and have a great advantage in the regularity with which the nailing can be accomplished, but trees are often also trained on stone walls, and the walls of houses are sometimes used for this purpose. Trees are trained on walls in hothouses as well as in the open air. Flued walls are often used, the fruit being thus partially forced by artificial heat; and screens of various kinds, as of reeds, canvas, and oiled paper, are sometimes



Horizontal Form.

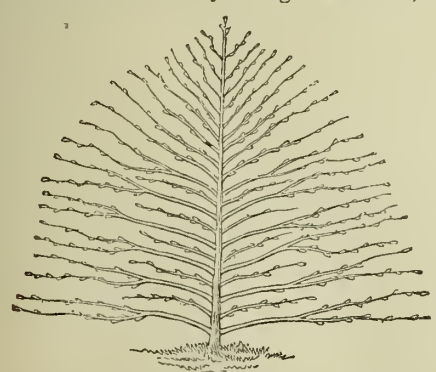
employed to protect blossoms in spring. Woollen nets are also much used for this purpose, and a net even with wide meshes affords much protection from spring frosts. Wall-trees, intended permanently to occupy the wall, are generally trained in the nursery with a dwarf stem only five or six inches in length, so that the branches may cover the whole wall, and no available part of it may be lost. It is usual, however, in planting to introduce *riders* alternately with the permanent wall-trees, which are grafted or budded on tall stocks, and occupy part of the wall till the other trees have become large enough to require it all for themselves. Garden-walls are generally 12 or 14 feet in height. Different modes of training wall-trees are practised, of which the principal are known as *fan training* and *horizontal training*. In the former, the branches are arranged like the spokes of a fan; in the latter, a main stem is led up, from which they are spread out



Fan Form.

horizontally on both sides. Different modes are preferred for different kinds of trees, and the art of the gardener is displayed in keeping to his plan of training, and *laying in* branches so as completely to fill up the space, and make every part of the wall productive.

There is a Dutch mode of training, which consists in leading two chief branches horizontally to right and left, and training



Half-fan.

shoots from them straight up to the top of the wall. It is seldom employed in Britain, except for white currants. Riders are not unfrequently trained in a star-like form, some branches being led downwards, in order to fill the wall as quickly as possible. It is necessary for the gardener, in training wall-trees, to consider the habit of each kind, particularly whether fruit is chiefly to be expected on young branches or on the *spurs* of older branches. Superfluous branches must in all cases be carefully removed, and amongst these are to be reckoned all *fore-right shoots*, or branches which project straight from the wall. The use of small strands of cloth, along with nails, to fasten branches to walls is familiar to every one. These strands are renewed from year to year, so that they may not cause disease by interfering with the growth of the branches.

WA'LNUT (*Juglans*), a genus of beautiful trees of the natural order *Juglandaceæ*. This order is nearly allied to *Amentaceæ* (q. v.), and particularly to the sub-order *Cupuliferæ* (q. v.), or *Corylaceæ*. but differs in having the ovary one-celled, with a solitary erect ovule. The flowers are unisexual, the male flowers in catkins, the female in terminal clusters. The species, of which not quite thirty are known, are mostly natives of North America; a few are found in Asia. All are trees with alternate pinnated leaves. The genus *Juglans* is distinguished by monœcious flowers, with 18—24 stamens; and a drupe with a deciduous fleshy husk, which bursts irregularly, and a deeply wrinkled shell (*putamen*) of two valves, within which is the seed, curiously loped and wrinkled, with a membranaceous *testa* and partial dissepiments. The species of Hickory (q. v.) were formerly included in this genus. The COMMON W. (*J. regia*) is a native of Persia and the Himalaya, but has long been cultivated in all parts of the south of Europe. The date of its introduction is unknown, but it was certainly cultivated by the Romans in the reign of Tiberius. It is a



Walnut (*Juglans regia*).

lofty tree of 60—90 feet; with large spreading branches. Its foliage resembles that of the ash. The leaves have 2—4 pair of leaflets, and a terminal one. They have a fine balsamic odor when bruised; this quality, however, being much more marked in some trees than in others. An infusion of them has been found useful in scrofula; and when bruised and rubbed on the skin, they are efficacious in curing itch. Placed in wardrobes, they prevent the ravages of moths. The sap is limpid like water, but contains much sugar, so that the tree is sometimes tapped for it, like the sugar-maple, and the sugar is procured by evaporation. A pleasant kind of wine is also made from it. An excellent pickle and a kind of ketchup are made of the unripe fruit. The ripe fruit is one of the best of nuts, and is an important article of export from many parts of the south of Europe. Walnuts are also exported in large quantities from Cashmere and other Himalayan regions to supply the markets of India. The outer husk is removed before the nuts are brought to market. In the south of Europe, walnuts are a very considerable article of food, and when perfectly fresh, they are wholesome and nutritious, although in the state in which they are imported into Britain they are not easily digestible. Just before they are ripe they are much used in France with vinegar, salt pepper, and shallots. Among the varieties of W. in cultivation is one with a very thin shell, which is much esteemed. Walnuts yield by expression a bland fixed oil, which, under the names of *Walnut Oil* and *Nut Oil*, is much used by painters, and in the countries in which it is produced is a common article of food. The *cake* left after the expression of the oil is sometimes used as an article of food, and is also used for feeding cattle and poultry.

The timber of the W. is of great value, and is much used by cabinetmakers. Gun-stocks are made of it. It is light, although hard and fine-grained. The wood of young trees is white and little esteemed; that of old trees is brown, veined, and shaded with darker brown and black. The wood of the roots is beauti-

fully veined. Both the root and the husks of the W. yield a dye, which is used for staining light-colored woods brown. The W., when meant to become a timber-tree, is best sown where it is to remain, as the roots are much injured by transplanting. The best kinds of W. for fruit are generally grafted.—The W. succeeds well in Britain as an ornamental tree, even in the north of Scotland, although it seldom quite ripens its fruit except in the warmest parts of England. It was probably brought to England by the Romans. It takes its name from being foreign (A.-S. *wealh* or *walh*).—Very similar to the Common W., is the BLACK W. (*J. Nigra*) of North America, found in most parts of the United States, except the most northern. It is a very large and beautiful tree, the trunk sometimes six or seven feet in diameter. The leaves have more numerous leaflets than those of the Common Walnut. The timber is even more valuable than that of the Common W., and is used for the same purposes. The fruit, however, is very inferior, although it is sold in the markets of American cities. The partial dissepiments of the kernel are thick and woody.—The BUTTER NUT (*J. cinerea*) is abundant in the northern and north-western parts of North America, and in Canada. It is a tree only about 50 feet high, with trunk about a foot in diameter; leaves with 15—17 leaflets; the fruit elongated, and externally covered with a viscid substance. The nut is hard and rough, with prominent ridges, of good quality, and sometimes brought to market in America. The wood is not apt to split or warp, and is useful for many purposes. Sugar is obtained from the sap, as from that of the maple, but is of inferior quality. The inner bark is a mild cathartic, resembling rhubarb in its properties. The leaves, reduced to powder, are used for blistering, like cantharides.—To the natural order *Juglandaceæ* belongs the genus *Engelhardtia*, found in the Malayan Archipelago and the Himalaya. The wood of *E. Roxburghiana*, a Himalayan species, is much valued by turners.

WALPOLE, SIR ROBERT, third son of Robert Walpole, M.P., by Mary, daughter of Sir Jeffrey Burwell, was born August 26, 1676, at Houghton, in Norfolk. He received his education at Eton and at King's College, Cambridge. On July 30, 1700, he married Catharine, daughter of Sir John Shorter, Lord Mayor of London. On 28th November following, he succeeded to the family estates on the death of his father. In 1702, he was elected member of parliament for King's Lynn; and in 1705, he was nominated one of the council to Prince George of Denmark. In this latter capacity, he appears to have won the esteem of Godolphin, Marlborough, and other Whig leaders. In 1707, he was appointed Secretary at War; and in 1709, Treasurer of the Navy. Shortly after this, however, his fortunes suffered a temporary eclipse. He was found guilty by the House of Commons of 'a high breach of trust and notorious corruption,' and accordingly, on January 17, 1712, he was expelled the House, and sent to the Tower. There can be little doubt that he had all his life a profound faith in bribery, and never scrupled to exercise it; but his punishment on this occasion seems rather to have been the result of party animosity than of virtuous indignation on the part of the House. He had all along been a strong Hanoverian, and on the accession of George I., he was restored to fortune. He was made a privy-councilor, and had various other high offices conferred upon him. On the impeachment of Bolingbroke and others by his means, he became, in 1715, Chancellor of the Exchequer, and First Lord of the Treasury. A disunion of the cabinet having arisen in 1717, he resigned office, bringing in a Sinking-fund Bill on the day of his resignation. In opposition, he was the determined enemy of the South Sea Scheme. He was recalled to office on the retirement of the Earl of Sunderland in 1721; and from this time to his final retirement in 1742, the life of W. may be said to be the history of England. In 1723, his son was created Baron Walpole.

In 1737, his power was a good deal shaken by the disputes which had arisen between the king and the Prince of Wales; the latter siding with the Opposition, which began to grow very formidable in the questions which arose about this time between England and Spain. W. was opposed to war; the grand principle of his action being, according to Archdeacon Coxe, 'the love of peace;' according to Macaulay, however, his aim was not the peace of his country, but of his own administration. In 1740, a motion was made in the House to petition the king to remove Sir Robert W. 'from his Majesty's presence and counsels for ever.' This motion was negatived by a large majority; but the power of the great minister was evidently shaken. He resigned on 2d February 1742, when he was created Earl of Orford, with a pension of £4000 a year. Charges of bribery were now brought against him, and a committee of investigation was ultimately appointed by the House of Commons. It consisted of 21 members, of whom only two were of his own party. The Report was against him, but it was unsupported by evidence, and proceedings were ultimately dropped. The rest of W.'s life was spent in tranquillity and retirement. He died in 1745, aged 68. In private life, he was amiable and good-tempered. Love of power appears to have been his ruling motive of action. He had strong common sense, with clearness of political vision, and next to his own interest he had at heart the interest of his country. Doubtless, he bribed largely, but as Macaulay says: 'We might as well accuse the poor Lowland farmers who paid black-mail to Rob Roy, of corrupting the virtue of the Highlanders, as accuse Sir Robert Walpole of corrupting the virtue of parliament.'—See Coxe, *Memoir of Sir Robert Walpole* (1798); Macaulay's Essay on *Walpole's Letters;* Ewald, *Sir Robert Walpole* (1877).

WALPOLE, HORACE, third son of Sir Robert Walpole, first Earl of Orford, was born in 1717. He was educated at Eton and Cambridge. After finishing his education, he traveled abroad for some years, principally in Italy, where he seems to have acquired those tastes for which he afterwards became so well known. In 1741, he returned to England, and took his seat in parliament. But he had no taste for politics, and never took any active part in public life. In 1747, he purchased a piece of ground near Twickenham. Here he built his famous mansion—Strawberry Hill. Its erection and decoration may almost be said to have formed the principal occupation of his long life. In 1758, he published his *Catalogue of Royal and Noble Authors.* This was followed by *The Castle of Otranto, The Mysterious Mother*, and the *Historic Doubts on the Life and Reign of Richard III.* The works, however, to which he owes the preservation of his name are his *Letters.* These will always be interesting as pictures and records of the society and fashionable gossip of his day. Their interest is, however, considerably marred by their palpable want of truthfulness. On the death of his nephew in 1791, he became fourth Earl of Orford. He died in his 80th year on March 2, 1797. 'The faults of Horace Walpole's head and heart,' says Macaulay, 'are indeed sufficiently glaring. His writings, it is true, rank as high among the delicacies of intellectual epicures as the Strasburg pie among the dishes described in the *Almanach des Gourmands.* But as the *pâté de foie gras* owes its excellence to the diseases of the wretched animal which furnishes it, and would be good for nothing if it were not made of livers preternaturally swollen, so none but an unhealthy and disorganized mind could have produced such literary luxuries as the works of Walpole. . . . . The conformation of his mind was such that whatever was little seemed to him great, and whatever was great seemed to him little. Serious business was a trifle to him, and trifles were his serious business.'—See *Letters,* edited by Mr. Peter Cunningham (8 vols., 1857); also Macaulay's Essay on *Letters of Horace Walpole.*

WALPU'RGA, or WALPURGIS, ST. (otherwise *Walburga*), followed her brothers St. Wilibald and St. Wunnibald (sons of a king of the West Saxons), in the time of St. Boniface, from her native country, England, to Germany, to help them in extending Christianity. Wilibald established the bishopric of Eichstadt about 741; and Wunnibald, the neighboring convent of Heidenheim about 745, the direction of which last W. undertook, after his death (about 763), as the first abbess, and continued till the end of her own life (778). Her bones, from which, according to the oldest biography, a miraculous healing oil flowed, were transferred to Eichstadt, where a convent was erected in her honor. That old biography was written towards the end of the 9th c. by a monk, Wolfhart, in the monastery of Hasenried, and contained, like all the later legends, which are based solely upon it, only a multitude of marvelous stories of the usual stamp. A somewhat more special significance lies in the trait that W. was not molested by biting dogs, and was in consequence invoked for protection against them and other ferocious animals. The veneration of W. became widespread. Throughout all Germany, and even in France, the Netherlands, and England, churches and chapels were dedicated to her, relics of her were shown, and festivals celebrated in her honor. The feast of Walpurga falls properly on the 25th of February; but as in some German calendars it is assigned to the 1st of May, the name of W. has become associated, in a quite accidental way, with some of the most noted popular superstitions. The 1st of May had been one of the most sacred days of all paganism; it was the time of a great sacrificial festival, and of the old May assembly of the people. For centuries on the 1st of May, informal courts of justice continued to be held, the joyful May procession took place, and the kindling of the sacred May-fire. See BELTEIN. When afterwards the old heathen gods had been completely degraded into devils by the Christian missionaries, and when the belief in witchcraft had come in vogue, the Walpurgis-night obtained naturally a notorious significance, inasmuch as, during the night between the 30th of April and the 1st of May, the witches were held to ride on broom-sticks and he-goats to the old places of judgment and sacrifice, in order to enjoy themselves there with their master the devil. Such witch-hills were tolerably numerous in Germany and the neighboring countries. The best known, however, was the highest point of the Harz, the Brocken, Brocks or Blocksberg, which has obtained a wide celebrity as the scene of the witches' Sabbath in Goethe's *Faust.*

WA'LRUS. See MORSE.

WA'LSALL, a municipal and parliamentary borough, Staffordshire, stands amid pleasing scenery on a small stream, an affluent of the Tame, eight miles north-north-west of Birmingham. Its public buildings are accounted more than usually handsome, and embrace a number of churches, a free grammar and other schools, and a number of charitable institutions. The iron manufacture, for which the situation of the town on the edge of the South Staffordshire mineral field affords facilities, is the staple branch of industry. Tanning, currying, the manufacture of harness and harness furniture, and of every description of leather goods, are extensively carried on. Coal and lime works are in operation in the vicinity, and there is an extensive trade in malt. W. returns one member to parliament. Pop. (1871) 49,018; (1881) 59,415.

WALSINGHAM, Sir Francis, English statesman, of an ancient Kentish family, third and youngest son of William Walsingham of Scadbury, was born at Chiselhurst, Kent, in 1536. He studied at King's College, Cambridge, and afterwards traveled on the continent, where he remained until the accession of Queen Elizabeth. Burleigh, with his usual discernment in selecting men of talent, discovered his abilities, brought him into office, and sent him on an embassy to France in August 1570. He remained in Paris until April 1573, and discharged diplomatic duties with such consummate skill that he was, on the recommendation of his great patron, appointed one of the principal secretaries of state to Elizabeth. He was also sworn of the privy council, and knighted. In 1578, he was sent on an important embassy to the Netherlands; in 1581, to France; and in 1583, to Scotland. He was, with some reason, regarded by the adherents of Mary Queen of Scots, as the most insidious of her enemies in the English council. He contrived to intercept most of her letters, and after having deciphered them, sent them to their destination, in order to obtain fresh intelligence from their answers. Some of these deciphered letters are preserved in the British Museum.

W. soon held Mary secure in the toils. Some time previous to September 1583, he had bribed to his service Cherelles, the secretary to the French ambassador Castelnau, in whom Mary placed implicit confidence. W. also won over Gray, the envoy of the Duke of Guise and other friends of Mary to James VI. (James I. of England), who employed him to manage his correspondence with his mother and his friends in France. The most secret letters of Mary and of James thus came into the hands of Walsingham. Up to Babington's conspiracy, or, as some have called it, W.'s conspiracy, there was no evidence for charging Mary with being accessory to any of the plots formed against the life of Elizabeth. The real fountain-head of this conspiracy, and the chief confederates, were spies in the pay of W., and all the correspondence of Mary and her friends passed into the hands of Elizabeth's dexterous minister. After the discovery and execution of Babington, &c., W. went to Fotheringay as one of the commission to try Queen Mary. She charged him with having forged the correspondence produced against her, when W. rose in his place and solemnly called God to witness that he had not done anything unworthy of an honest man, and that he was wholly free from malice. Elizabeth signed her death-warrant with a jest on W.'s hatred of the Queen of Scots. She had ordered Davison to bring her the warrant, and when she had signed it she said: 'Go; tell all this to Walsingham, who is now sick; though I fear he will die for sorrow when he hears it.' W. was distinguished even among the ministers of Elizabeth for acuteness of penetration, extensive knowledge of public affairs, and profound acquaintance with human nature. His administration of foreign affairs was founded on the system of bribery, espionage, and deception. He is said to have had in his pay 53 agents and 18 spies, in various countries; and no minister was better informed of the intrigues of foreign courts. Notwithstanding this diplomatic duplicity, which was then universal among public men, W.'s personal integrity and disinterested patriotism are undoubted. He was of strict morals, favored the Puritan party, and in his later days gave himself up to religious meditation. He retired from public affairs some time before his death, and resided at his house in Barn Elms, where he died, April 6, 1590.

Elizabeth was ready enough to acknowledge his diligence, genius, and important services, yet she kept him poor. There remain in the British Museum (Harleian MSS.) various letters from W. complaining of his being wholly unable, on his scanty appointments, to support his establishment, though very inadequate to his dignity of ambassador in France. Camden says he died so far in debt that he was buried privately by night in St. Paul's Church, without any funeral solemnity. The queen was chary even in conferring honors upon him, for he received nothing but his knighthood, and held no offices when he resigned the charge of foreign affairs. He was married, and his daughter Frances became successively the wife of Sir Philip Sidney, of the brilliant and unfortunate Earl of Essex, and of the brave soldier, Richard de Burgh, 4th Earl of Clanricarde.

WA'LTHAM, a town of Massachusetts, U.S., on Charles River and the Fitchburg Railway, ten miles north-by-west from Boston, has a broad street of handsome residences, and manufactories of bleached cotton goods, hollow iron-ware, machinery, chemicals, boots and shoes, and machine-made watches, of which 10,000 are made a year. Pop. (1870) 9065; (1880), 11,711.

WALTHAM ABBEY, a market-town in the county of Essex, on the banks of the Lea, 13 miles north of the east part of London, on the Great Eastern Railway. It contains a spacious Norman church, originally belonging to an abbey. The river Lea here divides into several branches, which are made to turn a number of gunpowder and flour mills belonging to government. Enfield Lock, at which is situated the celebrated government factory for rifles, &c. (see Small-arms Factories, Royal), is about a mile distant; and many of the hands there employed live in and around Waltham Abbey. A weekly newspaper is published. Pop. (1881) 5368.

WALTHER VON DER VOGELWEIDE, the greatest and most famous Minnesinger (q. v.) of the middle ages, was born 1165—1170, in Franconia or in Austria. Although his family was noble, he had no possessions, and became a minstrel as much, perhaps, from necessity as from impulse. His master and early model was the elder Reinmar. It is thought that his first public performances in 'singing and saying' date from about 1187; soon after which, he found a warm patron in Friedrich the Catholic, Duke of Austria. But this prince having died in 1198, W. began the life of a wandering minstrel, in the course of which he visited the courts of most of the German sovereigns. A few details of his career are known. He twice (1199 and 1205) spent some time at the court of the Emperor Philipp; and then lived six years at Eisenach with a generous patron, Hermann, Landgraf of Thuringia. During 1214—1215, he repeatedly visited the Emperor Otho, by whom, as well as by Philipp, he seems to have been treated with unkingly parsimony. From 1217 to 1219, he lived with Duke Bernhard in Carinthia, then returned to Austria, and in 1220 received from Friedrich II. a small estate at Würzburg. He died about the beginning of 1228. His grave has long been pointed out in the Laurence Garden of the cathedral of Würzburg; but a new monument was erected to him in 1843. W. far excelled his master Reinmar, whom he survived about 20 years, both in matter and style; while in richness and versatility of mind all the other Minnesingers must stand far behind him; for, to his wide sympathies and matured art, all themes were alike: tenderness and depth, no less than cheerfulness and gaiety, deep earnestness, as well as playful raillery. He did not confine himself, like Reinmar, to minnelays, but wrote also hymns, eulogies of his patrons, and didactic pieces. He sang of the duties and dignities of the emperor; of the obligations of princes and vassals; of the rights and wrongs of the question between the pope and the emperor; of the glory of the true church; and often his song conveyed earnest and cutting censure. But it was only on conviction that he gave praise or blame, never influenced by favor or prejudice; and his censures of the church were those of a candid but pious believer.

From a decided patriotic feeling, he stood firmly by the empire and the emperor in opposing the pretensions and usurpations of the pope. His writings on this subject had a widespread and powerful effect; they alienated, according to the testimony of a contemporary, Thomasin, thousands from the pope, and determined the politics, so to speak, of the German poets for the whole century. W. was soon recognized by his contemporaries as the master of lyric poetry; and the traditions of the later Minnesinger schools place him among the twelve who, in the Emperor Otho the Great's time, originated and established the noble art of minstrelsy. Lachmann brought out a masterly critical edition of W.'s writings (Berl. 1827, 3d ed. 1853); and Simrock an excellent translation (with explanations by Simrock and Wackernagel, 2 vols. Berl. 1833; 2d ed. Leip. 1853); Uhland wrote a beautiful account of his life and writings (*W. von der Vogelweide, ein altdeutscher Dichter*, Stuttg. and Tüb. 1822); and Hornig, a complete *Glossarium* to his poems (Quedlinb. 1844).—See Reuss, *W. von der Vogelweide* (1843); Daffis (1854), Opel (1860), Rieger (1863), Kurz (1863), and Menzel (1865).

WALTON, Isaak, author of the *Complete Angler*, was the son of one Jervis Walton, a yeoman, and was born at Stafford on 9th of August 1593. Of his earlier life, not much is certainly known. In the year 1624, we find him settled in Fleet Street, London, and carrying on business there as a hosier. In the end of 1626, he married Rachel Floud, a descendant of Archbishop Cranmer. From George Cranmer, her uncle, who had been a pupil and friend of Hooker, it is thought likely that W. derived much of the material for his Life of that eminent man. In August 1640, she died in giving birth to a daughter, having before had two sons, neither of whom survived her. In 1643, W. retired from business with such a modest competence as sufficed for the simple way of life he affected; and in 1647 he married a second time.

The lady was Anne Kern, half-sister of the well-known bishop of that name. She bore to him a daughter and two sons, only one of whom lived, and died in 1662, to the great grief of her husband, who survived her many years. He died on the 15th December 1683, at the great age of ninety, in the house of Dr. Hawkins, his son-in-law, prebendary of Winchester Cathedral, and was buried in the vault of that sanctuary.

With the celebrated Dr. John Donne, who died in 1631, W., who attended his ministry, had been on terms of affectionate intimacy; and on the publication of his sermons in 1640, he was induced to preface them with a Life of the author. This, his first publication, was followed by Lives of Hooker, Sir Henry Wotton, and George Herbert, in succession; the whole four being reissued in a collected edition in 1670. In 1678, the life of his friend Bishop Sanderson, was added. *The Complete Angler, or Contemplative Man's Recreation*, was published in 1655. A *facsimile* of the original edition was published in 1875, and, from first to last, more than fifty editions have appeared. To the edition of 1676, a little treatise on Fly-fishing was added by Walton's friend, Charles Cotton, in a fishing-house built by whom, on the banks of the river Dove, many of the later days of his happy and blameless life lapsed peacefully in the pursuit of his favorite recreation. *The Complete Angler*, as a treatise on the art of angling, may be regarded as in good part obsolete, but it continues and will continue to be read for its charming simplicity of manner, its pastoral freshness and poetry, and the pure, peaceful, and pious spirit which is breathed from its quaint old pages. The Lives, though somewhat less widely known, are in their kind not less exquisite and *unique*. Wordsworth has dedicated to them a beautiful sonnet, in which he speaks of the five saintly names of the subjects of them as

> Satellites burning in a lucid ring
> Around meek Walton's heavenly memory.

WALTZ (Ger. *Wälzer*, literally, roller), a national German dance, said to have originally come from Bohemia. It first became a fashionable dance in the other countries in the early part of the 19th century. It is danced to music of ¾ time by any number of couples, who, with the gentleman's right arm round his partner's waist, wheel rapidly round on an axis of their own, advancing at the same time round the room. Some time ago the *Valse à Deux Temps* was generally adopted—a form of the waltz not so graceful as the older one, because not so correspondent to the rhythm of the music—but this has now given place to the *Valse à Trois Temps*.

WA'MPUM, a name given to shells and shell-beads, used as money, and worn for ornaments in strings and belts by the North American Indians.

WANDERING JEW. See JEW, THE WANDERING.

WANDEROO', a name which has been given to several species of monkey. The species commonly described under the name is *Macacus silenus* or *Silenus veter*, a native of the coast of Malabar,



Wanderoo Monkey (*Macacus silenus*).

a monkey of rather large size, deep black throughout, except a ruff of long gray or white hair, from the midst of which the face looks forth, and which descends over the chest, giving the animal a very peculiar aspect. This monkey exhibits considerable intelligence and docility, and performs its tricks with an absurd air of gravity.—The name W., however, more properly belongs to monkeys of the genus *Presbytes*, natives of Ceylon, to which it is given by the Singhalese, and appears to have been transferred by mistake to the species just described, which is not found in Ceylon. The wanderoos of Ceylon are all small monkeys. The best known species is *Presbytes cephalopterus*, found in the low parts of the island. It feeds chiefly on the berries and buds of trees, and is seldom seen on the ground. Twenty or thirty are generally found together in a troop. When alarmed, they display marvelous agility in leaping, or rather swinging from branch to branch, using their powerful arms alternately, often flinging themselves obliquely so as to catch the lower bough of an opposite tree, and taking advantage of its rebound to carry them up again till they can reach a higher branch; the females, all the while, being often encumbered by their young, which cling to them. This monkey is far from being so mischievous as monkeys in general. 'In captivity, it is remarkable for the gravity of its demeanor, and for an air of melancholy in its expression and movements, which is completely in character with its snowy beard and venerable aspect.'—Tennent's *Ceylon*. Its disposition is extremely gentle and affectionate, it is intelligent and docile, and very cleanly in its habits.—Several other species of W. or *Presbytes* are found in Ceylon, some of them in the more elevated parts of the island.

WA'NTAGE, a market-town in Berkshire, in the Vale of the White Horse, 26 miles west of Reading, and 60 west of London. It manufactures agricultural implements, and has an extensive trade in corn. Pop. (1871) 3295; (1881) 3488.

WA'PENSHAW (Sax. *wæpen*, weapon, and *sceawan*, to show), a periodical gathering of the people, instituted by various Scots statutes, for the purpose of exhibiting their arms, these statutes directing each individual to be armed on a scale proportioned to his property. There are numerous Scots acts of the 15th and 16th centuries regulating the subject of wapenshaws. In the time of war or rebellion, proclamations were issued charging all sheriffs and magistrates of burghs to direct the attendants of the respective wapenshawings to join the king's host. During the reign of the later Stuarts, attendance on the wapenshaws was enforced with considerable strictness; and in addition to military exercises, sports and pastimes were carried on by authority at these gatherings. The Covenanters, in consequence of these sports being of a kind disapproved of by them, did what they could to discourage attendance on the wapenshaws.

WA'PENTAKE (Sax. *wæpen*, arms, and *tac*, touch), a name given in Yorkshire to the territorial divisions of the county, similar to what, in most of the other counties of England, are called *hundreds*, and in the more northern counties, *wards*. The term has come down from Anglo-Saxon times, where it, in the first instance, signified the assemblies of each district held for the administration of justice and like purposes, at which each vassal attended armed, and 'touched' the spear of his overlord, in token of homage. From the assembly, the word was transferred to signify the district within which it was convened.

WA'PITI (*Cervus Canadensis*), a species of deer, nearly allied



Wapiti (*Cervus Canadensis*).

to the stag, but considerably exceeding it in size, being 4½ feet in height at the shoulder. It is a native of North America, found as far south as Carolina, and as far north as 56° or 57° N. lat. It is yellowish brown on the upper part; the sides gray; a pale yellowish patch on each buttock, bounded by a black line on the thigh; the neck, a mixture of red and black, with long, coarse black hair falling down from it in front like a dewlap; a black mark at each angle of the mouth. The hair is crisp and hard, but there is a soft down beneath it. The antlers are large, much like those of the stag, but the first branch bends down almost over the face. The W. is called *Elk* and *Gray Moose* in some parts of America, although very different from the true elk, or moose deer. It is found chiefly in low grounds, or in parts of the forest adjacent to savannahs and marshes. Its flesh is coarse and dry. The hide makes excellent leather.

WAR between states or nations, or between parties in the same state (*civil war*), is analagous to club-law (Ger. *faustrecht*). or the law of the strongest, among the individuals of a community, which is the normal state of things where no legal or fixed rights are established, or where there is no authority to enforce them. The prevalence of war among nations is thus an indication of the imperfection, or the total want, of international law. If the sentiment of brotherhood were universally diffused, and a system of international morality established and generally accepted together with an organization for putting it in force, we can conceive the necessity for war to cease. And although the full realization of this state of things may never be attained, it is nevertheless the ideal goal to which all real progress tends. But it by no means follows that in the present condition of the world, while the sentiment of international justice is yet in embryo, peace at any price is to be preferred to war.

When a community is in a state of anarchy, the individual man must take the law into his own hands, and defend his life and his rights with violence if need be; and nations in similar circumstances must do the same. The Balance of Power (q. v.), the shape in which the sentiment of political morality in Europe seemed at one time trying to crystallize itself, has gone again apparently into chaos.

Wars are various in their occasions and objects, sometimes breaking out in consequence of disputes about territorial possessions or material interests; at other times, having reference to the establishment of some important point of civil or religious liberty. In all cases, the aim of each contending party is to weaken and overthrow the opposing party. At one time, the art of war was supposed to consist very much in wearing out the enemy by a slow process of exhaustion, and thus wars were much protracted; but more recently the greatest generals have adopted the method of rather endeavoring to strike sudden and terrible blows, by which the war is sooner brought to a termination; and this method, although it may often have been adopted without regard to considerations of humanity, is, in all probability, less productive of suffering to mankind than the other.

Amongst rude nations, wars are conducted by tumultuary hosts, suddenly congregated, and in general, either after defeat or victory, soon dispersed. But the wars of the more civilized and powerful nations have long been conducted by armies carefully trained and disciplined; and in the case of maritime powers, by means of fleets at sea as well as of armies on land. Preparation for war amongst such nations requires not only the forming and training of the army, but vast provision in many various ways of the means and *matériel* of war. Much science and skill are also applied to the conduct of military operations, and the principles upon which they ought to be conducted have been carefully investigated, and theories tested by an examination of the history of the most important campaigns. See STRATEGY, TACTICS.

In the progress of society, certain *usages of war* have come to be generally recognized. These, of course, have varied at different times, and in different parts of the world, according to the state of civilization and the prevalent feelings of the time: they are also subject to modification from causes less general. But the changes which have taken place in them during the lapse of ages have been in general favorable to the interests of humanity. Prisoners of war are no longer put to death, nor are they reduced to slavery, as was once very frequently the case, but their treatment has become generally more and more mild and kind. It is a well-understood rule, however, that a prisoner of war obtaining his liberty by exchange or otherwise, with the condition of not serving again during a fixed period against the same power, forfeits his life if he is found so serving and is again taken prisoner. Amongst all civilized nations, quarter is granted in battle whenever it is sought; and there are certain usages universally prevalent with regard to the capitulation of fortified places, and of bodies of troops hopelessly hemmed in by superior forces, &c.

War-cries for mutual recognition and encouragement in battle have always been common, each rude nation or tribe having its own. The ancient war-cry of the English was *Saint George!* that of the Spaniards, *San Jago!* and that of the French, *Mountjoie Saint Denis!* In the fends of the middle ages, each party, or the retainers of each noble family, had a distinctive war-cry. Sometimes the war-cry was the name of the family. Thus, in Scotland, the retainers of the noble Houses of Douglas and of Home rushed into battle with the cry of *A Douglas! a Douglas!* or *A Home! a Home!* The French armies under Napoleon were accustomed to charge with shouts of *Vive l'Empereur!*

The invention of gunpowder has effected great changes in the whole art of war; but the introduction of firearms has rendered battles less sanguinary and ferocious than they previously were. Whilst firearms were yet unknown, warlike engines of various kinds were employed; but close combat was more general, and often more protracted, and the passions of the combatants had thus in ordinary battle more of that exasperation which fearfully characterizes the storming of a town.

WA'RASDIN, capital of a county in the Austrian kingdom of Croatia, upon the right bank of the Drave, and 28 miles north-north-east of Agram. It is to some extent fortified, is surrounded by straggling suburbs, and contains nine churches, a few convents, and a gymnasium. Tobacco, liqueurs, and vinegar are manufactured. Pop. (1880) 11,000.

WARBECK, PERKIN, a pretender to the crown of England, was born in London, though said to have been the son of a Jew of Tournay, where he spent his boyhood. In 1490, he appeared at the court of the Duchess of Burgundy, sister of Edward IV. of England; and here professed to be the Duke of York, the younger of the two sons of Edward IV. murdered in the Tower. In 1492, he landed at Cork, where he was welcomed. Subsequently, he was received at the court of Charles VIII. of France as Duke of York, and from the court of Burgundy, where he was treated as nephew of the Duchess, he went to Kent, and attempted a rising against Henry VII. He next went to Scotland, where James IV. gave him the daughter of the Earl of Huntly in marriage. In 1498, he came to Cornwall, took the title of Richard IV. of England, was taken prisoner, escaped from prison, was retaken, was detected in a plot, and finally executed at Tyburn, 23d Nov. 1499.

WA'RBLER, a popular name often applied to all the birds of the family *Sylviadæ* (q. v.), many of which, however, commonly receive other popular names, as the Blackcap, Nightingale, Hedge-sparrow, Redbreast, Redstart, Stonechat, Wheatear, Whitethroat, &c. (q. v.), while many receive the name Warbler with some adjunct. Several British species, commonly thus designated, belong to the genus *Salicaria*, others to the genus *Sylvia*. The species of the former genus have the tail rounded; in the latter, it is almost square or a little forked. The *Salicariæ* are also inhabitants of moist situations, whence they are known as *Sedge Warblers* and *Reed Warblers;* the *Sylviæ* are inhabitants of woods. Of the former genus is the GRASSHOPPER W. (*Salicaria locustella*), not unfrequent in many parts of England, and found also in the south of Scotland and in Ireland. It is found in most parts of the center and south of Europe, at least during summer, being partially a bird of passage. It is of a greenish brown color, the centers of the feathers dark brown, producing a spotted appearance; the lower parts pale brown. It is a shy bird, hiding itself in hedges and bushes, but very active, often darting out like a mouse from the bottom of the hedge, and receives its name from its chirping, grasshopper-like note.

The SEDGE W. (*Salicaria phragmitis*) is the most common British



1, Sedge Warbler (*Salicaria phragmitis*); 2, Willow Warbler (*Sylvia trochilus*).

species of *Salicaria*, and is generally found in thick patches of reeds or willows in marshes, or in other situations close to water, and where the aquatic herbage is thick and strong. It abounds on the marshy banks of the Thames. It is of a brown color, exhibiting various shades, finely intermixed; the chin and throat white; the under parts buff color.—The REED W. (*Salicaria arundinacea*) is found in summer in marshy situations in the south of England; it abounds in Holland and in many parts of Europe, and its range extends to the north of India. It is of a uniform pale brown, with a tinge of chestnut; the chin and throat white; the under parts pale buff color. Its nest is remarkable; it is attached to the stems of three or four reeds, and formed by winding the branches of their panicles together with a little wool; and is conical and deep, so that the eggs or young may not be shaken out when the reeds are shaken by the wind.—The WOOD W., also known as WOOD WREN (*Sylvia sylvicola*), is common in the wooded districts of England, in summer, particularly in old plantations of oak and beech. It is olive green, tinged with yellow, the wings brown, the primaries and secondaries edged with bright yellow, the ter-

tials with a broader edge of yellowish white; the lower parts yellow and white.



Nest of Reed Warbler.

The WILLOW W. (*Sylvia trochilus*) is very common in the south of England in summer, but more rare in northern parts of Britain. It frequents woods, shrubberies, thick hedgerows, and bushes; but builds its nest on the ground. It is of a dull olive-green color, the wing and tail feathers dark brown, the wing-feathers edged with green; the under parts whitish, slightly tinged with yellow. The tail is slightly notched. There are other British species of more rare occurrence.—Numerous species of W. are found in North America, migratory birds, which spend the winter in more southern regions. Not a few of the same species are therefore reckoned among the birds of the West Indies. Some of the European species are in like manner found in Africa; and Asia has many species of W., among which some of the European species are included. Australia has many species of W., some of which are of very beautiful plumage.

WARBURTON, WILLIAM, a distinguished English divine, commonly known as Bishop Warburton, was born at Newark, in the county of Nottingham, on the 24th December 1698. He was the eldest son of George Warburton, an attorney of that place, who claimed descent from an old Cheshire family. Young W. received his education at the school of his native town, and afterwards at Oakham in Rutlandshire, which he left in the year 1714, returning home to pursue the profession of his father, who had died some years before. Having served the necessary apprenticeship, he practised as an attorney at Newark for some years, but with no distinguished success. His natural bent was towards literature; and he had all along expressed a desire to take orders in the Church of England. Finally, he quitted the legal profession with this object in view; and having gone through the necessary course of study, he was presented, by Sir Robert Sutton, in 1728, to the rectory of Brand-Broughton, in the diocese of Lincoln, where he remained for many years. After publishing some comparatively unimportant pieces, he issued, in 1736, a treatise entitled *The Alliance between Church and State; or the Necessity and Equity of an Established Religion and a Test Law*. This work, which is still recognized as one of the most masterly statements of the subject from the point of view of the writer, drew great and immediate attention; and in January 1737—1738, it was followed by the first volume of the *opus magnum*, on which his fame as a theologian must mainly continue to rest.

This celebrated work, *The Divine Legation of Moses, demonstrated on the Principles of a Religious Deist, from the Omission of the Doctrine of a Future State of Rewards and Punishments in the Jewish Dispensation*, though it encountered a storm of adverse criticism, to which the writer thought it necessary to reply in *A Vindication*, &c., at once established the position of W. as one of the most potent intellects of the period; and though its main argument has since been extensively discredited as more or less 'precarious,' not the less the book, in virtue of its vast learning, its vigor, and originality, will always maintain its reputation, as one of the master-pieces of the great period of our English theology. In 1739, a new and revised edition of the first part of the work appeared. This was followed, in 1741, by the publication of the second part; and the third and concluding section, rather supplementary to the argument than essential to it, was only given to the world after the death of the writer.

Becoming involved in the controversy which followed the appearance of Pope's *Essay on Man*, W. undertook the defence of the poet, and, in 1739—1740, issued a series of seven letters, entitled *A Vindication of Mr. Pope's Essay on Man, by the Author of the Divine Legation*. The poet was much gratified; and between him and his vindicator a warm friendship was the result, which only terminated with the death of Pope, in 1744. He died, bequeathing to W. one-half of his library, and such profit as might accrue from any edition of his works published after his death. To Pope, W. was indebted for opportunities of cultivating the friendship of some of the most distinguished men of the time—among others, of the well-known Ralph Allen, of Prior Park, near Bath, to whose niece, Miss Gertrude Tucker, he was married in 1745.

Though W.'s important services to literature and religion were admitted, they did not for a long time bring him any very great recognition in the way of substantial preferment. On the appearance of *The Divine Legation*, indeed, he had been appointed Chaplain to the Prince of Wales; and in 1746, nearly ten years later, the Society of Lincoln's Inn unanimously elected him to be their preacher. In 1757, he was promoted to the deanery of Bristol; and finally, in 1760, Mr. Pitt, afterwards Earl of Chatham, bestowed on him the bishopric of Gloucester, declaring that 'nothing of a private nature, since he had been in office, had given him so much pleasure' as this exercise of his patronage. In the later years of his life, his mind became seriously impaired; and he was utterly prostrated by the loss of his only son, whom he did not long survive. He died on 7th June 1779.

W. was a keen polemic, and deeply engaged in all the intellectual warfare of his time. In nearly everything he wrote, there is the impress of a vigorous and fertile mind, with an arrogance of tone, which tends, in his treatment of adversaries, to degenerate into truculence and scurrility. In addition to those already mentioned, it seems sufficient to give the titles of a few of his more notable performances. In 1750, appeared his *Julian, or a Discourse concerning the Earthquake and Fiery Eruption which defeated that Emperor's Attempt to rebuild the Temple at Jerusalem, apropos* of Dr. Middleton's *Inquiry concerning the Miraculous Powers of the Christian Church*. Shortly after came two volumes entitled *The Principles of Natural and Revealed Religion occasionally Opened and Explained;* and in 1755, *A View of Bolingbroke's Philosophy, in a Series of Letters to a Friend*, which was held to be much the ablest of all the answers to Bolingbroke which appeared. In 1757, he attacked Hume, in a publication entitled *Remarks on Mr. David Hume's Natural History of Religion, by a Gentleman of Cambridge, in a Letter to the Rev. Dr. Warburton*. The blind deceived no one; and if we may estimate the success of the attack by the annoyance it gave the philosopher, his allusions to 'that low fellow Warburton' may be held to indicate success. In 1747, he went somewhat out of his way to issue an edition of Shakspeare, with notes critical and emendatory, which last, though ingenious, and occasionally happy, did not greatly add to his reputation. A complete and splendid edition of his works was published in 1788, at the expense of his widow, by his friend, Bishop Hurd.

WARD, ARTEMUS. See BROWNE, C. F.

WARD, EDWARD MATTHEW, R.A., a painter, was born in 1816, in London. He early displayed a taste for art, and was educated in a way to develop it. In 1834, he was sent to study at the Royal Academy; and two years after, he went to Rome, where he remained for some time, gaining, in 1838, a silver medal, given by the Academy of St. Luke. He returned to England in 1839, making on the way a short visit to Munich, where he had lessons in fresco-painting from the celebrated Cornelius. After his return, he annually exhibited pictures at the Royal Academy, though for some years without any very decisive recognition. In 1843, he competed unsuccessfully for the decoration of Westminster Hall and the Houses of Parliament, his large cartoon specimen, 'Boadicea,' being generally adjudged a failure. In the same year, however, he made a very 'palpable hit' by his picture, familiar to every one as engraved, 'Dr. Johnson perusing the Manuscript of the *Vicar of Wakefield*.' His steady progress thenceforward, in the estimation of connoisseurs and the public, is sufficiently marked by the fact, that in 1853, having previously, as we noted above, failed in the public competition for the work at Westminster, he was solicited by the Fine Arts Commissioners to aid in this national undertaking. Of the eight pictures which he engaged to furnish, two were done in oils and two in water-glass. The merit of all eight is unquestioned; and one of them in particular, 'The Last Sleep of Argyll,' is ranked by competent judges as one of the most masterly works in this kind which our country has as yet produced. In further recognition of his merits, Mr. W. was, in 1847, elected an Associate of the Royal Academy; and in 1855, he attained the full honor of Academician. Of the works of an artist so well known, it would be idle to attempt a catalogue.

A few of the more notable are—'The Fall of Clarendon,' 'Interview between Charles II. and Nell Gwyn,' 'The Royal Family of France in the Prison of the Temple,' 'Charlotte Corday led to Execution,' 'Jeanie Deans,' 'The Earl of Leicester and Amy Robsart,' 'Juliet and the Friar,' 'Luther's First Study of the

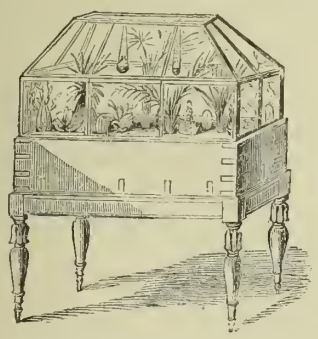
Bible,' 'Baxter and Jeffreys,' and 'Doctor Goldsmith.' In technical execution, W. is a master; but he often fails a little on the side of penetrative power and imaginative realization. He died from a wound inflicted by his own hand, 15th Jan. 1879. His wife, HENRIETTA WARD, is also favorably known as a painter, and is the grand-daughter of James Ward, R.A.

WARDEN, an officer appointed for the naval or military protection of some particular district of country. In order to keep the districts of England adjoining to Scotland and Wales in an attitude of defence, great officers, called Lords Wardens of the marches, were appointed, to whom the duty of protecting the frontier was committed. From this source originated the name *ward*, applied to the subdivisions of the counties of Cumberland, Westmoreland, and Durham—a term afterwards extended to divisions of a city, town, or burgh, adopted for municipal purposes. The custodier of Dover Castle was created by William the Conqueror warden of the Cinque Ports (q. v.), and guardian of the adjacent coast; an office comprising extensive jurisdiction, civil, naval, and military, the greater part of which was taken away by 18 and 19 Vict. c. 48.—As to the Lord Warden of the Stannaries, see STANNARIES.

WAR DEPARTMENT, the entire administration of the military affairs of the nation. It includes the purely military command under the COMMANDER-IN-CHIEF, and the civil administration under the Surveyor-General of the Ordnance, and the Financial Secretary. This latter includes the manufacture of warlike stores, and their custody; the formation of defensive works; the paying, feeding, punishing, curing, arming, carrying, &c. of the army. The National Surveys form also a part of this department. The whole department is controlled by the Secretary of State for War. See WAR OFFICE.

WA'RDHOLDING, the military tenure of land in Scotland under the feudal system, by which the vassal was bound to serve the superior in war whenever called on to do so. As the military duties of the vassal could not be performed when he was under age, the superior had a right both to the guardianship of his person and to the possession of his fee during his minority. An arrangement, however, was frequently made by which this right was commuted into an annual payment, in which case the fee was said to be held in *Taxed Ward*. When an unmarried vassal succeeded, the superior was entitled to a sum proportionate to the value of the estate, called the *Avail of Marriage;* and a large sum, called the *Double Avail of Marriage*, was due when the superior named a wife for his vassal, and the vassal, rejecting her, married another woman. If a vassal alienated his lands or the larger portion of them without consent of his superior, the fee fell to the superior by what was called the casualty of *Recognition*, which was a check on vassals impoverishing themselves to such an extent as would render them unfit to perform feudal services. Wardholding was abolished by 20 Geo. II. c. 50, as a system hazardous to the public tranquillity, such fees as were held ward of the crown being converted into Blanch (q. v.) holdings, and those held of subjects becoming feu-holdings, a yearly sum being made payable to the superior, as a recompense for the casualties which were done away with.

WA'RDIAN CASES, close glass cases placed upon a trough containing soil, and accurately fitted to it, intended for the growth



Wardian Case.

of plants in the windows of apartments. Remarkable success has attended the use of them even in the smoky atmosphere of the largest towns. Ferns and other plants may now be seen in great beauty and luxuriance in these cases in the windows of houses in London and in all the cities of Britain. They are especially adapted to those plants which require an atmosphere more moist than that of an inhabited apartment can ordinarily be. They derive their name from the inventor, Mr. W. B. Ward of London. To the success attending them, the invention and frequent use of *vivaria* for marine animals is with great probability attributed.

WARDLAW, RALPH, D.D., the most celebrated preacher and theologian in the roll of Scotch Independents, was a Seceder by extraction, and studied in connection with the Associate Secession Church. Before he had completed his curriculum, however, he had convinced himself that congregational independency was the scriptural system of church government. In 1800, he began to preach, and after some time settled in Glasgow as pastor of an Independent church. In 1811, he was appointed Professor of Theology to the Congregational body in Scotland, in conjunction with the Rev. Greville Ewing; an office he retained, along with his pastorate, to the period of his death, which happened on the 17th December 1853. W.'s life was a very laborious and earnest one. Besides discharging faithfully and ably the duties of the pulpit and the professor's chair, he was a voluminous author, often involved in theological controversy, and a prominent actor in the public religious and philanthropical movements of the day. His intellect was acute, his understanding sound, and his style remarkable for its perspicacity, vigor, and grace. The most important of W.'s works are: *Discourses on the Socinian Controversy* (1813); *Lectures on Ecclesiastes* (2 vols. 1821); *Essays on Assurance of Faith, and on the Extent of the Atonement and Universal Pardon* (1830); *Discourses on the Sabbath* (1832); *Christian Ethics* (1833); *Discourses on the Nature and Extent of the Atonement of Christ* (1843); *The Life of Joseph and the Last Years of Jacob* (1845); *Congregational Independency* (1848); *On Miracles* (1852).—See *Life and Correspondence of Ralph Wardlaw*, by Dr. Alexander (1856).

WA'RDÖEHUUS, a seaport in Norway, at the east extremity of Finmark, stands on the island Wardöe or Vardöe, and is protected by a fort, the most northerly fortification on the globe, being in lat. 70° 22'. The inhabitants, inclusive of the garrison of 24 men, number only 120. Not even potatoes or barley comes to maturity; and the few cows that are kept have sometimes to be fed on herrings.

WA'RDSHIP, in English Feudal Law, was the guardianship which the feudal lord had of the land of his vassal while the latter was an infant or minor. Until the majority of the infant, the lord, out of the profits, provided a fit person to render the services incumbent on the vassal. See TENURE, WARDHOLDING.

WARE a small market-town in Herts, 2½ miles north-east of Hertford. Malting, for which there are several establishments, most of them engaged in supplying the London breweries, is the principal employment. There is a silk-mill here, employing 200 hands, and two large paper-mills. In one of the inns of the town, is still to be seen the famous Bed of Ware, for a notice of which, see BED. Pop. (1871) 4917; (1881) 5276.

WA'REHAM, an exceedingly ancient though small town of Dorsetshire, stands between the rivers Piddle and Frome, 14 miles nearly due east from Dorchester. It was a British town, and afterwards a Roman station, and is surrounded by a British vallum or rampart of earth, which, although extremely ancient, is still about 30 feet high, and is perfect on three sides. The chief trade is the export of potter's clay; there are also breweries, malthouses, and brick-fields. The borough, comprising the parishes of Holy Trinity, Lady Saint Mary, Saint Martin Arne, Bere Regis, Corfe Castle, and parts of the parishes of East Stoke and Morden, sends a member to parliament. Pop. (1881) 6102.

WA'REHOUSING SYSTEM is a plan for lessening the pressure of excise or customs duties by postponing payment of them until the goods they are laid on pass to the consumer, or, at all events, to the retail dealer. A merchant who might import a thousand pounds worth of wine or tobacco, if he only paid duty on it by installments as it went out to the dealer, would be quite unable to import so much if he had to pay somewhere from one to five thousand pounds of duty on its arrival. The system of bonded warehouses was hence adopted. The taxable commodity thus came to be locked up in a government warehouse, and the duty to be paid on its removal, along with a proportional fee or rent for the custody of the article, or its accommodation in government premises. Bonding in this manner was part of the scheme of Sir Robert Walpole in 1733, generally known as the Excise Scheme, which was defeated from its unpopularity. The system was first authorized by an act of George III. in 1802. When the customs laws were from time to time consolidated, the Warehousing Act formed a portion of the consolidation. In the consolidation of 1846, there was a separate 'Act for the Warehousing of Goods.' In the latest consolidation of 1853, the warehousing system is embodied in clauses 41 to 113 inclusive of the general 'Customs Consolidation Act' (16 and 17 Vict. c. 107). This process, by which the crown holds in custody the goods of private persons, has produced some curious effects on mercantile law and trading practices. When transactions have taken place about bonded goods, should they be injured or destroyed, it may come to be a question of nice adjustment who is to bear the loss, seeing there is not possession to show ownership; and still nicer questions sometimes arise as to whether such goods are or are not part

of a bankrupt estate. There is a difficulty in securing money upon goods without transferring their absolute possession, as in the case of pledging or pawning. The warehousing system, however, by retaining the goods for the owner, whoever he may be, has created a complete system of paper-money in the transference of the title-deeds, as they may be called, of such goods—the dock-warrants or other documents—the possession of which is equivalent to possession of the goods.

WARHAM, WILLIAM, Archbishop of Canterbury from 1503 to 1532, was born about 1450 at Church Oakley in Hampshire, and studied at Winchester and New College, Oxford. He qualified to practise law, became known to Henry VII., and was attached to an embassy to the court of Burgundy. He also took holy orders. His services in connection with Perkin Warbeck's claim to the crown obtained for him rapid preferment in church and state, and he was soon Bishop of London and Lord Chancellor (1502), and then primate (1503). He fell into disfavor with Henry VIII., and in 1515 resigned the great seal to Wolsey. He was a close friend and favorer of the New Learning and of its apostles in England, Erasmus, Dean Colet, Grocyn, and Linacre. In regard to the divorce of Catherine of Aragon, he passively supported the king, and he agreed to recognize the king's supremacy. He was disposed to reform in the church in the same sense and measure as Erasmus was; but would never have become a 'reformer,' as the word soon came to be understood. He died 22d August 1532.

WARM-BLOODED ANIMALS. Under this title are included those vertebrates which possess a four-chambered heart and spongy lungs; the heart and lungs being so arranged that the whole of the venous or impure blood is propelled over the large but closely-packed capillary area of the lungs, by successive contractions of a special ventricle, receiving it from a distinct auricle (these being called the right or pulmonary ventricle and auricle), while the blood thus purified by the action of the air in the lungs is conveyed to another auricle, and propelled over the whole system by a second distinct ventricle (these being known as the left or somatic auricle and ventricle). The only animals which exhibit these structural peculiarities are mammals and birds. In man and in the ox, the mean temperature of the interior of the body is 100°; in the mouse, it is 99°; while in the whale it is 103°. In birds, it ranges, in different species, from 106° to 112°. The warm-blooded animals present, however, gradations of their heat-making power. In the hybernating animals, there is commonly a loss of heat, of from 10° to 20°, during their winter-sleep; and in the bat, the temperature falls to 40°. In the cold-blooded animals, the fishes, amphibians, and reptiles, the temperature of the blood rarely exceeds that of the surrounding medium. For the general characters of the warm-blooded animals, the reader is referred to the articles BIRDS and MAMMALIA.

WARMING AND VENTILATION. WARMING.—A certain temperature, constant within narrow limits, is essential for the life of warm-blooded animals, and the heat by which this temperature is maintained is produced by the vital actions of the body itself. See ANIMAL HEAT, TEMPERATURE OF THE BODY. In the case of man, however, at least in ordinary climates, and in the civilized condition, the heat of the body, if allowed freely to escape, would be dissipated faster than it is produced; and hence arises the necessity of clothing, houses, and other means of retarding its escape. To allow the body to continue depressed in temperature beyond the natural state, instead of hardening, infallibly weakens its vitality, and sows the seeds of disease; and that this error is committed on a vast scale, in Britain more especially, is apparent enough. The Reports of the Registrar-general show that, exactly as the thermometer sinks, the rate of mortality rises and certain diseases of the most fatal kind become more prevalent; the vitality, in short, of the community decreases as the warmth of the atmosphere decreases. Could this be, if the means taken to arrest the waste of heat from our bodies, or to supplement it, were not, for the majority of men and women, insufficient, or injudiciously managed? This is a matter of literally 'vital' moment to one and all. The economy of heat is a primary element in the art of living in health and comfort; and 'no knowledge of common things' that we can think of can surpass in importance a right understanding of the principles and facts on which that art rests.

Where fuel is scarce the resource against the cold of winter is thick clothing indoors as well as out. This is said to be the regular practice in China; and even in the south of Europe, fires are dispensed with in weather when we should think them absolutely necessary, and additional wrappings are considered as appropriate while sitting in the house, as in the open air. But wherever fuel can be had, it is always preferred to wear within doors much the same clothing in winter as in summer, and to keep the apartments nearly at summer temperature by artificial heat. It is this special branch of the subject, viz., the artificial warming of apartments, that we are at present to consider; and in doing so, we presume the reader to be acquainted with the more general facts regarding the generation of heat by combustion, and its diffusion, as stated in the articles COMBUSTION, FLAME, FUEL, HEAT.

The great aim, it may be premised, in all plans of warming is, as it is expressed by Dr. Arnott, '*to obtain everywhere on earth at will, the temperature most congenial to the human constitution, and air as pure as blows on a hill-top.*' The obtaining of the desired temperature would be comparatively easy by itself; the difficulty lies in combining warmth with pure air. Warming and ventilation are thus in some degree antagonistic operations, and are therefore best treated in one article. The various plans of warming hitherto tried may be classed under the four heads of—The Open Fire, Stoves, Gas, Steam and Hot Water.

The Open Fire.—The first application of artificial warmth consisted, most likely, in lighting a fire of dried sticks and leaves in a grove, a cave, or other natural shelter. When tents or wigwams came to be erected, the fire would be lighted on the middle of the floor, with perhaps a hole in the roof for the smoke to escape by. This primitive arrangement may still be seen in some of the cabins of Ireland and the Scottish Highlands. The Romans warmed their apartments chiefly by portable stoves or chafing-dishes, without any regular exit for the smoke and fumes; and a brasier of charcoal is still the chief means of heating sitting-rooms in Spain and Italy, which are in general without chimneys. The Chimney (q. v.) is a modern invention.

The open coal-fire glowing in a grate, which is the prevalent mode of warming dwelling-houses in Britain, has an air of cheerfulness and comfort, and a power of concentrating the whole family in one social circle, that make it almost an object of worship; but it is not without serious drawbacks, the most serious of which is the waste of fuel it occasions. About one-half of the heat produced by a common fire ascends with the smoke—the black part of the smoke itself being an unconsumed part of the fuel—while about a fourth of the heat which is radiated into the apartment is, in ordinary circumstances, carried into the chimney between the fire and the mantel-piece, and thus lost. It was calculated by Dr. Arnott, that only about one-eighth part of the heat-producing power of the fuel used in common fires is realized, all the rest being dissipated into the surrounding atmosphere. A common fire gives also a partial kind of warmth, heating the side of the body next to it, but leaving the rest cold; and it produces draughts into our rooms which are anything but safe or agreeable. Notwithstanding these and other acknowledged evils, the open fire continues to hold its place, partly perhaps from prejudice, partly from real points of superiority over other methods as yet practised; and the object of late has been, not so much to do it away, as to improve it.

Grates.—One improvement consists in diminishing the quantity of metal in immediate contact with the fuel, and forming the back and sides of the grate of fire-bricks. The bricks act like clothing, and keep in the heat of the coals, thus rendering the combustion more complete, and the fire far hotter; while iron, being a good conductor, runs away with the heat as fast as it is generated, and passes it into the wall, making the coals that touch it dull and black. The same quantity of fuel, therefore, burned in a brick-lined grate, not only produces more heat, but throws a greater proportion of that heat out into the room, and less up the flue and through the wall, than when it is surrounded by a mass of iron; for radiation depends more upon the intensity of heat than upon its quantity.

Another point deserving attention is the shape given to the chimney-mouth, or recess above the grate. When the sides are square with the back, none of the heat falling on them is given out again into the room. With a view, therefore, to throw out the heat better, the sides, or *covings*, as they are called, are inclined to the back at an angle of about 130°; and sometimes they are made curved and of polished metal, in order that they may reflect the heat without absorbing it. It is questionable if simple brick slabs, placed at the proper angle, do not throw out more heat than the most splendid polished metal plates; for though the bricks do not reflect the rays of the fire, they become heated themselves, and then radiate their heat into the room. Plates of rough metal absorb the heat that falls upon them as the brick does; but being good conductors, the heat passes through them into the wall, and thus they never become hot enough to radiate sensibly.

Much also depends upon the shape of the fire-box, or grate itself. To see the importance of this, it is necessary to attend carefully to the exact way in which an open fire heats a room. It does so almost entirely by the rays of heat that it throws out; and these rays do not warm the air directly; they pass through it like light through glass, just as the hottest rays of the sun pass through the upper atmosphere, leaving it cold enough to freeze mercury. It is only when the rays of the fire fall on the floor, furniture, and walls of the room, that they give out their heat; and it is by coming in contact with these solid heated bodies that the air is gradually warmed. We may thus see the necessity of having a

fire lighted and burning brightly for a considerable time before the hour when the apartment is expected to be comfortable.

The law that radiant heat neither affects nor is affected by the surrounding air, also explains the fact that an apartment may feel very cold, though the air in it be at high summer heat. A church or other massive stone building in frosty weather may be filled with artificially-heated air and yet retain its chilling effect for many hours. The warmth of the living body is lost in two ways: the film of colder air that touches it receives part of its heat by conduction, and rising up makes room for another film to do the same; a moderately heated body in cooling, is robbed of about half its heat in this way. The other half is given off in rays, which pass through the air, and impinge upon the objects around. These objects are radiating back heat in return; but their temperature being low, the return is small, and the warmer body is colder by the difference. Hence we are chilled by a cold wall or a cold window without touching it, and though the air between us and it may be at 70°.—To return to the shape of the grate.

The chief object is to present as large a surface as possible of glowing fire to the front. With this view, the grate is made long and deep, in proportion to its width from front to back. This principle, however, is carried too far in many grates. The stratum of fuel is too thin to burn perfectly, especially in the narrow angles at the sides, where the coals seldom get to a red heat, and are only warm enough to distil away in smoke. Such fires are constantly going out, and are further from being economical than a square box.

The practice recently come into vogue of placing grates almost on a level with the floor, is also a mistake. The floor and the lower part of the person receive no share of the radiant heat.

The chimney-throat, instead of a gulf drawing in a constant wide current of the warm air of the room, and causing draughts from windows and doors towards the fireplace, should just be sufficient to admit the burned gases and smoke that come directly from the fire, and no more. See CHIMNEY. This is the object of the movable plate in what are called *register-grates*.

It would be endless to attempt to enumerate the various forms of grate constructed, with more or less success, on the above principles. We shall content ourselves with a notice of the recent invention of the late Dr. Arnott, to whom the subject of warming apartments is more indebted than to any individual since the days of Count Rumford. It comes nearer to the idea of perfection in an open fireplace than any previous contrivance. Its peculiar advantages will be understood from the following description:

Arnott's Smokeless Grate.—ab, *ef* (fig. 1), represent the front

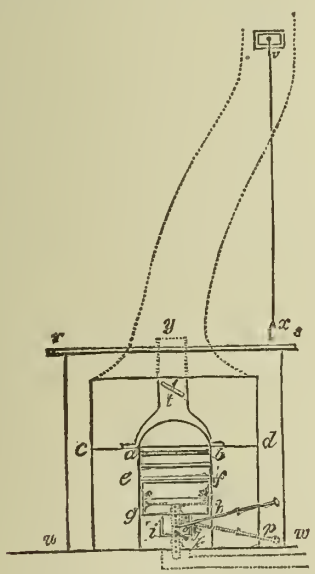


Fig. 1.

bars of a grate in a chimney of the usual construction, *rswu*. The grate has no bottom, and below it is an iron box, open only at top, into which the charge of coal for the day—from twenty to thirty pounds—is put. Any kind of coke or coal may be used. To light the fire, the usual quantity of wood is laid on the surface of the fresh coal at *ef*, and a thickness of three or four inches of cinders or coked coal, left from the fire of the preceding day, is laid over all. 'The wood being then lighted, very rapidly ignites the cinder above, and at the same time the pitchy vapor from the fresh coal below, rises through the wood-flame and cinders, and becomes heated sufficiently itself to become flame, and so to augment the blaze. When the cinder is once fairly ignited, all the bitumen rising through it afterwards burns, and the fire remains smokeless.'

As there is no supply of air but through the bars in front, the box being close underneath, the fire must be gradually raised up as the combustion goes on; and this is effected by having a false bottom, *ss*, in the box, which can be moved like a piston by means of a rod. The rod has notches in it, and, by means of the poker used as a lever, can be raised up and then retained at any height by a rachet-catch. When the piston comes level with the bottom bar of the grate, the coals may be replenished while the fire is burning, by pushing in a flat shovel over the piston, so as to form a temporary bottom to the grate, and support the fire, while the piston is allowed to descend to the bottom. The shovel is then raised up a little in front, or a part of the upper edge of the box is made to fold down, and fresh coals are shot into the box; on which the shovel is withdrawn, and the combustion goes on as before.

'A remarkable and very valuable quality of this fire is, its tenacity of life, so to speak, or its little tendency to be extinguished.' Even after it sinks below the level of the box, it does not go out, but continues to smoulder slowly for a whole day or night, and is ready to burn up actively when the piston is raised.

Another peculiarity of the Arnott grate is the means taken to diminish the proportion of the heat usually carried up the chimney. Of the thick column of smoke that issues from a common chimney-can, only a small fraction is true smoke or burned air; the rest consists of the warmest air of the room, which becomes mixed with the true smoke in the large space usually left between the top of the fire and the throat of the chimney. 'The whole of the air so contaminated, and which may be in volume twenty, fifty, or even a hundred times greater than that of the true smoke, or burned air, is then all called smoke, and must all be allowed to ascend away from the room, that none of the true smoke may remain. It is evident, then, that if a cover or hood of metal be placed over a fire, as represented by the latters *yab* in the diagram—or if, which is better, the space over the fire be equally contracted by brickwork, so as to prevent the diffusion of the true smoke, or the entrance of pure air from around to mix with it, except just what is necessary to burn the inflammable gases which rise with the true smoke—there will be a great economy. This is done in the new fireplace, with a saving of from one-third to one-half of the fuel required to maintain a desired temperature. In a room, the three dimensions of which are fifteen feet, thirteen feet and a half, and twelve feet, with two large windows, the coal burned to maintain a temperature of 65° in cold winter days has been eighteen pounds for nineteen hours, or less than a pound per hour.'—Arnott's *Warming and Ventilation*.

The hood is furnished with a throttle-valve or damper *t*, having an external index, showing its position, so as to give complete control over the current. The provision made for ventilation in this fireplace is considered further on.

Even in this, perhaps the most economical form of open fire yet contrived, there is still great waste of the heat actually produced by the combustion. To say nothing of what passes by conduction from the fire itself into the wall, and is mostly lost; the quantity carried off in combination with the hot gases, though no more air is allowed to enter than is necessary for complete combustion, is still great. It deserves being noticed, that the proportion thus carried off is greatest in the case of fuel that burns with flame. Experiment shows that a fire of wood radiates one-quarter of its heat, the rest flying up; while the radiation from wood-charcoal is one-half of the whole heat produced. Every one has felt that a *blazing* fire has far less warming effect than a glowing one. Not that flame has not intense heat in it—more intense even than a glowing fire; but it gives it out only by contact, and not by radiation. It thus appears that any mode of heating that depends upon direct radiation, as the open fireplace chiefly does, necessarily involves great waste of fuel. This can be avoided only by applying the heat on a different principle, which consists in first making the fire heat certain apparatus with considerable surface, which then, by radiation and contact with the air of the apartment, diffuses its heat throughout it. This is the principle of the other methods of warming, which we now proceed to describe. The consideration of methods that combine the two principles, will come most conveniently last.

Warming by Stoves.—A *close stove* is simply an enclosure of metal, brick, or earthenware, which is heated by burning a fire within it, and then gives out its heat to the air by contact, and to surrounding objects by radiation. The simplest, and, so far as mere temperature is concerned, the most effective and economical of all warming arrangements, is what is called the Dutch stove; which is simply a hollow cylinder or other form of iron standing on the floor, close at top, and having bars near the bottom on which the fire rests. The door by which the coals are put in being kept shut, the air for combustion enters below the grate; and a pipe, issuing from near the top, carries the smoke into a flue in the wall. If this pipe is made long enough, by giving it, if necessary,

one or more bends, the heated gases from the fire may be made to give out nearly all their heat into the metal before they enter the wall; and thus the whole heat of the combustion remains in the room.

The great objection to this form of stove is, that the metal is apt to become overheated, which not only gives rise to accidents, but has a hurtful effect upon the air. The exact nature of the change that highly heated metal produces upon air is not very well understood. It cannot be said to burn it, in the proper sense of the word, for none of its oxygen is abstracted, but it gives it a peculiar odor, which is both unpleasant and unwholesome. This is thought to arise in some measure at least from the hot iron burning the particles of dust that light on it, which particles consist of organic matter, such as wool, wood, &c.

Part at least of the unwholesomeness of air so heated arises from its excessive dryness; it parches and withers everything it touches, like the African simoom. It must not, however, be supposed that this is peculiar to air heated by contact with metal; *air suddenly heated is always unwholesomely dry*. This is an important point in regard to the subject of warming, and requires consideration. A cubic foot of air, say at 32°, can contain a certain quantity of moisture and no more; but if heated to 80°, it is capable of containing *five* times as much, and has thus become *thirsty*, and drinks up moisture from everything that contains any. The heating of air, therefore, does not dry it, in the sense of taking moisture from it, it only renders it greedier of more; and this is equally true whether it is heated by a stove or an open fire. The chief difference is, that in the latter case the warming is more gradual, and no part of the air becomes very highly heated; while the air that touches a metal plate near redness is all at once rendered intensely thirsty, and before its fierceness is tempered by thoroughly mixing with the rest of the atmosphere of the room, must be highly pernicious. But whenever the temperature within doors is much higher than without, the air is in a too thirsty state, and parches the skin and lungs, unless means be taken to supply the necessary moisture. *An evaporating pan or other contrivance is an essential part of warming apparatus;* it is specially necessary to attend to this during east winds, which are generally too dry even at their natural temperature.

All improvements on this simple and rude form of stove aim at avoiding a high heat in the warming surface, and this chiefly by lining the fire-box with brick, and enclosing it in several casings, so as to enlarge the heated surface. A general notion of these contrivances may be got from the annexed cut (fig. 2), representing the kind of stove called a *cockle*. The fire is burned in a small furnace within the inner case, and the air is warmed by circulating between the inner and outer cases. When placed in the apartment or hall to be warmed, the outer casing has perforations about the top for the issue of the warm air. For heating churches and similar buildings, the stove is placed in a separate furnace-room, and the warm air is conveyed to the different parts of the building in pipes or flues, while fresh air is drawn to the stove through a channel or culvert leading from outside the building to the openings in the outer casing, where the arrows are seen entering.

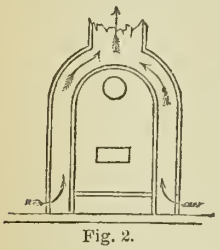


Fig. 2.

The stove invented by Dr. Arnott is upon the same principle of an extensive and moderately warm heating surface. Under a sense of professional honor, Dr. Arnott did not take out a patent for his stove; it was therefore made by many furnishing ironmongers in the metropolis and elsewhere, some of whom took out patents for what they considered as improvements upon it. No fewer than twelve patents were taken out in one year for modifications of this stove, *all of which Dr. Arnott considered to be upon false principles*. The consequence has been, that many Arnott stoves, which had been introduced into houses, have been given up on account of the inconvenience felt from the species of heat which they generated. It is also, however, to be observed that the stove, made even upon the most approved principles, requires certain adjuncts and conditions in order to operate healthfully and agreeably.

The accompanying figure represents the Arnott stove in the most improved form given to it by the inventor. We give the description in his own words. 'The complete self-regulating stove may indeed be considered as a close stove, with an external case, and certain additions and modifications now to be described. The dotted lines and small letters mark the internal stove, and the entire lines, the external case or covering. The letters ABCD mark the external case, which prevents the intense heat of the inner stove, *abcd*, from damaging the air of the room. F is the regulating-valve, for admitting the air to feed the fire. It may be placed near the ashpit door, or wherever more convenient. The letters *ff* mark the fire-brick lining of the fire-box or grate which prevents such cooling of the ignited mass as might interfere with the steady combustion. H is a hopper, or receptacle with open mouth below, suspended above the fire like a bell, to hold a sufficient charge of coal for 24 hours or more, which coal always falls

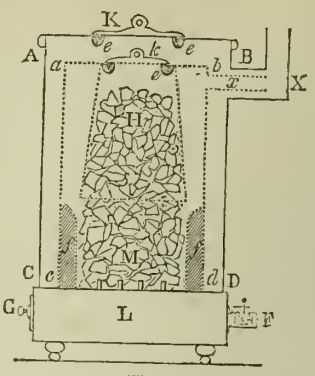


Fig. 3.

down of itself, as that below it in the fire-box is consumed. The hopper may at any time be refilled with coal from above, through the lid, *k*, of the hopper, and the other lid, K, of the outer case. These lids are rendered nearly air-tight by sand-joints; that is, by their outer edges or circumference being turned down, and made to dip into grooves filled with sand, as at *e*, *e*. The burned air or smoke from the fire, M, rises up in the space between the hopper and the inner stove-case, to pass away by the internal flue, *x*, into the other flue, X, of the outer case. L is the ashpit under the fire-bars. G is the ashpit door, which must be carefully fitted to shut in an air-tight manner, by grinding its face or otherwise. M is the coal intensely ignited below where the fresh air maintains combustion, but colder gradually as it is further up. Only the coal in the fire-grate below, where the fresh air has access to it through the fire-bars, can be in a state of active combustion.' The self-regulating valve above mentioned is an ingenious contrivance by which the passage for the air is rendered narrower according to the force of the draught. Dr. Arnott describes various other plans of effecting the self-regulation of the combustion.

A drawer inserted into the heated chamber of the stove would serve for cooking meat, and a pot for boiling might be placed upon the fire-box; it is therefore, as the inventor remarks, peculiarly the *poor man's* stove. Or, by making the space between the two casings water-tight, a *water-stove* is produced, which, besides securing a regulated heat, offers many other conveniences.

In Russia, many parts of Germany, and other northern countries of Europe, the stoves are usually built of brick, covered with porcelain. They are of the size of a large and very high chest of drawers, and usually stand in a corner of the room. The fire is burned in a furnace near the bottom, and the heated smoke is made repeatedly to traverse the structure from side to side, along the winding passage, before it reaches the top, where a pipe conveys it, now comparatively cold, into a flue in the wall. The heated mass of brick continues to warm the room long after the fuel is burned. It is generally sufficient to warm the stove once a day. The same quantity of wood burned in an open grate would be consumed in an hour, and would hardly be felt.

Open-fire Stoves.—As a specimen of the numerous plans for combining the advantages of the stove and the open fire, we may take Sylvester's stove or grate, which is thus described in Ronalds and Richardson's *Technology:* 'The fuel is placed upon a grate, the bars of which are even with the floor of the room. The sides and top of these stoves are constructed of double casings of iron, and in the sides a series of vertical plates, parallel with the front facing, are included in the interior, which collect, by conduction, a great portion of the heat generated from the fire—the mass of metal of which these are composed being so proportioned to the fuel consumed, that the whole can never rise above the temperature of 212° F. under any circumstances. The sides and top of the stove are thus converted into a hot chamber, offering an extensive surface of heated metal; at the bottom, by an opening in the ornamental part, the air is allowed to enter, and rises as it becomes warmed, traversing in its ascent the different compartments formed by the hot parallel plates, and is allowed to escape at the top by some similar opening into the room.' The Sylvester stove can either be placed in an ordinary chimney recess, or be made to stand ornamentally forward into the room. The feeding-draught may be either taken directly from the apartment, or brought by flues from the outside of the building.

The idea of having an air-chamber behind and around the fireplace, from which warm air would issue into the room, thus saving part at least of the vast amount of heat that is lost by passing through the wall, is not new, having been put in practice by the Cardinal Polignac in the beginning of last century. But the way

to carry the principle out to the full would be to have the open fireplace in a pier of masonry standing isolated from the wall, like a German porcelain stove. A very small fire would keep the whole mass mildly heated. The pier could receive any shape, so as to give it architectural effect; and it might either terminate in the room—the smoke, after parting with most of its heat, being conducted by a pipe into the wall—or it might be continued into the story above, where its heat would still be sufficient to warm a bedroom. An Arnott smokeless grate, set in the pedestal of an ornamental column, which might either stand in front of the wall or in a niche in its depth, might be made the *beau-idéal* of comfort, economy, and elegance.

Warming by Gas.—A prejudice arose against gas as a medium of heat, from the first attempts to employ it being made in an unskillful way. But when care is taken to carry off the products of combustion by a pipe, and to prevent overheating, gas-stoves will be found economical and pleasant, and capable of being used in situations where a common stove is inadmissible.

In stoves, gas should always be burned with the Bunsen burner, which is generally employed by chemists when they make use of gas for heating purposes. It consists of a small brass cylinder, or chimney, set over the gas-jet, like the glass of an argand lamp, with openings near the bottom to allow air to enter. The gas being admitted into this before lighting, mixes with the air, and when lighted at the top, which is usually covered with wire-gauze or perforated metal, burns with a pale-blue flame. The most complete combustion and the greatest heat are obtained in this way. Smoke, properly so called, there is none. Still, it must not be forgot that there is burned air—a cubic foot of carbonic acid, besides a quantity of watery vapor, for every cubic foot of gas used; and therefore, even with the Bunsen burner, these gaseous products should, wherever it is possible, be conducted away.

A pleasant and very serviceable gas-stove might be constructed by making the casing double, to contain water. It has been ascertained that a gallon of water may be brought to the boiling-point in 20 minutes by burning 4 cubic feet of gas, which, at 4*s.* 6*d.* per 1000 feet, costs less than a farthing. The cost of doing the same by a newly-lighted coal-fire is more than threefold.

Steam and Hot Water.—The immediate warming agent in these two methods is the same as in Arnott's and other low-temperature stoves—viz., an extensive metallic surface moderately heated; but instead of heating these surfaces by direct contact with the fire, the heat is first communicated to water or steam, and thence to the metal of a system of pipes. This affords great facility in distributing the heat at will over all parts of a building; and these methods are peculiarly adapted to factories, workshops, and other large establishments. Other advantages are—freedom from dust, and from all risk of overheating and ignition.

Steam.—Steam-warming is generally adopted in establishments where steam-power is used, as the same boiler and furnace serve both purposes. When steam enters a cold vessel, it is condensed into water, and at the same time gives out its latent heat till the vessel is raised to 212°, when the condensation ceases. The condensing vessel is usually a cast-iron pipe placed round the wall of the apartment near the floor. In admitting fresh air into the room it may be made to pass over this pipe, and thus be warmed. The steam is conducted from the boiler by a smaller tube, which may be covered with list or other material, to prevent all condensation by the way; and the admission of the steam is regulated by a cock within the apartment, means being provided for allowing the air to escape. Where a pipe cannot be laid round the room, a coil of pipe may be formed, or the steam may be admitted into a large vessel or into a hollow statue, forming a steam-stove. Allowance must be made for the expansion of the tubes by heat; and they are so arranged that the condensed water is conveyed back to the boiler. One round of iron pipe, of four inches diameter, is quite sufficient to warm each of the large apartments or stories of the printing-office from which the present work issues.

There can be no proper comparison between this plan of heating and that of common fireplaces. Coal-fires cannot warm the air in large workshops, the heat is confined to their own immediate neighborhood; hence the workmen are often obliged to draw near the grate to warm themselves. According to the plan here adopted, every part of the house is equally heated, and the whole of the workmen are as comfortable during the hardest frosts as if they were working in a pleasant summer day. It is difficult to estimate the expense of supplying the heat, seeing that the steam happens to be drawn from a boiler which is always in operation for other purposes. Excellent, however, as the process is, it is for many reasons unsuited to private dwelling-houses.

In calculating how much surface of steam-pipe will be sufficient to warm a room, it is customary to allow about 1 foot square for every 6 feet of single glass window, of usual thickness; as much for every 120 feet of wall, roof, and ceiling, of ordinary material and thickness; and as much for every 6 cubic feet of hot air escaping per minute as ventilation, and replaced by cold air.

Hot Water.—Hot-water apparatus was applied as early as 1777 by M. Bonnemain, in Paris, to warm the hot-houses at the Jardin des Plantes, as well as for the artificial hatching of chickens. It was first introduced into England by the Marquis de Chabannes in 1816, and is now used in many large buildings. It is more economical than steam, except where a steam-boiler is required for machinery; and from this and other advantages, it is generally preferred to steam-apparatus. One of these advantages is, that the heat begins to be distributed, in some degree, as soon as the fire is lighted, while with steam-apparatus the whole of the water must be at boiling-heat before any steam enters the pipes.

There are two kinds of hot-water apparatus—high-pressure and low-pressure. In the first, the water is confined, and can be heated to any degree; in the other, it is open to the air, and cannot be heated above 212°. Fig. 4 will explain the way in which water is made to carry the heat of a furnace to any part of a building by the low-pressure method. *a* is a boiler, from the top of which a tube issues, and after circulating through the building, re-enters near the bottom. At the top of the circuit, there is a funnel, or a small cistern, *c*, by which the tubes and boiler may be kept full. When the fire is lighted at the bottom of the boiler, the heated portion of water, being lighter than the rest, rises towards the top through the tube *bb*, while the colder water from *dd* flows in to take its place. The tube is made to traverse the apartments to be warmed, where it gives out its heat to the air; the returning portion of the pipe is thus always colder, and therefore heavier than the other, so that the circulation is constantly kept up. The warming surface is increased, wherever it is necessary, by coiling the pipe, or by making expansions upon it of various forms, so as to constitute water-stoves.

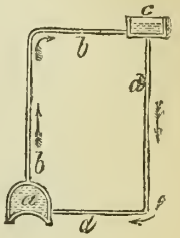


Fig. 4.

To avoid the necessity of so large a surface, and such a mass of water as is required at the low temperature the water attains in the pipes of this kind of apparatus, Mr. Perkins introduced the high-pressure system. In this, the pipe is made comparatively small, but very strong, and is formed into an endless circuit cut off from the atmosphere. The water is heated by making a number of coils of the pipe itself pass through the furnace; and as the whole circuit forms a shut vessel, as it were, the temperature may be raised to 300° and upwards, according to the strength of the pipes. This high temperature causes a rapid circulation. A compendious and readily understood specimen of the apparatus, calculated for a house of three stories, is presented in the accompanying engraving. In filling the tube with water, which enters at *b*, care is taken to expel all the air; and at *a* there is an expansion of the tube, equal to 15 or 20 per cent. of the capacity of the whole, which is left empty both of water and air, to allow for the expansion of the water when heated. The arrangement of the pipe may be various: the plan generally followed is to place a considerable coil of it within a pedestal or bunker, with open trellis-work in front, in a convenient part of the room. It may also be made to wind round the room, behind the skirting-board, which, being perforated with holes, will allow of the entrance of the warmed air.

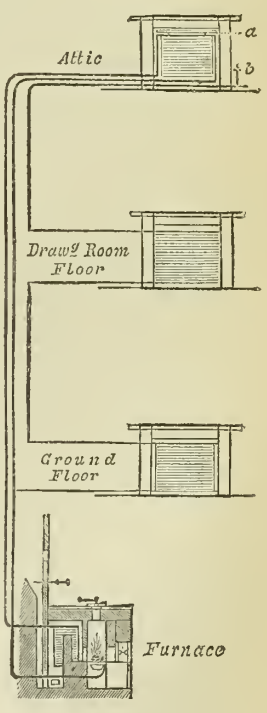


Fig 5.

The hot-water apparatus has been fitted up by Messrs. Perkins and Heath in various public buildings, warehouses, and gentlemen's houses; and, while sufficiently effective for the desired end, it has been proved to be attended with as few drawbacks as any regulated mode of heating whatever. But there is a great obstacle to its general adoption in its expensiveness. The temperature also becomes at times so high as to cause a disagreeable odor. Another objection is its liability to burst; though, from the tubes being of malleable iron, such an accident causes more inconvenience than serious danger.

Conservation of Warmth.—The art of warming embraces not only the production and distribution of heat, but the construction

of apartments with a view to prevent its escape. The way to effect this—setting aside in the meantime the necessity of renewing the air—is, in the first place, to make the walls, floor, windows, doors, &c. as impervious to air as possible, to prevent the heat from being carried off by currents; and in the next place, to make them bad conductors of heat. For this last purpose, the walls ought to be sufficiently thick, and, if possible, built of non-conducting materials. Solid iron would make a cold wall; wood, a warm one; and in this respect brick or porous stone is preferable to hard stone. But the chief element in a warm wall is that it be *double*, which every wall in effect is, when it is lined by a coating of plaster, kept apart from the wall itself by the laths. The plate of confined air between the two is the most effectual barrier to the passage of the heat outwards that could be contrived. By making iron walls double or cellular, with a lining of plaster, they might be rendered as warm as wished. Windows are a great source of cold, not merely by admitting cold air, but by allowing the heat to pass by conduction through the thin glass. The air of the room that touches the window is robbed of its warmth, and is constantly descending in a cold stream towards the floor. There is thus a cold influence felt from a window, however close it is. This is partly arrested by window-blinds, shutters, and curtains, which check the flow of the air, and retard its carrying power. But a far more effectual plan is to have double windows: either two frames, or double panes in the same frame. The loss of heat by a double window is said to be only one-fourth of that by a single. Double windows are considered essential in countries where the winters are rigorous.

By carrying those principles far enough, we might succeed in well-nigh imprisoning the heat, and thus produce a house of ideal perfection, so far as mere temperature is concerned. But for the habitation of living beings, another condition, seemingly antagonistic to the former, is no less requisite—'air as free as that on a mountain-top.' In general practice, the two hostile conditions are not so much sought to be reconciled as compromised; and then, as usual, neither object is well attained. Circulation of air is got accidentally, through the imperfections of structure in our rooms—through the chinks and bad fittings of the windows, doors, floors, and the uneconomical fashion of our fireplaces. Were houses much better constructed than they are, the inmates would in many cases be suffocated outright, as they often partially are with the degree of perfection we have already attained. Neither the airing of our houses, nor the art of building them solid and warm, can advance to perfection, until the former be no longer left to chance, but be in every case secured by special apparatus capable of direct control. We now proceed to consider how this is sought to be attained; confining ourselves still to the leading principles, and only noticing a few of the specific plans that have been put in practice.

Ventilation.—The necessity of constantly renewing the air wherever living beings are breathing, arises chiefly from the effects produced upon air in the lungs (see Respiration). The average quantity of carbonic acid in expired air or breath is found to be 4·3 per cent. by measure. Now this gas, when taken into the lungs, is a poison, and tends to arrest the vital processes. Like other poisons, however, it can be rendered harmless by *dilution*. The small proportion naturally existing in the atmosphere is perfectly innocuous, and may be considerably increased without sensible effect. But it is decidedly prejudicial to breathe for a long time air containing 1 measure in 100 of carbonic acid; and it is considered desirable that the proportion should never exceed 1 in 500. We may assume, then, what is near the truth, that 20 cubic feet of air pass through the lungs of a man in an hour. To reduce the poison of this to 1 per cent., at which point it is barely respirable, it requires to mingle with as much fresh air as will make a mixture of nearly 100 cubic feet; and to make the dilution at all safe, it must be carried five times as far. In other words, the respiration of one human being vitiates hourly about 500 cubic feet of air.

In addition to carbonic acid, expired air contains an undue amount of watery vapor. Minute quantities of animal matters are also exhaled with the breath, which in close ill-ventilated apartments form a clammy deposit on the furniture and walls, and, by putrefying, become organic poisons.

A further necessity for the constant renewal of fresh air arises wherever lights are burned. The deteriorated air of a fire goes off by the flue, but lights are generally burned where the products must mingle with the atmosphere of the apartment. Now, a pound of oil in burning consumes the oxygen of 13 feet of air, and produces a large amount of water in vapor, and also of carbonic acid. Every cubic foot of gas consumes the oxygen of 10 feet of air, and forms at least 1 foot of carbonic acid, besides watery vapor, sometimes mixed with sulphurous fumes.

To counteract these various sources of pollution, and keep the air sufficiently fresh and wholesome, in rooms where many persons are breathing, it is found in practice that on an average about 20 cubic feet of fresh air per minute for each individual must be supplied.

Ventilation consists of two operations—the removal of the foul air, and the introduction of fresh. Though neither operation can go on without the other going on at the same time, it is convenient to consider the two separately.

The agents employed in removing the air from apartments are chiefly two: that by which nature effects the ventilation of the earth on a grand scale, viz., the draught of ascending currents produced by difference of temperature; and mechanical force, such as pumping. The former is the more common, and is the only one applicable to private houses.

The column of air in the chimney of a lighted fireplace being expanded and comparatively light, exerts less than the prevailing pressure on the air immediately under and about its base. The air, therefore, below and around it pushes it up, and flows in to take its place; the velocity of the movement being in proportion to the height of the chimney and the degree of heat. Thus, although it is often convenient to speak of the air being *drawn* or *sucked* into the chimney, the force does not lie in the chimney, but in the greater pressure of the air behind.

Wherever, then, there is a heated chimney, there is a means of removing the foul air. And in rooms moderately lofty and spacious, with windows and other fittings not closer than usual, and a chimney-mouth of the usual width, there is little risk, when there are only a few inmates, of any serious vitiation of the air. The heated breath that ascends to the ceiling has time to diffuse itself gradually, and be drawn in a diluted state into the currents that are setting from all quarters towards the chimney. These currents, however, are one great objection to this mode of ventilation, as they consist in great part of cold air that has just entered by the doors and windows, and are strongest where the inmates sit to enjoy the fire.

The ascent of foul air to the top of the room dictates its exit in that direction, rather than low down at the mouth of the chimney. It is conceived by some that the carbonic acid of the breath, from its greater weight, must be chiefly at the bottom of the room; but this is a mistake. The heated breath ascends instantly, because it is, as a whole, lighter than the air around it; and the carbonic acid in it does not tend to separate from it and fall down by its superior weight, but, by the law of the diffusion of gases, seeks to spread itself equally all over the room, and would do so though it were lying at first on the floor. It is on the principle of the foul air ascending at first to the top of a room, that Dr. Arnott's ventilating-valve is contrived. The valve may be used to supplement the open-fire draught in small and crowded apartments, and is essential where the fire is burned in a close stove or in the smokeless grate. The valve is represented at *v*, fig. 1. An aperture is cut in the wall over the chimney, as near to the ceiling of the apartment as may be convenient. In this is suspended a valve, capable of opening inward to the chimney, but not in the other direction, by which means a return of smoke is prevented. The valve is so balanced on its center of motion, that it settles in the closed position, but is easily opened.

A flap of 36 square inches is sufficient, where there is good chimney-draught, for a full-sized room with company. This simple apparatus may be painted or otherwise made ornamental. It operates by virtue of the draught in the chimney. Whenever that is active from the presence of a fire, the valve is seen to open inwards, and a stream of air from the top of the apartment passes through into the chimney, and is carried off. The operation is precisely equivalent to the stream of air always passing into a chimney between the fire and the mantel-piece, but has the great superiority of draining off the most impure air in the room. A wire descends to a screw or peg fixed in the wall, by which the opening of the valve may be limited or altogether prevented. This is a far more efficient plan of ventilation than an open window, or an opening in the wall near the roof, leading merely to the outer air; where there is an open fire in the room, such openings rather admit a rush of cold air than let out the foul.

There is generally more or less draught in a chimney even without a fire, from the air within being slightly warmer than that without; and this action might be strengthened by burning a jet of gas within the ventilating aperture at *v*. Where a house is to be built new, some recommend having special ventilating-flues in the walls, separate from, but close to the fire flues, so that the air may be heated, and an ascending current produced. In weather when fires are not required, the draught can be maintained by gas-jets at the entrances to the vents. This plan of causing a draught by gas is applicable to churches and apartments without fire-places.

Where a fire is burned for the express purpose of producing a current of air, it is called ventilation by *fire-draught*. The plan has been exemplified with success in mines, where a fire being lighted at the bottom of a shaft, air is drawn off in all directions around, and sent up the shaft; to replace which, fresh air is constantly pouring down other shafts.

Many of our large buildings are ventilated by fire draught. Fig. 6 shows an arrangement by which a school or church may be ventilated: *aa*, the flooring perforated with holes, through which air, warmed by hot-water pipes, passes to the interior. The ceiling, *bb*, is perforated, leading to a chamber which communicates with a vertical flue, *cc*; which leads to the fireplace of the warming-apparatus, situated at the foot of a flue, *ed*. As the only air which reaches this must pass from *cc*, a constant current is maintained therein, and also through the apertures in the ceiling. Dr. Reid exemplified this method, first in his own class-room in Edinburgh, and afterwards in various public buildings, among others, in the temporary House of Commons, erected after the burning of the old house in 1834. The plan was attended with some inconveniences —in fact, no plan can meet every contingency—but, notwithstanding the storm of hostile criticism that was raised at the time, Professor Tomlinson (*Treatise on Warming and Ventilation*, 1864) gives it as his opinion that, 'in the case of the temporary House of Commons, where all the arrangements were left in his own hands, he succeeded in the proposed object of removing the vitiated air, and keeping up a constant supply of warm or of cool air to fill its place.' The arrangements for warming and ventilating the present House of Commons are a modification of Dr. Reid's plan.

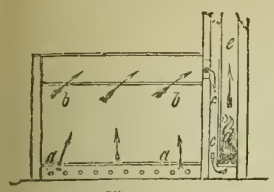


Fig. 6

In other cases, as at the prison in Millbank, warm air is admitted at the ceiling, and carried off by the draught of a chimney in connection with the sides or lower part of the rooms.

In these last-mentioned instances, the apparatus provides as well for the admission as for the removal of air. In ordinary dwellings, no special provision is in general made as to admission. It is, in fact, not absolutely necessary; for the removal of a portion of the air of a room never fails to secure the entrance of a fresh supply somewhere. Whenever the chimney-draught or other means removes a little of the pressure inside the room, the pressure without forces air through every opening and chink; and even, were there no actual openings, would force it through the porous substance of the structure—such as mortar, and even wood itself. But this irregular source of supply has various inconveniences. It often requires more force to strain the air in this manner than the draught is possessed of, and then the chimney smokes; it is smoke produced by this cause that is curable by opening the door or window. Another objection is, that impure air is often thus drawn into rooms from the lower parts of the building and from drains about the foundation. For these and other reasons, there ought, in all cases, to be a free and legitimate entrance provided for fresh air, so as to give a control over it; and this entrance should be independent of the windows. It is a much disputed point whereabout in a room the air should be made to enter—some advocating openings for it near the floor, others near the ceiling; and it must be confessed that neither method has yet been rendered unobjectionable. One essential thing is, to prevent the air from rushing in with a strong current, by passing it through minute holes spread over a large space. A tube, for instance, leads from the outer air to a channel behind the skirting, or behind the cornice, and the air is allowed to issue into the room through minute holes, or through a long, narrow, and concealed opening covered with perforated zinc or wire-gauze. The passage or tube leading from outside the wall can be more or less closed by a valve regulated from the inside.

But the great difficulty lies in the coldness of the air directly introduced from the outside, whether by the doors and windows, or through channels in the walls; and all such plans of ventilation must be considered as imperfect make-shifts. The fresh air ought in every case to be warmed before being admitted, or, at least, before being allowed to circulate in a sitting-room. In the smokeless grate (fig. 1,) the air is led directly from the outer atmosphere into a channel (1, 2) underneath the hearth, and escaping below the fender and about the fire, is warmed before spreading through the apartment. With stoves and heated pipes, the air should enter about the heated surface; in stoves on the cockle principle, the fresh air, as it enters, is made to pass between the casings of the stove. With an open fire, a very feasible plan is to make the fresh-air channel pass behind the fire-place, and allow the warmed air to escape from concealed openings about the chimney-piece and jambs, or from behind the skirting. In Condy's Ventilating-grate, the fire-box is constructed of hollow pieces of fire-brick communicating with the external atmosphere and with the room.

For a house with fireplaces of the usual construction, perhaps the simplest and most effective expedient is to admit the fresh air into the entrance-hall, and there warm it by means of a low-temperature stove or by hot-water pipes: its passage into the several rooms can then be provided for by regular channels, behind the skirting or otherwise. In America, perforations are frequently made in certain parts of the doors, before which silk curtains are disposed, so as to temper the currents. It is almost unaccountable that in this country the plan of warming the lobby and staircase is so seldom resorted to. To say nothing of the comfort thus diffused through the whole house, and the benefit in point of health, especially to weakly constitutions, the economy of the arrangement is beyond dispute. In the sitting-rooms, not more than one-half the usual quantity of fuel requires to be burned in the open fires; and in the bedrooms, as a rule, fires are rendered altogether unnecessary in the coldest weather. It ought to be observed that when air is admitted by a regular and free channel, comparatively little is strained in by the windows and other byways.

Ventilation by Fans and Pumps.—The fan-wheel has been for many years used in factories, to which it is particularly applicable, from the readiness with which it can be kept in motion by the engine. It is essentially the same as the barn-fanners; the air is drawn in at the center of the wheel, and flies off at the circumference by centrifugal force. The fan is placed at the top of a flue, into which branches from all parts of the establishment proceed; and when it is set in motion, it draws off the air from every apartment communicating with it. Dr. Arnott observed, that in the fan-wheel as well as in the air-pump or bellows invented by Dr. Hales, a great deal of power was wasted by 'wire-drawing' the air—that is, making it squirt through small valves or other narrow openings. To obviate this, he invented a ventilating-pump, which supplied a hospital with fresh air, requiring no other motive-power than the descent of the water used in the establishment from a high reservoir to the lower parts of the building. It is described in his work on *Warming and Ventilation*.

Transference of heat from the used air to the fresh.—This is the kind of economy which is put in practice in the Respirator (q. v.) and in the Caloric Engine (q. v.). Whatever difficulties—or impossibilities, as some maintain—there may be in the way of turning this transferred heat into a fresh source of power, nothing seems simpler, in theory at least, than to economize heat in this manner for the warming of dwellings and similar purposes. The



Fig. 7.

idea originated with Dr. Arnott, many years ago, who thus illustrates it in the case of water: Suppose *a* a vessel of boiling water, with a thin metallic tube issuing from the bottom, and having a stop-cock at *d*; and *b* a similar vessel of water at freezing, the tube of which is larger, and envelops the other. When both are flowing simultaneously, the hot water, if the tube is long enough, will have lost all its excess of heat before getting to *d*, while the counter-current will have gained all that the other lost. In an experiment with tubes six feet long, the boiling water from *a* issued from *d* at 34°, and the freezing water from *b* issued from *c* at 210°. It is clear that if *a* were a bath, the warm water in it, after being used, might in flowing out be made to heat the cold water from a reservoir, *b*, flowing into another bath below *c*. We are not aware that the principle has ever been acted upon; but the possible economy of heat is obvious, and it only requires mechanical ingenuity to realize it.

It will at once strike the reader how desirable it would be to do the same with the impure heated air which we are obliged to eject from our dwellings. Where the ventilation depends upon the draught of a common chimney, it would seem impossible to bring the entering air in contact with that which is escaping; but where the mechanical force of a pump or a fan is employed, nothing seems simpler than to make the two currents run counter to one another for a certain distance in close contact through a system of tubes. The smoke even, which, with the most economical arrangements, still issues from the flues at a temperature considerably above that of the building, might be drawn into the current along with the foul air of the apartments, and the whole reduced nearly to the temperature of the atmosphere before being allowed to escape. Of course, there must be loss in the transference; but a large percentage would be saved, and the consumption of fuel would be reduced by that amount. Were this 'double-current ventilation' applied to churches, ball-rooms, theaters, &c., where thousands of persons are assembled, Dr. Arnott believed that 'no other heating apparatus would be required but the lungs of the company.'

An extensive exhibition of apparatus for the economical production and management of heat was held at London in 1881; but notwithstanding all the improvements recently effected, this important branch of the art of living is still in a very rude and im-

perfect condition. A writer in the *Quarterly Review* for 1866 justly remarks that 'in a household fire heat is, as it were, manufactured on a very small scale; and experience has proved that the cost of production of an article has always been inversely proportionate to the scale of its manufacture.' He accordingly suggests that 'it seems practicable, in a great measure, to supersede domestic fires, and to lay on heat (heated air), or the means of generating heat (low-priced gaseous fuel), to our houses pretty much as we now lay on gas.'

The abatement of the smoke-nuisance, and systematic and thorough ventilation, ought to be effected on a similar joint-plan, 'by connecting the chimneys of all the houses with underground culverts, provided at intervals with high shafts, in which, if necessary, the draught upwards might be increased by furnaces. We have long been familiar with extensive manufactories, covering large areas, in which are very numerous fires, all in communication with a single lofty chimney. With such an arrangement, no visible smoke should be produced, and with due attention, a smoky chimney should be impossible.' In the case of existing houses, the amount of reconstruction necessary might be a serious obstacle; but in building a new street, it might easily be made to empty its entire smoke through the medium of a single tall tower resembling those medieval campanili which are to be seen in Bologna and other Italian cities.' It is further proposed to make the ordinary sewers serve the purpose of culverts for the passage of the smoke to the common chimney. The sulphurous acid of the smoke would destroy the noxious qualities of the sewage gases, and improve the sewage for agricultural purposes; and instead of foul gases escaping through every opening or leak in the sewers, as at present, the powerful suction of the ventilating shafts would draw in fresh air, thus establishing a thorough system of atmospheric sewage. Another effect of the common chimney system would be to make the transference of heat, or double-current ventilation, spoken of above, easily practicable in domestic houses. The pipe through which the heated air and smoke were being drawn away might be made to give up its heat to the counter-current of fresh air which was being drawn in.

Even though such painstaking plans of economizing heat might not pay at the present cost of fuel in this country, it is pleasing to think that there is such a resource in reserve. It is not with all countries as with us; and even our stores of coal are not inexhaustible. It is an unworthy, and, in the real sense of the word, an inhuman maxim, that bids us 'let posterity look to itself.' If the absorbing passion for present gain will not let us begin practising economy now, we may at least seek to devise and perfect plans to be in readiness when the necessity comes. It is not uncommon to hear the argument, that before the coals are done, something else will be discovered as a substitute. We are at a loss to imagine what the something is to be, unless it be the ingenuity to make the fuel that is now wasted in a year last a hundred; and this we believe to be quite possible.

WA'RMINSTER, a small ancient town of Wiltshire, on the west border of Salisbury Plain, and 19 miles north-west of Salisbury. The parish church dates from the reign of Henry III.; and the interesting edifices in the town and neighborhood are numerous. An important corn-market is held every week. Pop. (1871) 5786; (1881) 5640.

WARNING, in Scotch Law, means a notice given to terminate the relation of master and servant, or landlord and tenant; corresponding in England to notice to leave and notice to quit respectively.

WAR OFFICE, the immediate office of the Secretary of State for War, and the center on which pivots the entire administration of the army. It is divided by the 'War Office Act' of 1869 into three great departments—the Military, the Ordnance, and the Finance—under respectively the Officer Commanding in Chief, the Surveyor-general of the Ordnance, and the Financial Secretary. All are ultimately responsible to the Secretary of State for War, who has, for his immediate assistance, one parliamentary and one permanent Under-secretary of State.

WAR-OFFICE REGULATIONS consist of the royal warrants regulating the pay, retirement, and allowances of officers and men of the army, together with the instructions to paymasters and others considered necessary for the proper carrying out of the warrant.

WARP, in Weaving, signifies the yarn or thread which runs lengthwise in the cloth. See WEAVING.

WARPING, a mode of improving land, practised where rivers bring down large quantities of mud, or where mud is brought up from estuaries by the tide. It is practised in some of the valleys of the Alps; and the rich soil brought down from the mountains is thus arrested, and made to increase the fertility of fields. It is practised also in England, on the tidal waters of the Ouse, Trent, and other rivers falling into the Humber. There are not many places in Britain where the process of warping is capable of profitable application. The term warping belongs to the banks of the Humber. The name *warp* is there given to the large quantity of earthy particles held in suspense by the tidal waters. About a century ago, warping began to be practised, by means of small tunnels made through embankments, the water being allowed to remain, and deposit its sediment of earthy particles before the sluices were opened for it to flow off.

Warping has now long been carried on, upon a larger scale, with large canals, embankments, and flood-gates. Many acts of parliament have been obtained for large warping canals, to lead tide-water over great tracts of land. Land previously sterile and worthless has been covered with good soil, and has become very productive. The 'compartment' which is embanked around, in order to warping, is generally only fifty acres, or less; the farmer warping only one field in a season, because in the meantime it is unproductive. In some cases, however, 500 or 600 acres have been warped in one piece. In the rivers which flow into the Humber, the water coming down the river in floods is unsuitable for warping, and contains no such quantity of sediment as the tidal waters.

WA'RRANDICE, in the law of Scotland, is the obligation to indemnify the grantee, or purchaser of land if, by defect of title, there should be an evictive or paramount claim established against the lands. Warrandice is personal or real; and personal warrandice is subdivided into general and special. Special warrandice is either (1) simple—i. e., that the granter shall do nothing inconsistent with his grant; or (2) warrandice from fact and deed—i. e., that the granter has not done, and will not do any contrary deed; or (3) absolute warrandice, or warrandice against all deadly—*contra omnes mortales*—i. e., that the granter shall be liable for every defect in the right which he has granted. Real warrandice is where the granter or vendor conveys another estate or lands, called warrandice lands, to be held by the grantee in security of the lands originally granted.

WA'RRANT OF APPREHENSION is an authority given by a justice of the peace to apprehend a person who is charged with a misdemeanor, felony, or treason. It is in the form of a command in her Majesty's name, issued by the justice to a constable, and to all other peace-officers of the county, reciting that an offence has been committed, and that oath has been made as to the offender, and commanding the constable to bring the offender before him (the justice), or some other of her Majesty's justices, to answer the said charge, and be dealt with according to law. The warrant must be signed and sealed by the justice. It may be issued and executed on a Sunday as well as any other day. In Scotland, the sheriff or justice of the peace who issues a warrant to arrest does not seal the document. In both countries, the warrant must name the individual arrested. In England, the party must either be taken or seized, or hands must be laid on him, accompanied with the words: 'I arrest you.' If the party arrested demand to see the warrant, the constable, if a known officer, is not in strictness bound to show it to him; but if the officer is not a known officer, and not acting within his precinct, then he must show the warrant. It is enough for the constable to say simply that he arrests in the Queen's name. If the party to be arrested be in a house, and the doors be fastened, the constable may, after first demanding admittance, and being refused, break open the doors. If, however, the house be a stranger's house, the constable who breaks open the door is not justified in doing so unless the accused be actually within. A general warrant, i. e., a warrant to apprehend all persons suspected, without naming or particularly describing any individual, is illegal and void for uncertainty, for mere vague suspicion is not enough to deprive any man of his liberty.

A practice had obtained in the Secretary of State's office ever since the Restoration, grounded on some clauses in the acts for regulating the press, of issuing general warrants to take up (without naming any person in particular), the authors, printers, or publishers of such obscene or seditious libels as were particularly specified in the warrant. When these acts expired in 1694, the same practice was inadvertently continued in every reign, except the last four years of Queen Anne, till the question was raised and decided as to the validity of such warrants, and they were declared by the Court of Queen's Bench illegal. The House of Commons in 1766 also passed a resolution making the issuing of general warrants illegal.

WARRANT OF ATTORNEY, in English Law, is an authority given by a debtor to some attorney to enter up judgment against him in any action that may be brought to recover a particular debt. It is generally given by a debtor when he finds he has no defence, and wishes to gain time; and if he do not carry out his promise, the effect is that the attorney can immediately sign judgment, and issue execution against him, without the delay and expense of an ordinary action. But to prevent the malpractices of attorneys, and any imposition upon ignorant men, no such warrant is legal unless the debtor has his own attorney present, ex-

pressly named by him, and attending at his request, to inform him of the nature and effect of such warrant; and such attorney must subscribe his name as a witness. It is also provided that all warrants of attorney shall be void unless they are filed, within 21 days after execution, with the clerk of the judgments in the Queen's Bench.

WARRANT-OFFICERS, on Shipboard, are the highest grade to which seamen ordinarily attain. They are the gunner, boatswain, and carpenter. Their widows receive pensions.

WA'RRANTY, in English Law, is a promise or covenant to warrant or secure, against all men, a certain person the enjoying of the thing granted or sold to him. As applied to ordinary sales of things personal, it is used to secure the truth of certain representations which the purchaser has no means, or has imperfect means, of ascertaining for himself, and yet the knowledge of which is material to the contract. The law does not imply on the part of the seller of an article in its natural state, who has no better means of information than the purchaser, and who does not affirm that the article is fit for any particular purpose, any warranty or undertaking beyond the ordinary promise that he makes no false representation calculated to deceive the purchaser, and practises no deceit or fraudulent concealment, and that he is not cognizant of any latent defect materially affecting the marketable value of the goods. In the ordinary sale of a horse, the seller only warrants it to be an animal of the description it appears to be, and nothing more; and if the purchaser makes no inquiries, as to its soundness or qualities, and it turns out to be unsound and restive, or unfit for use, he cannot recover as against the seller, as it must be assumed that he purchased the animal at a cheaper rate. And on the sale or transfer of wares and merchandises, if nothing is said as to the character or quality of the thing sold, the buyer takes the risk of all latent defects unknown to the seller at the time of the execution of the contract of sale; all that the seller answers for being that the article is, as far as he knows, what it appears to be. Whenever a man sells goods as owner, he impliedly undertakes and promises that the goods are his own goods, and that he has a right to make the sale and transfer which he professes to make; and if he was not the owner, he is responsible in damages if the real owner claims them from the purchaser. If the purchaser does not himself inspect and select the subject-matter of sale, the seller impliedly warrants the article he sells to be the very article the purchaser has agreed to buy, and is responsible in damages if he furnishes a different article. If the vendor is told the article is wanted for a specific purpose, then he is taken to warrant impliedly that the article he furnishes is sufficient for that purpose.

Every victualer or dealer in provisions impliedly warrants them to be wholesome and fit for food. But a private person who does not trade in provisions is not responsible for selling an unwholesome article of food without fraud and in ignorance that it is unfit to eat. Where buyer and seller have equal means of knowledge, then the vendor is not liable for any representation which he makes without fraud; but if, from the nature of the case, the vendor has the exclusive means of knowledge, then he impliedly warrants that what he says is true. Warranty is also to be distinguished from mere matter of opinion or belief. When a servant sells a horse, he has no right to give a warranty, unless his master expressly authorized him to do so. In the law of Scotland, the doctrine of Warranty of Goods does not substantially differ from the above.

WARREN, HENRY, president of the Institute of Painters in Water-colors, was born in London, September 24, 1798. W.'s father inherited considerable wealth, which, however, he contrived to dissipate, and his children were left to shift for themselves. The subject of this memoir at first got a situation in a counting-house; but afterwards, having an intense love for art, was placed in the studio of Nollekens, the celebrated sculptor of the day. At Nollekens's, he was associated with Bonomi and Gibson. Through Benjamin West, W. obtained an introduction to the sculpture-room of the British Museum, where he practised both drawing and modeling, and where he used to meet Haydon's pupils, Bewick, Christmas, and the Landseers. In 1818, he became a student of the Royal Academy, where he attended regularly for many years in the company of Etty, the Landseers, F. R. Lee, Webster, and others less distinguished. W.'s first paintings were in oil. He exhibited several of these from time to time at the Academy. One was a subject from Collins's *Ode to the Passions*. Etty thought very highly of this picture, and W. repeated it in water-color, and sent it for exhibition to the 'New Society of Painters in Water-colors' in 1835. Of this society, now known as the 'Institute of Painters in Water-colors,' W. was president for over thirty years, after which he remained honorary president until his death, during which time, both by his teaching and example, he did much towards raising the English school of water-color drawing to the proud eminence that it now occupies in comparison with the same branch of art in foreign countries—namely, the highest place of all.

W.'s first great picture in water-colors was 'The Happy Valley,' from *Rasselas*—a piece embodying both landscape and figures, and displaying great power both in its composition and coloring. A great many of his subsequent pictures are on Eastern subjects, leading some persons to suppose that he has lived a long time, or at least traveled much, in Egypt, the Holy Land, Arabia, &c. But this is not the case. Among these Eastern subjects, many are Scriptural, as—'Rebecca at the Well,' 'Hagar and Ishmael cast out into the Wilderness,' 'Christ and the Woman of Samaria,' 'Joseph's Coat brought to Jacob,' 'Christ with his Disciples in the Cornfield,' 'The Death of the Firstborn,' 'The Flight into Egypt.' Of Eastern subjects not Scriptural may be named—'The Dying Camel in the Desert;' 'A Halt in the Nubian Desert;' 'Moslem Charity;' 'The Crusaders' First Sight of Jerusalem.' Of subjects not Eastern there may be mentioned—'Alfred in the Swineherd's Cottage,' 'Incipient Courtship,' 'Happy Nutting Days,' besides numerous English landscapes. W., who was Professor of the Fine Arts at Queen's College, London, wrote, amongst other works, a little book on *Water-color Painting*, and one on *Artistic Anatomy*. His son, Edmund George, became well known as a water-color artist. W. died 18th Dec. 1879.

WARREN, SAMUEL, a well-known English author, was born at Racre, Denbighshire, 23d May 1807. He began a course of medical study in Edinburgh, but changing his views, he was entered as a student of the Inner Temple, and called to the bar in 1837. In 1851 he was made a Queen's Counsel, and was Recorder of Hull from 1854 to 1874. W. represented Midhurst in the Conservative interest, 1856–59, when he was appointed one of the two Masters of Lunacy. His best known work, *Passages from the Diary of a Late Physician*, was contributed to *Blackwood's Magazine* in 1830–31; it contains many touching and beautiful stories, and was translated into several European languages. W. excels in painting the passions and in depicting scenes of modern life. In 1841 appeared *Ten Thousand a Year;* and in 1847, *Now and Then*. A collection of miscellaneous articles to *Blackwood's Magazine* was also issued in 2 vols. In addition to many works on more professional subjects, he has edited *Blackstone's Commentaries Systematically Abridged*. W. died 29th July, 1877.

WARREN is a place kept for the purpose of breeding game or rabbits. In its strict legal sense a right of free warren can only be derived by grant from the crown, and gives certain privileges to the warrener as to recovering game and destroying dogs which infest it (see Paterson's *Game Laws*, 20); but in the popular sense, a warren merely means a preserve for keeping game and also rabbits.

WA'RRINGTON, a parliamentary and municipal borough and manufacturing town of Lancashire, on the right bank of the Mersey, 16 miles east of Liverpool by railway. After the parish church, which is of Saxon origin, the chief buildings to be mentioned are the cotton and other factories and the cloth-halls. In the older streets, ancient wooden houses are even yet to be seen. The manufactures of W. comprise cotton goods, as fustians, twills, corduroys; chemicals; files and other tools, pins, wire and wire-woven work; glass; leather and soap; and a famous ale is brewed. Vessels of 100 tons can ascend the Mersey as far as the bridge of this town. Pop. of parliamentary borough, which returns one member to parliament, (1871) 33,053; (1881) 45,257.

WA'RSAW, formerly the capital of Poland (q. v.), now capital of the Russian, or rather Russianized, government of W., stands on the left bank of the Vistula, about 390 miles east of Berlin by railway. Lat. of observatory, 52° 13′ N., long. 21° 2′ E. It stands partly on a plain, partly on rising ground sloping upwards from the left bank of the river, extends over a wide area, and consists of the city proper, and of a number of suburbs, several of which are beautifully built. A bridge of boats 1626 feet long connects W. with the suburb of Praga, on the right bank of the Vistula. The streets are mostly narrow, though in several instances they are broad and handsome. The Vistula at W. is broad, shallow, and ever-changing in its sandy course, and is navigable for large vessels only when, after thaw, rivers of melted snow pour down into it from the Carpathians, or when it is swelled by the autumn rains. But the only craft seen here on the Vistula are rude rafts, usually laden with wheat, which they convey to Danzig by river, and (within the last few years) steamers at intervals. Seen from Praga, on the right bank, the Castle, standing on a steep ascent, has a most imposing effect. Attached to the Saxon Palace are a spacious court and gardens, which are considered the finest promenade in the city. Among the other buildings there are nearly 30 palaces; the cathedral of St. John (dating from 1250), a Gothic building of great beauty, containing statuettes and many interesting monuments, among which is one by Thorwaldsen; the Lutheran church, the loftiest building in W., and numerous other places of worship, including synagogues. There are several large

and memorable squares, as the Sigismund Square, containing the monument, erected by Ladislas IV., in honor of his father, Sigismund III. In this square, in April 8, 1861, 40 unarmed and unresisting Poles were massacred. The citadel, erected by the Emperor Nicholas, for the express purpose of intimidating, and, if necessary, destroying the city, commands, from its situation, every part of Warsaw. The university, broken up by the Emperor Nicholas after the insurrection of 1830, was re-established by decree, 1864, through the influence of the Grand Duke Constantine; and besides this institution, there are several minor colleges, gymnasiums, &c. Woollen and linen fabrics, chemicals, sugar, and leather are manufactured. Pop. (1880) 339,350 (50,000 being Jews.)—The Government of W. has an area of 5600 sq. m., and a pop. of (1880) 1,230,700. For the history of W., see POLAND, JOHN III., &c.

WAR SERVICES.—ARMY ORGANIZATION AND RECENT CHANGES.—The Crimean War had revealed many defects in the organization of the British army, but little of lasting value was done towards remedying these defects, beyond an improved method of admission, by examination, of candidates for her majesty's commission, and some small amelioration in the position of the privates. An English military critic could still say that 'there was no such thing as a definite English brigade, divisional, or army corps organization; if war came, the whole had to be evolved from a force of brave men with muskets or field-guns, but destitute of all else.' Other events and considerations occupied the public attention. Still, the Indian Rebellion, the second and third China War, the Abyssinian Expedition, did not allow the subject to altogether fade from the public mind. So, when the mighty events of the Franco-German War of 1870–71, and the lessons to be derived from them, burst in upon us, they fell upon a soil not unprepared, and acted as a great impulse towards a real re-organization of the British army. The work since then has been kept steadily in hand by the War Office, under successive ministries, both Liberal and Conservative. Mr. (now Lord) Cardwell began it in 1871, under Mr. Gladstone; Colonel Stanley continued it during Lord Beaconsfield's administration; and Mr. Childers, during Mr. Gladstone's second tenure of office, practically completed the work by his measure bearing date, July 1, 1881.

To Mr. Cardwell is due, in the first instance, the introduction of the principle of localization of the military forces, the linking of battalions, and the admission of short at the side of long service —the first steps towards the creation of an efficient reserve, and the abolition of the purchase of officers' commissions. Long service was previously general: it meant 21 years with the colors. Mr. Cardwell established, for some regiments, short service for all the men, and left others with long service for all. Short service came now to mean a period of 12 years, divided for the infantry and engineers into two periods of 6 years with the colors, and 6 years in the reserve; and for the cavalry and artillery, of 8 years with the colors, and 4 in the reserve. No re-engagement was allowed except for non-commissioned officers, and a few men specially recommended, as likely to make, in time, good non-commissioned officers.

Long service of 21 years was spent entirely with the colors; it came to be distributed into two periods of 12 years and 9 years. These arrangements have, since then, been further modified, in the direction of giving decided preference to short service. There is now no more long service, except for the Household Cavalry, the band of the Royal Military College, the Corps of Ordnance Artificers, and boys. These are to be for 12 years with the colors; only in exceptional cases will they be permitted to re-engage. Short service means now 12 years' service, of which 7 only are with the colors, and 5 years in the reserve; which periods will be extended to 8 years' army service, and 4 years' reserve service, if the period of army service expires while the man is serving abroad. In case of war, soldiers will be liable to be retained for an additional year. In some cases an engagement for short services may be extended by non-commissioned officers. Some men, generally officers' servants, are allowed, after the lapse of their engagement, to remain, with three months' notice.

Meanwhile, Mr. Cardwell being Secretary of War, Mr. Gladstone, in the face of strong parliamentary opposition, had, by an unusual exercise of the royal prerogative, abolished, in 1871, the system of purchase of officers' commissions. At present, every officer on promotion signs a declaration to the effect, that no money or other valuable has been paid by him or on his behalf, in respect to such promotion; nor, since 1st November 1871, in respect of his steps in the regiment leading to such promotion (Queen's Regulations, Sect. IV 3). The localization scheme was initiated by the establishment of brigade depôts.

The Militia came by the New Organization more into the foreground; and, here too, it was Mr. Cardwell who introduced the change. The ranks are now composed of about the same material as before, but they gain by being in more direct contact with the line, and the status of their officers is improved. These are now under military law. Formerly they were nominated by the Lord Lieutenant of the county. For the last few years they have been appointed, though without an examination as yet, by the Secretary of War and the Queen. Many officers now enter the army through the militia, by a special examination.

The principle of linked battalions, too, was brought forward by Mr. Cardwell, but its present development was left for his successors. Other of his proposed reforms have been superseded by new measures based on fuller experience.

In comparing the new system of linked battalions with the old regimental system, it is necessary first to remember that the line counted 109 regiments of the line, beside the Rifle Brigade.

Of these 109 regiments, 25 had 2 battalions	= 50	bat.
The 60th had 4	= 4	"
The remaining 83, each one battalion	= 83	"
The Rifle Brigade had 4	= 4	"
	141	"

These were now so reorganized as to produce 71 regiments (linked battalions). Or, in other words, many of the former 109 regiments disappeared, and by uniting, in many cases, two one-battalion regiments (linking them, as it was now technically called), new battalions, or rather 71 two (or more) battalion regiments were formed. But these did not, for the most part, remain two-battalion regiments; two or more battalions were taken from the militia, and in some cases more than two. In each of these new regiments the first and second battalions are line battalions, except the former 60th (now King's Royal Rifle Corps) and the old Rifle Brigade, in each of which the first four battalions are regulars of the line; any subsequent battalions are militiamen. Volunteer regiments are now likewise affiliated, with the same regimental districts, to these regiments, without, however, forming parts of these regiments, or bearing consecutive numbers of battalions: thus the King's Royal Rifle Corps (the old 60th) has 10 volunteer corps, all belonging to Middlesex and London, attached to it.

The rule for these new regiments of linked line and militia would seem to demand the existence of four battalions each. In some cases, however, the Army List informs us that the 4th battalion 'is not yet formed.' A few, like the Queen's Own Cameron Highlanders, have only 2 battalions; others, the Royal Dublin Fusiliers, Royal Munster Fusiliers, Prince of Wales's Leinster Regiment (Royal Canadians), Princess Victoria's Royal Irish Fusiliers, have 5; others again, the Connaught Rangers, and the Royal Irish, have 6. The old Rifle Brigade, now the Prince Consort's Own, has 9 battalions of line and militia, to which 11 volunteer battalions are affiliated; the King's Royal Rifle Corps, as already mentioned, has 9 battalions of line and militia, to which 10 volunteer battalions are attached.

In place of the former numbers of regiments, now no longer applicable, territorial designations were chosen in preference, and some of the old and popular names of regiments are now only preserved, in parenthesis as it were, by a given battalion, whose twin battalion originally belonged to, or formed, quite another regiment. The new territorial designations proving somewhat cumbersome and inconvenient, numbers for regiments seem likely to come in again, though not those of the regimental districts, nor, of course, the old ones. Meanwhile, at the side of the territorial designation there is also, in some cases, another; thus, the Lothian Regiment (Regimental District No. 1) is also, and by preference, called the Royal Scots; the Royal West Surrey Regiment, also the Queen's; the East Kent Regiment, also the Buffs, &c. Thus an approach to the old mode of distinction has been kept up.

The Queen's Regulation List still shows numbers for the cavalry regiments. Nor has this arm been subjected to the process of linking. The Engineers and Artillery (q. v.) have had militia and volunteers attached to them more recently. The system first adopted for the line has not been applied to the Foot Guards. Nor is the Yeomanry linked at all, but falls into two cavalry districts for auxiliary forces, the first having its headquarters at York, the second at Aldershot. There are also, independently of yeomanry, some Light Horse Volunteers and Mounted Rifle Volunteers, partly attached to corresponding Infantry Volunteer Corps. Also, not linked are: the Channel Islands Militia; the Royal Malta Fencible Artillery; the two West India Regiments; the Armorer Sergeants Corps; the Commissariat and Transport Corps, and the Ordnance Store Corps.

The new arrangements as to short service produced gradually for the British army an element which it long wanted—an efficient Reserve. And on the two occasions when the reserve men were called out, viz., in 1878, on a prospect of war with Russia; and in 1882 when many of these reserve men had to do actual service in warlike operations, the results are considered to have fully justified the anticipations conceived of this new plan. The corps of Old Pensioners which formerly represented an apology for a reserve force, are allowed to die out as a corps.

Some important steps have been taken to improve the material out of which the rank and file of the army is composed. Branding for desertion was abolished three years ago; flogging in 1880. Desertion, from which the British army has suffered more than the armies of the Continental powers, where the men have less facility of escape, has on the whole been rather decreasing, more especially in the form called 'bounty jumping.' A counter-weight to the loss of partial security which branding afforded, has been found; and recruiting has been improved by a slight rise in the daily pay, and by the introduction of deferred pay, the latter introduced by Colonel Stanley, consisting of an addition of £3 a year, payable on a man going into the reserve, or otherwise completing his service.

Some subordinate branches of the Army organization may be briefly mentioned: such are the Army Clothing Depôt at Pimlico, and the School of Music, at Kneller Hall, Twickenham.

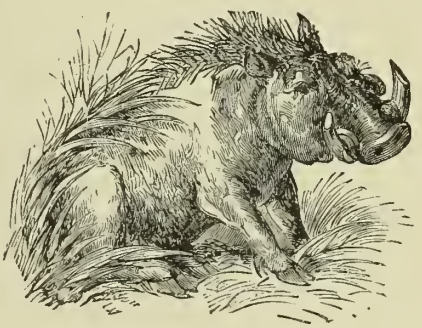
The distribution of regiments into divisions and army corps, which previously was wanting, has been completed, at least on paper. The actual regiments have been told off. The Guards and certain battalions of the line, with batteries and cavalry regiments, compose the First Army Corps, and some of the battalions had been raised to fighting strength, even before the Egyptian campaign of 1882. Thus, from twenty to thirty thousand men, with a due proportion of guns, are always to be ready to go out immediately on the declaration of hostilities. This state of things did not exist at the outbreak of recent South African wars, and even at the moment of the Egyptian war, it was more complete on paper than in reality. Some battalions had their complement of seasoned men; others required reserve men or volunteers from other regiments to swell their numbers. The Second Army Corps does not even claim to be complete without the Reserves. The latter amounted in 1883 to about 54,000 men, half of them trained soldiers; the other half, militiamen of fair training. As to artillery, the militia and volunteer artillery are considered sufficiently good to allow England to be drained of the royal gunners, except field artillery. It is intended to have a siege-train always ready at Woolwich. Great progress has been made as to the organization of the Transport Service, and during the recent Egyptian campaign a post-office corps was added, with much advantage to the army in the field. The conveyance of troops by sea has also been foreseen: plans for embarkation, transport, and disembarkation lie ready at the War Office, and the capacity of all steamships fit for carrying troops is known to the Admiralty. A vanguard for the First Army Corps may be said to be comprised in the garrisons of Gibraltar and Malta.

WA'RTBURG, WAR OF THE, the name given both to a grave poetic contest, which is represented to have taken place on the Wartburg, and also to a poem in the Middle High-German dialect, which commemorates the event. At the time when the aforesaid dialect had attained its highest literary development, and its poets enjoyed a brilliant reputation, Hermann, the munificent Landgraf of Thuringia, had made his court a sort of refuge or home for the *irritable race*, as well as for many other people. It could hardly fail, under the circumstances, that quarrels and jealousies should abound; and, in fact, allusions to these are sufficiently distinct in several of the most distinguished writers who lived at the Thuringian court—e. g., in Wolfram von Eschenbach and Walther von der Vogelweide. But soon after, the conception of these things underwent a sort of mythical transformation, and the occasional temporary and natural rivalries of the poets were changed into a particular and premeditated contest for superiority in poetic skill; and to the list of those poets who actually had intercourse with each other at Eisenach were now added others partly historical, and in part purely fictitious characters—e. g., the virtuous Schreiber, Bitterolf, Reinmar (subsequently confounded with Reinmar von Zweter), the almost mythical Heinrich von Ofterdingen, and the wholly mythical Master Klingsor, the Transylvanian magician and astrologer. On the basis of this historico-mythical tradition, and under the formal influences of the then much admired songs of emulation, riddle-contests, and ecclesiastical plays, there was composed, about the year 1300, a strange, obscure, unharmonious poem in two parts, called *Kriec von Wartburg*. In the first of these, executed in a long and artistically managed measure, and entitled *Tone des Fürsten von Thuringia*, Heinrich von Ofterdingen challenges the other poets to a contest in verse—the fate of the vanquished to be death—and asserts the excellence of Leopold, Duke of Austria, over all the other princes. Victory, however, inclining to the Eisenachers, Heinrich calls in Klingsor to his aid, who, on his part, fights his verse-battle against Wolfram by the assistance of evil spirits, with riddles and dark science. With distinct reference to Klingsor's 'black art,' the simpler and shorter measure of this second part is called *Schwarze Ton*.

Throughout the whole poem, which may be regarded as the first attempt at a secular drama, but which is rather an intermediate link between the Lyric contest and the Drama, one may trace an unmistakable imitation of Wolfram's style of poetry. The author is unknown. From the inequality of the style, one is disposed to conclude that several hands were employed in its composition. The poem, which has been much overrated in modern times, does not seem to have exercised any particular influence on literature. In a prose form, the story of the Wartburg Contest first appears—in the Thuringian Chronicles—after the beginning of the 14th c., and probably owes its origin to the poem. The poem was printed in a separate edition by Ettmüller (Ilmenau, 1830), and is also to be found in Bodmer's and Von der Hagen's collection of the *Minnesinger*.—See Von Plotz, *Ueber den Sängerkrieg auf Wartburg* (Weimar, 1851).

WA'RTHÉ, the longest and most extensively navigable affluent of the Oder, rises on the south-west frontier of Poland, 35 miles north-west of Cracow. In Poland, it flows north and west, and the length of its course in this country is 300 miles. It then flows west-north-west through Prussia for 180 miles, passes Posen, and joins the Oder at Kustrin, where it is 620 feet broad. Total length, 483 miles, for 220 miles of which it is navigable.

WART-HOG (*Phacochœrus*), a genus of *Suidæ*, closely resembling the true hogs in most of their characters, and particularly in their feet, but remarkably differing from them in their dentition; the molar teeth being much like those of the elephant, and replacing one another in the same manner. There are two triangular incisors in the upper jaw, and six small ones in the under; the tusks are lateral, very large, project far from the mouth, and are bent upwards; there are six or eight molars in each jaw. The head is very large, and the muzzle very broad; the cheeks furnished with large wart-like excrescences, so that the appearance is altogether very remarkable and uncouth. The species are all natives of Africa. They feed very much on the roots of plants, which they dig up by means of their enormous tusks. The AFRICAN W., or HARUJA (*P. Æliani*), a native of Abyssinia and of the central regions of Africa, from the coast of Guinea to that of Mozambique, is nearly four feet long, with a naked slender tail of one foot, is scantily covered with long bristles of a light brown color, and has a mane sometimes ten inches long, extending from between the ears along the neck and back. Another species is found in the south of Africa (*P. Æthiopicus* or *Pallasii*), the *Valke*



Wart-hog (*Phacochœrus Æthiopicus*).

Vark of the Dutch colonists at the Cape of Good Hope. The incisors of the latter fall out at an early age, those of the former are persistent.—A closely allied genus is *Potamochœrus*, of which there are several species, as the *Bosch Vark* of Cape Colony (*P. Africanus*), which is nearly black, with whitish cheeks having a central black spot; and the PAINTED PIG of West Africa (*P. penicillatus*), which is reddish, with black face, forehead, and ears. The species of *Potamochœrus* frequent swampy grounds, and sometimes receive the name of WATER-HOG. They have longer ears than the true wart-hogs, tapering and ending in a pencil of hairs, the face is elongated, and has a huge protuberance on each side. The flesh of all the wart-hogs and water-hogs is in high esteem. They are hunted by dogs, which are often killed in the encounter with them. They are much addicted to fighting among themselves.

WARTON, JOSEPH, D.D., was born at Dunsfold, Surrey, in 1722. His earlier education he received from his father, the Rev. Thomas Warton, sometime Professor of Poetry at Oxford. At the age of 14, he was sent to the great school at Winchester whence, in 1740, he was transferred to Oriel College, Oxford, where, four years afterwards, he took his degree of B.A. After passing the intermediate years as a curate at Chelsea and elsewhere, in 1748 he was presented by the Duke of Bolton to the rectory of Winsdale, near Basingstoke, a living of no great value, yet sufficient to determine his marriage with a Miss Damon, to whom he had been engaged. Previous to this, he had become known as a writer of verse in the *Gentleman's Magazine*. Dodsley's *Museum*, &c., and as the author of a volume of *Odes and other Poems*. In 1751, he went abroad with the Duke of Bolton; and after his return, he issued, in 1753, an edition of Virgil, with a

translation of the *Eclogues* and *Georgics*. This, with the critical notes and dissertations appended to the work, met with great approval, and subsequently procured him from the university of Oxford the degree of M.A. In 1756, appeared the first volume of his chief literary performance, the *Essay on the Writings and Genius of Pope*, the second and concluding volume of which was not given to the world till 1782. Venturing, as he did, to question the positive supremacy which it was then fashionable to attribute to Pope, W. did not by this work attain any very instant increase of popularity; but the value in relation to the literature of the time, of the critical principles announced in it, as also in his other more casual Essays, has since been sufficiently recognized. In 1755, W. was appointed second Master of Winchester School, of which he became head in 1766. Soon after, he revisited Oxford, and had conferred on him the degrees of Bachelor and Doctor of Divinity. Of preferment in the church, he had subsequently his full share. By the good offices of Dr. Lowth, Bishop of London, he was made, in 1782, a Prebendary of St. Paul's; and the living of Thorley, in Hertfordshire, was conferred on him. He obtained besides, in 1788, a prebend in Winchester Cathedral, and the rectory of Easton, which he soon after exchanged for that of Upham.

The Mastership of Winchester he resigned in 1793, and devoted himself to the preparation of an annotated edition of Pope, which was completed in 9 vols. 8 vo. in 1797. At his death, 23d February 1800, he was engaged on a similar edition of Dryden, of which he had published two volumes. Though W.'s reputation has not survived as a poet, yet it certainly has as a critic, along with that of his more distinguished brother.—See *Biographical Memoirs of Rev. Joseph Warton, D.D.*, by Rev. John Wooll, A.M. (1806).

WARTON, Thomas, the younger brother of the preceding, was born in 1728, at Basingstoke, in Hampshire, of which place his father had then become vicar. His earlier education he received chiefly at home from his father; and in 1743, he was entered at Trinity College, Oxford, where, in 1750, he took his degree of M.A. The year after, he obtained a fellowship. He remained at the university, employed as a tutor; and in 1757, he was made Professor of Poetry, in which capacity he was much esteemed as a lecturer. In 1767, he took his degree as Bachelor of Divinity, and was soon after presented to the living of Kiddington by the Earl of Lichfield. In 1782, that of Hill Farrance, in Somersetshire, fell to him by favor of his college; and these two unimportant pieces of ecclesiastic preferment were the only ones he ever enjoyed. Very early, he became known as a poet, and in 1754, he published a volume entitled, *Observations on the Faerie Queene of Spenser*, which established his reputation as one of the first critics of the day. In a second edition of the work, issued in 1762, it was expanded into two volumes. Of W.'s miscellaneous literary activity, no account need be given in detail. The work by which he is now chiefly remembered is his *History of English Poetry*, the first volume of which was published in 1774. Two other volumes followed in 1778 and 1781, but at his death the work remained unfinished.

In its wealth of information regarding the earlier portion of our literature, the book remains to this day unrivaled. As a poet, also, W. takes distinct, if not very high rank. In 1777, he published a collection of such of his scattered pieces as he deemed most worthy of being reprinted, and the acceptance it met with is shown in the successive editions of 1778, 1779, and 1789, as also in the fact, that on the death of Whitehead, the poet-laureate, W. had the honor, such as it might be, of being selected to succeed him in the office. The last work on which he was engaged was an elaborately annotated edition of the Minor Poems of Milton. Of this, published in 1785, a carefully prepared re-impression was issued the year after his death, which took place suddenly on the 21st May 1790. In 1802, a new edition of his poems was published, with a Life of the author by Mr. Mant.

WARTS (sometimes known in Surgery by their Latin name *Verrucæ*) are collections of lengthened Papillæ of the Skin (q. v.), closely adherent and ensheathed by a thick covering of hard dry cuticle. From friction and exposure to the air, their surface presents a horny texture, and is rounded off into a small button-like shape. Such is the description of the simple wart, which is so commonly seen on the hands and fingers (and rarely on the face or elsewhere) of persons of all ages, but especially of children. Amongst other varieties of warts are: (1) One to which the term *Verruca digitata* has been applied. It is more elongated in shape, and less protected by cuticle than the preceding. It is said to occur nowhere but on the scalp of women of adult age, and sometimes to occasion great annoyance in brushing and combing the hair. (2) *Subungual warts*, growing, as their specific name implies, beneath or at the side of the finger or toe nails. They originate beneath the nail, and as they increase, they crop out either at the free extremity or the side of the nail, and are usually troublesome, and often very painful. They are generally of syphilitic origin. (3) *Venereal warts*, caused by the direct irritation of the discharges of gonorrhœa or syphilis, and occurring about the parts which are liable to be polluted with such discharges. They attain a larger size, and are more fleshy and vascular than other warts.

Nothing is known of the causes of warts further than the third variety is induced by an irritating discharge, that the malignant form of wart which is the beginning of chimney-sweepers' cancer is caused by the irritation of soot, and that persons engaged in dissection and *post-mortem* researches are especially liable to them; hence we may infer they are always due to some local irritation. Venereal warts are certainly contagious; with regard to others, we cannot speak positively. In some cases, but not invariably, blood from a wart is capable of producing similar warts when applied to the skin. In consequence of the capricious way in which warts often spontaneously disappear, there are numerous popular charms for their removal, several of which may be found recorded in the pages of *Notes and Queries*. Common warts are so apt to disappear, that they may be often left to themselves. If it is desired to remove them, glacial acetic acid is perhaps the best remedy: it must be applied with a camel-hair pencil till the wart is pretty well sodden, care being taken not to blister the neighboring skin. One or at most two applications are usually sufficient. Nitrate of silver and tincture of iron are popular and general applications. Small warts hanging by a neck, may often be very simply removed by the moderately tight application of an elastic ligament (for example, a small broken elastic ring) to the base. The wart usually shrivels up, and falls off within a week. The other varieties of warts must be left to the surgeon.

WA'RWICKSHIRE, one of the midland counties of England, bounded on the W. by Worcestershire, on the N. by Stafford and Leicester shires, and on the S. mainly by Oxford. Area, 610,587 acres; pop. (1871) 630,472; (1881) 637,188. The surface, though presenting no lofty hills, is marked by gentle eminences and vales. The north districts of the county were formerly occupied by the forest of Arden, of which there are still remains; and the scenery, in general remarkably rich and charming, is varied by moor and heath. The principal rivers are the Avon, flowing from north-east to south-west; and the Tame in the north. The soil varies much in quality, being cold and heavy on the higher and more exposed positions; while in more favorable districts, it is as a rule good. Of the whole area, there were (1881) 491,569 acres under all kinds of crops. The chief manufacturing centers in W. are Birmingham and Coventry; the brass jewelry, iron, and steel-pen trades are carried on in the former, and ribbon-weaving and watchmaking in the latter. Of minerals, coal, stone, lime, and marl are found. The county returns four members to the House of Commons.

WA'RWICK, a municipal and parliamentary borough, chief town of the county of the same name, stands in the middle of the county, on the Avon, 20 miles south-east of Birmingham. It is a very ancient town, and contains many ancient and interesting buildings and institutions. Of these the most notable is Warwick Castle, the principal residence of the Earls of Warwick, beautifully situated on a rocky elevation, 40 feet high, on the banks of the Avon. Of this edifice, Guy's Tower, 128 feet high, was built in 1394; and Cæsar's tower, still more ancient, is 147 feet high. The interior, before the castle was partly burned, Dec. 3, 1871, was remarkable for its splendor and elegance, and has been restored in similar style. The Earl of Leicester's Hospital for aged brethren has an annual income of £2016. There are numerous other charities, with schools, libraries, &c. Agriculture and general trade afford employment to a large number of persons. W. returns two members to the House of Commons. Pop. (1871) 10,986; (1881) 11,802.

WARWICK, a township of Rhode Island, U. S. America, 10 miles south-west of Providence, on Narraganset Bay, and the Stonington and Providence Railway, containing the villages of Natick, Phœnix, Centerville, Arctic, Crampton, and Apponang. It has 22 cotton mills with 160,000 spindles and 4000 looms, 2 woollen mills, 2 bleacheries, 2 print-works, 15 churches. Drum Rock, a balanced rock of great size, can be moved by a child, and makes a sound which can be heard for miles. Pop. (1870) 10,453; (1880) 12,163.

WARWICK, Richard Neville, Earl of, K.G., popularly named the King-maker, was eldest son of Richard, Earl of Salisbury, and Alice, daughter and heiress of Thomas Montacute. He was born about 1420, shortly before the accession of Henry VI. Lord R. Neville, as he was then styled, early manifested his distinguished bravery and brilliant personal qualities in a hostile incursion across the Scottish marches, in which he accompanied his father, the Earl of Salisbury. He became the most powerful nobleman in the kingdom, by his marriage with Anne, daughter and heiress of Richard de Beauchamp, Earl of Warwick. He not only acquired by this alliance the broad lands of the Warwick family, but was created Earl of Warwick, with succession to the heirs of his wife. He is the most prominent figure in the civil War of the Roses, one of the darkest periods of our history. The Duke of York gained his support by his marriage with Lady Cecille Neville;

and when the barons declared the incapacity of Henry VI., and chose the duke to be protector of the kingdom, W. led into the field his well tried borderers of Wales. The Yorkists and the Lancastrians first met at St. Albans in 1455, when W. rushing suddenly into the town at the head of his men, mainly won the battle by his impetuous onset. He was rewarded with the government of Calais—'then,' says Comines, 'considered as the most advantageous appointment at the disposal of any Christian prince, and that which placed the most considerable force at the disposal of the governor.' He also obtained command of the fleet for five years.

In 1458, he sailed from Calais with five large and seven small vessels, and attacked a fleet of 28 ships, belonging to the free town of Lübeck. After a battle of six hours, he took six of the enemey's vessels. In 1460, he landed in Kent at the head of his troops, and entered London amidst the acclamations of the people. He defeated the queen's army, near Northampton, with great slaughter, and obtained possession of the person of the king. Richard, Duke of York, now advanced his claim to the throne. Queen Margaret raised an army to rescue the king; and the duke committed the idiotic monarch to the custody of the Duke of Norfolk and W., while he advanced to Wakefield to attack the Lancastrians. The duke was taken, and put to death; and W.'s father, the Earl of Salisbury, with twelve other Yorkist chiefs, was beheaded at Pontefract. Another battle at St. Albans was won by the Lancastrians; but Edward, Earl of March, now Duke of York, accompanied by W., marched boldly upon London, which was throughout Yorkist, and Edward was proclaimed king by the style of Edward IV. The next battle was that of Towton, near York. The Lancastrians had retaken the pass of Ferrybridge, on the river Aire, and W. in despair at the loss of so good a position, rode up to Edward, and dismounting, shot his own horse through the head, as a signal for an attack from which there could be no retreat, exclaiming: 'Sir! let him flee who will flee; but by this cross' (kissing the hilt of his sword) 'I will stand by him who will stand by me!' The Lancastrians were defeated with immense loss; and Edward, returning to London in triumph, was crowned June 22, 1461. The battle of Hexham was followed by the capture of Henry; and W., who had been left in command in London, placed the deposed king on a horse, under whose belly his feet were fastened, and thus led him through Cheapside to the Tower. W. having been authorized to negotiate with Louis XI. of France for the marriage of his sister-in-law, the Princess Bonne of Savoy, to King Edward, could not brook the king's sudden marriage with Elizabeth Woodville, and seemed inclined to show that he could pull down as well as set up kings. He was now at the height of his power.

To the earldoms of Warwick and Salisbury, with the estates of the Spencers, he added the offices of High-admiral and Great-chamberlain, together with the lord-lieutenancy of Ireland and the government of Calais. Comines states the income of his offices at 80,000 crowns a year, besides the immense revenues accruing from his patrimony; yet he had the meanness to accept a secret pension and gratuities from Louis XI. After being sent into honorable banishment by means of embassies to France, Burgundy and Britany, he gave his daughter in marriage to George, Duke of Clarence, without asking Edward's permission. He soon afterwards broke out into revolt against Edward, and concluded a treaty with Queen Margaret, by which it was agreed that her son, Prince Edward, should espouse Anne Neville, W.'s daughter, and that in failure of issue, the crown should devolve on Clarence. King Edward escaped to Holland; and Henry VI. resumed the sovereignty. Edward, however, raised a body of Flemings and Dutchmen, and, landing near Hull, advanced towards London. He gave battle to King Henry's army, commanded by W., at Barnet, April 14, 1471. The battle was memorable and important. W. and his brother, Montague, were left dead on the field, and with them fell the greatness of the House of Neville. This fatal battle, followed by the decisive engagement of Tewkesbury, completed the defeat of the Lancastrians, and concluded the sanguinary War of the Roses. It appears (Fenn's *Letters*) that every individual of two generations of the great families of Warwick and Somerset fell on the field or on the scaffold, a victim of these sanguinary contests. W. is the most conspicuous personage of these disturbed times. He kept open house wherever he resided, and daily fed at his various mansions 30,000. He loved turbulence for its own sake, and was ready to make or unmake any king, according to the caprice of the moment, and in order to show his power.

WARWICK, GUY OF, the hero of one of the most ancient and popular of our early romances. His father was Segard, steward of Rohand, Earl of Warwick; his instructor in the exercises of chivalry, the famous Héraud of Ardenne. Having fallen deeply in love with Felice, the fair and accomplished daughter of the earl, he fell into a grievous sickness, but was recalled to life by a promise of her hand when he had earned it by knightly deeds. Immediately he crossed to Normandy, at the great tournament of Rouen distanced all competitors, and at once set out into 'far lands,' traveling through Spain, Almayne, and Lombardy, and gaining the prize in every tournament. He then returned to England, but his haughty mistress was still unsatisfied. Once more he left his country to traverse Flanders and Italy, and here he well-nigh lost his life through the treachery of Otho, the 'felon duke' of Pavia. He next went to Constantinople to save the Emperor Ernis from the Saracens, slew the mighty Coldran, cousin of the 'soudan,' and scattered his huge army. The grateful emperor pressed on him the hand of his lovely daughter and heiress Loret, but Sir Guy tore himself away, and returned, with many adventures by the way, to his native country. No sooner had he reached its shores, than tidings were brought of a most portentous dragon then ravaging Northumberland. He hastened to meet the monster, slew him, and carried his head to King Athelstane, at Lincoln. The fair Felice had now no scruple to marry the hero. But regret for all the slaughter he had done merely for a woman's love began to seize him, and after forty brief days of wedded happiness, he let his home in the dress of a palmer to visit the Holy Land. Here he rescued Earl Jonas from his dungeon, and slew the ferocious giant Amiraunt, after which he returned to England to find Athelstane besieged in Winchester by the Danish Anlaf, of whose army the mainstay was the terrible Colbrand. Sir Guy, still in his disguise, after a prolonged and awful struggle, succeeded in striking off the champion's head. He now visited his wife all unknown in his palmer's weeds, and then retired to a hermitage in Ardenne. Before his death he sent her parting ring as a token to Felice, and she arrived in time to close his eyes, survived him for but fifteen days, and was buried in the same grave.

WASH, a wide estuary on the east coast of England, between the counties of Lincoln on the north-west and Norfolk on the south-east, is about 22 miles in length, and 15 miles in average breadth. It is surrounded by low and marshy shores, and receives the rivers Witham, Welland, Ouse, Nen, and Nar. The estuary for the most part is occupied by sandbanks, dry at low water, and between these sandbanks are the channels through which the rivers mentioned flow into the North Sea. On both sides of the channel by which the Ouse falls into the sea, considerable tracts of land have been reclaimed. Anchorage is afforded to vessels by two wide spaces or pools of water, called respectively Lynn Deeps, opposite the coast of Norfolk, and Boston Deeps, opposite the Lincolnshire coast.

WASHING AND WASHING-MACHINES. Although domestic washing is a simple enough process, yet it may be useful to give a brief description of the most efficient way of conducting it, in so far as experience and correct principles can guide such an operation. The first essential is suitable water, in other words, *soft* water. See WATER-SUPPLY. Yellow Soap (q. v.) being the kind chiefly used in washing linen, it is well to bear in mind that it is not desirable to purchase it very pale in color, or very low in price. In order to gratify the desire for a light color, soap-makers are obliged to reduce the strength of good dark soaps with adulterants; and it will give some idea of how easily the demand for cheapness may be met, to state, that hard soap, which should not contain so much as 25 per cent. of water, can be made with as much as 75 per cent. Soap, as is well known, improves by keeping. Soft or potash soap is sometimes used to wash coarse things, on account of its being stronger than hard soap, but its smell is objectionable. Soda is easily procured good; and with respect to washing-powders, as their merit depends on the amount of alkali which they contain, suffice it to say that to buy them is only a dear way of buying soda.

In arranging clothes for washing, it is desirable to sort them into kinds most suitable for washing together; such as lace, nets, and fine muslin into one heap; white body linen into another; colored things of the nature of prints and ginghams into another; and so on. It is also desirable to wash clothes as soon as possible after they are soiled. Previous to washing, all white articles should be soaked for a night in cold water, in which a little soda has been dissolved, as the steeping in alkaline water greatly aids in removing all dirt of a greasy nature. The clothes should then be washed twice in clean tepid water with a sufficient supply of soap. If the water is quite cold, the dirt is taken off with difficulty; and if too hot, it is apt to fix it into the fibre of the cloth. The clothes should next be examined for spots or stains, so as to remove them, if possible, by an additional rubbing; after which they are boiled for at least 15 minutes in soap and water. Ink-stains or iron-molds require to be taken out with oxalic acid, or the essential salts of lemon (oxalate of potash); and fruit-stains by boiling the stained parts with pearlash. After being boiled, the clothes are rinsed twice in cold water; and in the second rinsing, a little stone blue is added, to neutralize any yellowness occasioned by the washing. When this is done, they are wrung, and hung out to dry.

For the washing of flannels, it is even more desirable that the water should be soft than for linen or cotton; and it should contain no soda or potash in any form, as although a little alkali would more effectually remove dirt, yet it always turns woollens yellow, and at the same time thickens them. It is well to remember also that all rubbing, wringing, or squeezing tends to make woollen goods shrink, by facilitating their tendency to felt or mat into a thicker fabric. With respect to ladies' colored dresses made of fine wool, such as merino, it is considered best to wash them in warm soft water with ox-gall, say a pint in a tubful of water. Ox-gall is a soap in its chemical nature, and it clears and brightens the colors.

The washing of printed cotton fabrics, especially muslins, has of late years become a difficult operation, on account of the fugitive nature of some of the dye-stuffs employed. The beautiful hues produced by the aniline or coal-tar colors, and by the archil lakes in imitation of them, have led to their being extensively used in calico-printing, as well as in the dyeing of silk and wool. These dyes can scarcely be said to be permanent on any fabric; but on cotton they require to be fixed by mordants, such as albumen (white of egg), which will scarcely stand washing at all, and to which hot water is utter destruction. The same thing is true of some other dyes, such as the light blue produced by artificial ultramarine. If economy is to be studied, it is far better to have printed dresses done in fast colors—the reds and purples, from madder, for example—as they, although less attractive at first, can be washed without injuring their appearance. All such articles should be washed in soft warm water; that which has been used for flannels, if not too dirty, will do. When thoroughly cleaned, rinse them well in clean cold water, and do not allow them to remain long in contact before they are hung up to dry.

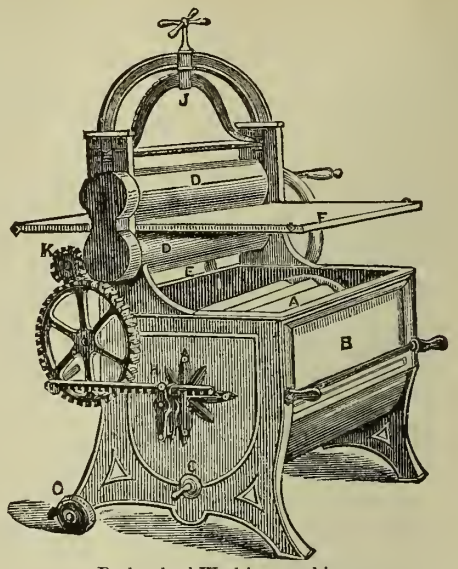
White silk articles, as stockings and gloves, should be washed with soap, first in milk-warm, and afterwards in nearly boiling water. They will be improved if hung up for a short time in the fumes of burning sulphur (sulphurous acid) while still damp.

We have now to notice the domestic washing-machines which have, of late years, come into rather extensive use. A machine of this kind, when in motion, ought to produce at least as much agitation as will keep up a constant change in the deterging solution in contact with the linen, and at the same time cause the clothes to slide over each other in a somewhat analogous manner to hand-washing. There is an old form of washing-machine called the *dolly-tub*, which has been in use in Yorkshire for upwards of eighty years. It consists essentially of a presser or dolly, which is simply a round piece of wood, say ten inches in diameter, with from three to five legs rounded at the ends; the whole exactly resembling a footstool, but with the addition of an upright rod or spindle from its center, with a cross piece at the top for working it. Any vessel, such as a tub, barrel, or box, may be used to hold the clothes, which are washed by moving the dolly first one way and then the other, at the same time a certain pressure being exerted on them against the sides and bottom of the vessel.

Of recent washing-machines, a certain class of them are modifications of the dolly-machine, with spring-ribbed boards, on which the linen is rubbed by a swinging motion. Another class consist of boxes which also oscillate upon an axes, but operate by jerking the clothes and water from side to side. A third, and perhaps the most efficient class are made upon the principle of the dash-wheel, so much used in large bleach-works. In this machine, the materials to be washed are lifted by internal ribs on the rim of a large wheel, and allowed to fall with some force from fully half its height into the cleansing liquid—this being of course repeated as the wheel rotates.

The annexed figure shows a dash-wheel washing-machine for domestic purposes, by Messrs. Summerscales & Sons, Keighley, Yorkshire. The names of its separate parts are given in the references to the letters, but we may explain that the linen is put inside the drum or dash-wheel, A (a sparred cylinder), which has a reciprocating action, so that, after making a complete revolution, it is reversed. The clothes are thus driven both ways through the water, and the quick reversing action of the machine gives them a jerk or dash at each change of motion—the equivalent of the fall from a large dash-wheel. There are brushes on the inside of the drum, which are brought into play if the clothes are coarse and dirty, but are turned out of action if they are of a fine description. A machine of this kind, 26 inches wide, will take in two pair of sheets or a dozen of shirts at a time, and by turning the handle with a brisk motion, they will be washed in eight or ten minutes. The lather for linen is made up with one pound of soap, half a pound of soda, and three quarts of water—the last being poured in boiling. Only about half as much soap is required as for washing by hand.

The wringing is performed by passing the wet clothes through the wooden rollers D, D, the upper one being temporarily covered with flannel to protect buttons, hooks and eyes, &c. from damage. The necessary pressure is obtained by means of the spring at J, and before turning the rollers, the washing cylinder is thrown out of gear. With the aid of the mangling-boards, F, the clothes are mangled by these same rollers.



Dash-wheel Washing-machine:

A, Drum inside of tub; B, Tub with cover removed; C, Tap to draw off water; D, Wooden rollers; E, Drip-board; F, Mangling-Boards; G, wheels to remove the machine; H, Oscillating motion for dash-wheel; I, Brushes for dirty clothes; K, Wheel thrown out of gear when mangling, in gear when washing.

Washing by Steam, though little known in England, is practised to a considerable extent in France. The French chemist, Chaptal, first brought the process to perfection. Besides a saving of fuel, soap, and manual labor to the extent of at least one half, the wear and tear of the linen attending rubbing and beating is avoided. The efficacy of steam in washing depends upon its penetrating and dissolving property. The clothes are first steeped in a ley of soda or potash, or in a mixture of alkali and soap, and then hung in a wooden vessel kept full of steam by a pipe communicating with a boiler. On a small scale, a large cask, made air tight, will answer, and a common tea-kettle will produce steam enough. There must be an aperture to allow the air to escape when the steam first enters; the air being expelled, the aperture is shut. In half an hour, the dirt is sufficiently loosened to wash out with ease, and the linen is found to be extremely white.

WASHING OF FEET (called in Latin *Pedilavium*, and sometimes *Mandatum*, from the first word of the 'little chapter' in the service), one of the ceremonial observances of the Holy Week (q. v.) in the Roman Catholic Church. It forms part of the service of Holy Thursday, which day, from the word *mandatum*, is also called Maundy Thursday. The origin of this observance is extremely ancient. It is founded on the example and exhortation or precept of our Lord in John xiii. 5—14; and is traceable in the writings of Justin, Tertullian, Ambrose, and Augustine, as well as in many of the early councils. In some churches, however, or at least at some particular periods, the day fixed for the ceremonial was Good Friday, although for many centuries it has uniformly been assigned to Holy Thursday. It is necessary, however, to distinguish from the ceremonial of the Holy Week, another washing of the feet (also called *pedilavium*), which, in the case of catechumens, preceded baptism, and which, in many churches, was accompanied by a washing of the head, *captilavium*, and took place on Palm Sunday (q. v.), thence called 'Dominica Captilavii.' To this usage Sts. Ambrose and Augustine distinctly refer. In the medieval and modern church, the washing of feet has generally followed the solemn mass of the day. In those churches where the ceremony is still retained, the officiating bishop or priest, wearing a cope, and girt with a towel, and attended by a deacon and subdeacon, washes, dries, and kisses the right foot of a certain number of pilgrims, generally twelve, in memory of the twelve apostles; after which all the pilgrims are hospitably entertained, and served in person by the bishop, who distributes to each a dole in money or provisions. An appropriate service, consisting of a gospel (John xiii. 1—14) sung by the deacon, a chapter ('Mandatum novum') chanted by the choir, and a prayer by the bishop, accompanies the ceremonial. The washing of the pilgrims' feet on Holy Thursday forms a very striking part in the Holy Week ceremonial as carried out not only by the pope, but also by the bishops in most of the great cathedrals abroad. It was also practised by kings and other royal and noble personages, even down to a very recent date.

WASHINGTON, GEORGE, Commander-in-chief of the Continental forces in the war of the American revolution, and first President of the United States, was born in Westmoreland county, Virginia, February 22, 1732; son of Augustine Washington and his second wife, Mary Ball; a descendant of John Washington, who emigrated to Virginia from England about 1657, who was a grandson of John Washington, mayor of Northampton, and first lay-proprietor of the Manor of Sulgrave, in Northamptonshire, who married a daughter of Shirly, Earl Ferrers. Lawrence, an elder brother of John, studied at Oxford; John resided at one time at South Cave, Yorkshire. Being royalists in the time of Cromwell, both emigrated, and became landed proprietors and planters in Virginia, in the district between the Potomac and Rappahannock rivers. Augustine Washington died when his second son George was 12 years old, leaving a large property to his widow and five children. His education in the indifferent local schools extended only to reading, writing, arithmetic, book-keeping, and land-surveying, then an important acquisition. He grew tall, had great physical strength, and was fond of military and athletic exercises. At the age of 13, he wrote out, for his own use, 110 maxims of civility and good behavior. In 1740, his elder brother, Captain Lawrence Washington, served under Admiral Vernon in the expedition against Carthagena, and named his residence on the Potomac Mount Vernon, in honor of his commander, who offered George a commission as midshipman on his ship, which, but for the opposition of his mother, he would have gladly accepted. He then spent his time chiefly with his brother at Mount Vernon, and with Lord Fairfax, who owned great estates in the Virginia valley; and in 1748, he engaged to survey these wild territories for a doubloon a day, camping out for months in the forest, in peril from Indians and squatters. At the age of 19, at the beginning of the Seven Years' War, he was appointed adjutant of the provincial troops, with the rank of major; in 1751, he made his only sea voyage—a trip to Barbadoes—with his brother Lawrence, who died soon after, and left George heir to his estates at Mount Vernon.

At 22 (1754), he commanded a regiment against the French, who had established themselves at Fort Duquesne (now Pittsburg), and held Fort Necessity against superior numbers, until compelled to capitulate. The year following, when two regiments of regulars were led against Fort Duquesne by General Braddock, W. volunteered; and at the disastrous ambuscade of July 9, 1755, he was the only aide not killed or wounded. He had four bullets through his coat, and two horses were shot under him. The Indians believed that he bore a charmed life, and his countrymen were proud of his courage and conduct. Two thousand men were raised, and he was selected to command them. In 1759, he married Mrs. Martha Custis, a wealthy widow, resigned his military appointments, and engaged in the improvement of his estates, raising wheat and tobacco, and carrying on brick-yards and fisheries. He was, like nearly all Americans of property at that period, a slaveholder, and possessed at his death 124 slaves, whom he directed, in his will, to be emancipated at the death of his wife (who survived him but three years), so that the negroes of the two estates, who had intermarried, might not be separated. He was for some years a member of the Virginia Assembly; and in 1774, though opposed to the idea of independence, and in favor of the union with Great Britain so ardently desired by all British Americans, he was ready to fight, if necessary, for the constitutional rights of the colonists. He spoke seldom and briefly; but Patrick Henry declared him to be, 'for solid information and sound judgment, unquestionably the greatest man in the assembly.' The news of the battle of Lexington (April 19, 1775) called the country to arms; and W., then a member of the Continental Congress, was elected Commander-in-chief by that body. He hastened to the camp at Cambridge; compelled the evacuation of Boston; was driven from New York; compelled to retreat across New Jersey; often defeated, and reduced to the most desperate straits, by disaffection, lack of men and supplies, and even cabals against his authority; but by his calm courage, prudence, firmness, and perseverance, he brought the war, with the aid of powerful allies, to a successful termination; and (Dec. 23, 1783), the independence of the thirteen colonies achieved, he retired from the army to Mount Vernon, which he had, during the eight years of the war, but once visited. He refused pay, but kept a minute account of his personal expenses, which were reimbursed by Congress.

In 1784, he crossed the Alleghanies to see his lands in Western Virginia, and planned the James River and Potomac Canals. The shares voted him by the state he gave to endow Washington College, at Lexington, Va., and for a university. The Federation of States having failed to give an efficient government, W. proposed conventions for commercial purposes, which led to the Convention of 1787, of which he was a member, which formed the present federal constitution, considered by him as the only alternative to anarchy and civil war. Under this constitution he was chosen president, and inaugurated at New York, April 30, 1789. With 'Lady Washington,' so termed by the courtesy of the period, he presided over a federal court, far more formal and elegant than exists at this day, and made triumphal progresses in the north and south. During his second term of office, he was disgusted by the opposition of the Republican party, under the leadership of Jefferson and Randolph, and refusing a third election, he issued, in 1796, his farewell address, and retired to Mount Vernon. In 1797, when there arose a difficulty with France, threatening hostilities, he was appointed lieutenant-general and commander-in-chief. On the 12th of December 1799, he was exposed in the saddle, for several hours, to cold and snow, and attacked with acute laryngitis, for which he was repeatedly and largely bled, but sunk rapidly, and died, December 14. His last words were characteristic. He said: 'I die hard; but I am not afraid to go. I believed from my first attack that I should not survive it. My breath cannot last long.' A little later he said: 'I feel myself going. I thank you for your attentions; but I pray you to take no more trouble about me. Let me go off quietly. I cannot last long.' After some instructions to his secretary about his burial, he became easier, felt his own pulse, and died without a struggle. He was mourned even by his enemies, and deserved the record: 'First in peace, first in war, and first in the hearts of his countrymen.'

W. was 6 feet 2 inches high, with brown hair, blue eyes, large head, and strong arms; a bold and graceful rider and hunter; attentive to his personal appearance and dignity; gracious and gentle, though at times cold and reserved; childless, but very happy in his domestic relations and his adopted children—nephews and nieces. His best portraits are those by Stuart, and the statue by Houdin at Richmond. He was an exemplary member of the Church of England.—See art. UNITED STATES; also Sparks's *Life and Writings of Washington*, 12 vols. 8vo (Boston, 1834—1837); *Life of Washington*, by Chief-justice Marshall, 5 vols. 8vo (Philad. 1805); *Life of Washington*, by Washington Irving, 5 vols. 8vo (New York, 1855—1859); &c.

WA'SHINGTON, a territory of the U. S., in lat. 45° 30′—49° N.; long. 117°—125° W.; bounded N. by British Columbia, E. by the territory of Idaho, S. by the Columbia River, which separates it from Oregon, W. by the Pacific Ocean. Estimated area, 69,994 square miles. Its capital is Olympia. Port Townsend is a flourishing site on Puget's Sound; and other new towns, with a multitude of mining villages and camps, are scattered over the territory. The chief rivers are the Columbia or Oregon, on the southern border, which also drains the whole territory east of the Cascade Mountains; the Okonagan, its great northern branch, flowing from the lake of the same name in British Columbia; Lewis or Snake River; and numerous streams emptying into Puget's Sound and the Pacific. W. is rich in sounds and harbors. Puget's Sound, from 1 to 4 miles wide, and 8 fathoms or more in depth, opens out of the Strait of Juan de Fuca, penetrating 100 miles into the heart of the country, and with its bays and islands forming one of the finest collections of harbors in the world. Hood's Canal, a narrower channel on the west, extends 60 miles. Bellingham, on the eastern shore of the Gulf of Georgia, has a tide of 20 feet. There are also large and deep harbors, suitable for naval stations, on the Strait of Juan de Fuca.

The great range of Cascade Mountains, a continuation of the Sierra Nevada, passes through the center of the territory from north to south, about 100 miles from the coast. Its chief summits are Mount Baker, lat. 48° 44′, 11,900 feet, an active volcano; Mount Rainier, lat. 46° 40′, 12,330 feet, an extinct volcano; Mount St. Helen, 9550 feet, nearly extinct; Mount Adams, 9000 feet, entirely extinct. East of the Cascade Mountains, the soil is thin, rocky, dry, and sterile, but with fertile valleys; on the west, and especially around Puget's Sound, the soil is rich, and the country covered with a dense evergreen forest. West of the Cascades, the formation is of tertiary sandstone; near the Sound, the alluvium has a depth of 100 feet. Lignite, or tertiary coal, is found in many places. The mountains are granitic, and near Mount Adams is a large field of lava. East of the Cascade Mountains, the formations are igneous and metamorphic, with trap and volcanic scoriæ. There are rich gold-diggings in the north-eastern portion. The climate in the western district is almost precisely that of England, with a rainfall of 53 inches; east of the mountains, there is but a quarter of the rainfall, and extremes of heat and cold. The timber in the western district is of great richness and abundance; the red fir and yellow fir (*Abies Douglasii* and *A. grandis*), growing 300 feet high, and 6 to 8 feet in diameter. The vegetable and animal productions are the same as in Oregon. Fish are very abundant, a dozen species of salmon filling all the streams, with halibut, cod, herrings, and sardines in great quantities. The water and mountain scenery is among the finest on the continent. The chief product is timber, of which 250,000,000 feet were produced in 1875. Steam sawmills on Puget's Sound and Hood's Canal saw 150,000 feet a day. Wheat, barley, oats, potatoes, and the hardier fruits, are

produced in abundance. This territory was discovered by Juan de Fuca, a Greek, in 1592; visited by a Spanish navigator in 1775, and three years after by Captain Cook.

In 1787, Berkeley, an Englishman, re-discovered the Strait of Fuca, which had been missed by others. Captain Gray, an American, visited the coast in 1791; and the English Captain Vancouver in 1792; Captains Lewis and Clark explored the interior during the presidency of Jefferson, and settlements were made by the Hudson's Bay Company in 1828; in 1845, American settlers entered the territory, then a part of Oregon. It was constituted a separate territory in 1853. Wars with the Indians in 1855 and 1858 retarded immigration, but in the latter year 15,000 persons were attracted by the gold-diggings at Fraser's River. Pop. (1870) 23.995, besides 15,508 tribal Indians; (1880) 75,120, besides Indians.*

WASHINGTON CITY, the seat of the government of the U. S. of America, is in the district of Columbia, on the left bank of the Potomac River, between Anacostia River and Rock Creek, which separates it from Georgetown, lat. 38° 51′ 20″ N., long. 77° 0′ 15″ W., 35 miles south-west of Baltimore, 136 from Philadelphia, 205 from New York, 120 north-east of Richmond, 1203 from New Orleans, 2000 from San Francisco, 160 above the mouth of the Potomac, and 300 from the Capes of the Chesapeake. The Potomac at W. is one mile wide, and of sufficient depth for the largest vessels. The city was laid out under the direction of General Washington, on a handsome scale for the national capital, on a plateau 40 feet above the river, with several elevations, with streets from 90 to 120 feet wide, and 20 avenues, 130 to 160 feet. The principal edifices are the Capitol; the White House, residence of the president; Patent-Office; General Post-Office; Treasury, War, and Navy Departments; Smithsonian Institute (q. v.), &c.

The Capitol, on the summit of a gentle elevation, in a pleasure-ground of 35 acres, was commenced in 1793, burnt by British troops in 1814, completed in 1825, and extended by the addition of two spacious wings in 1851; the center is 352 feet by 101, with a lofty dome; the wings, 142 by 238 feet; the entire building being 751 feet long, 324 deep, covering 3¼ acres—the center of white sandstone, the wings white marble. The Rotunda, under the dome, contains several national pictures by Trumbull, Weir, Vanderlyn, Powell, Chapman, &c. The Senate Chamber is a noble hall, 112 by 82 feet, with galleries for 1000 spectators; the Hall of Representatives is 139 by 93 feet, with galleries for 1200. The Congressional Library, 91 by 34 feet, which receives a copy of every new book, contains upwards of 300,000 volumes. The Capitol is highly ornamented with rich marbles, frescoes, and groups of statuary. The buildings of the Treasury and State Departments, Post-office, &c., are massive and spacious. The saloons of the Patent Office, filled with models, are 1300 feet in length. A monument to Washington, intended to be 600 feet high, came to a stand-still; but Congress decided in 1876 to complete it as a plain obelisk, 70 feet square at the base, and 470 feet high. The city also contains numerous large hotels, 120 churches, a Roman Catholic and a Baptist College, five daily and several weekly newspapers, academies, schools, &c. The public buildings alone, however, are spacious and costly, the city in general having a scattered and mean appearance. During the War of Secession, from its exposed position, it was threatened with capture, and was surrounded by fortifications, and converted into an entrenched camp. Pop. (1870) 109,199; (1880) 147,307.



The Capitol at Washington.

WA'SHITA, a river of the U. S. of America, rises on the western borders of Arkansas, and runs east and south-east through Louisiana, emptying into the Red River, 30 miles from its mouth; it is 500 miles long, and navigable to Camden, 300. Its chief branches are the Saline River, La Fourche, Tensas, and Little Missouri.

WASHOE SILVER MINES, a rich deposit of siliceous argentiferous galena, discovered in 1859 in a range of hills on the east side of the Sierra Nevada, on the borders of California and Nevada Territory, near the sources of Carson's River, 160 miles east by north of Sacramento. The ore produces as much as 2000 dollars to the ton, and is largely exported to England. The discovery of these mines caused a great excitement in California, and a large emigration.

WASP (*Vespa*), a Linnæan genus of insects, now forming the family *Vespidæ*, a very numerous and widely distributed family, of the order *Hymenoptera* and section *Aculeata*. They are distinguished from all the other *Hymenoptera*, by their wings, when at rest, being folded throughout their entire length. The wings of all the wasps exhibit a similar pattern of nervation, with one marginal and three submarginal cells, and an incomplete terminal submarginal cell. Their antennæ are usually angled, and somewhat club-shaped at the extremity. The maxillæ are long and compressed; there are glands at the extremity of the labrum; the tongue is trifid, its tips laciniated. The body is naked, or but slightly hairy. The general appearance resembles that of bees; the color is usually black, with yellow markings. The division between the thorax and abdomen is very deep, the abdomen often stalked. The legs are not fitted for collecting pollen, like those of bees. The females and neuters have stings, generally more formidable than those of bees. The larvæ have tubercles instead of feet. The wasps differ very widely in their habits, some being solitary, the family *Eumenidæ* of some entomologists; others social, to which the name *Vespidæ* is sometimes restricted. Neuters are only found among the social wasps. Some of the solitary wasps make curious burrows in sand, or construct tubes of earthy paste on the sides of walls, in which they form cells for their eggs, at the same time placing there a store of food for the larvæ, some of them using for this purpose perfect insects, others caterpillars, which are stung so as to be rendered incapable of motion without being killed. Others make little earthen cells on the stems of plants, and store in them a little honey for their young.

The social wasps have various modes of constructing their nests, which are sometimes formed in excavations in the ground, sometimes attached to walls, boughs of trees, &c., and formed of a paper-like, or sometimes a paste-board-like substance, produced by mixing into a pulp, with their saliva, small particles of woody fibre, torn by their broad and powerful mandibles from gate-posts, palings, the bark of trees, &c. Great diversities are to be seen in the arrangement of the combs within the nest. The combs are made of a substance similar to the outer covering of the nest, but generally thicker and firmer. As the nest is enlarged, new paper is made for the purpose, the whole nest being enclosed in the last-made envelope, and the inner ones, which sufficed for its former size are removed to give place to combs. Several inner envelopes are generally found in a W.'s nest so that paper-making must be a great part of the industry of these insects. The nests of the wasps of tropical countries are often very large, sometimes six feet long, and the communities very numerous. In colder regions,

* In 1860, before the abstraction of the eastern and larger portion of its area, which is now included in the separate territories of Idaho and Montana, W. Territory contained 193,071 square miles.

the increase of the community and of the nest is arrested by the approach of winter, when the males and the neuters die; but a few of the females survive, passing the winter in a torpid state in some retreat, and found new communities in spring. In a community of wasps there are many perfect females—not a single queen, as in the case of hive bees. Wasps in their perfect state



Nests of Various Species of Wasps:
1, Vespa crabro; 2, V. Holsatica; 3, V. vulgaris.

feed very indiscriminately on a great variety of animal and vegetable substances, as insects, flesh, fruit, sugar, &c. Grapes or gooseberries, especially if over-ripe, are often found to contain a W. in the interior. Wasps often invade bee-hives and steal honey. There is a Brazilian species (*Myropetra scutellaris*) which stores up honey like bees. Wasps may be killed by pouring hot water on their nests; but more easily by the vapor of burning sulphur, when the nests are not in the ground; or ether or chloroform may be used to stupefy the wasps, so that the nest may be safely destroyed. The largest British species of W. is the Hornet (q. v.), found only in the south of England. The most abundant species, diffused over all parts of the country, are *Vespa vulgaris* and *V. media*. The former is about eight lines long. The front of the head is yellow, with a black center; there are many yellow spots on the thorax, and a yellow band with black points at the posterior margin of each ring of the abdomen; the rest is black. *V. media* is very similar, but rather larger, *V. vulgaris* makes its nest in the ground; *V. media* suspends it generally to the branches of trees, but sometimes to the projections of walls.

WASTE, in English Law, has several meanings. (1.) It means a common belonging to a manor, and by analogy is often applied to pieces of land of no great value, lying at the sides of highways or the seashore. The presumption is that a strip of land adjoining a highway belongs to the owner of the land next to it. (2.) Waste also means the spoil or destruction to houses, gardens, trees, or other corporeal hereditaments, committed by tenants for life or for years, to the injury of the remainderman or reversioner. Thus, he who has a life estate, or an estate for years, in a house or land, cannot change the nature of things, as by turning meadow into arable, nor wood into pasture, though he may better a thing of the same kind, as by draining the meadow, &c. The alteration caused by thus diminishing an inheritance is called waste, and its characteristics are to diminish the value of the inheritance, or to increase the burden upon it, or to impair the evidence of title. Waste is either voluntary or permissive. The former consists in the commission of acts which the tenant has no authority to do—such as pulling down buildings, felling timber, or opening mines. Permissive waste arises from the omission of acts which it is the tenant's duty to do—as, for example, suffering buildings to go to decay by wrongfully neglecting to repair them. There is, however, incident to every estate for life or years, the right to take estovers—that is, so much wood, stone, &c., as is required for use on the tenement, for repairs, husbandry, and the like purposes. It is a common practice, in family settlements, to provide that, in addition to this privilege, the estates of the tenants for lives shall be without impeachment for waste. The effect of this clause is to enable the tenant to take timber, minerals, &c., severed by himself or others during the continuance of his estate. But even where the tenant holds without impeachment of waste, he is not entitled to cut down ornamental timber; and if he do so, a court of equity will restrain him by injunction. Wherever the tenant is committing acts of a character especially destructive to the inheritance, or still more, acts of wanton or malicious mischief, the Court of Chancery holds that his legal power to commit waste is being used unconscientiously, and will restrain him.

WASTE LANDS, according to the general use of the term, are uncultivated and unprofitable tracts in populous and cultivated countries. The term waste lands is not employed with reference to land not reduced to cultivation in countries only partially settled. There is a large extent of waste lands even in the British Islands. Of the 77,800,000 acres which they contain, only about 47,000,000 are arable land and improved pasture; 2,000,000 acres are occupied with woods and plantations; 7,000,000 acres in Scotland consist of sheep-pasture, generally at a considerable elevation, and little improved by art; 8,000,000 acres in Ireland are unenclosed pasture, generally quite unimproved; 3,000,000 acres are mountain and bog; and the remainder consists of unimproved and very unproductive land of other kinds.

The improvement of waste lands is very much a question of expense. It is often more profitable to improve lands already cultivated, and to bring them into a higher state of cultivation and productiveness, than to reclaim waste lands; in attempting which, much money has often been lost. Much of the cultivated land of Britain is far from having been brought to the highest state of cultivation of which it is evidently capable, or to a state equal to that of the best cultivated lands of similar soil and situation. In many instances, however, waste lands have recently been improved with great advantage, and it seems probable that no small part of the waste lands of the country are capable of profitable improvement. The process must often be slow and gradual, especially where the soil is naturally very poor, as even the addition of large quantities of manure to very poor soils will not render them fertile, but on the contrary will be followed by a sterility greater than before. The quantity of guano which a rich soil would gratefully receive, will destroy every vestige of vegetation on a very poor soil.

The waste lands of Britain are of very various character. Some of them are bogs, already sufficiently noticed in the article Bog. Others are marshes and fens, generally very near the level of the sea, and often within the reach of its tides, chiefly in the eastern counties of England. See Bedford Level. Of these, a great extent has been reclaimed, and has become very productive; much still remaining, however, to be done. There are also extensive moors both in England and in Scotland, often of very poor soil, and often also at such an elevation above the level of the sea, as to render profitable agriculture hopeless. This is not the case with all the moors, and it is sometimes possible to effect great improvement by drainage; so that land, formerly almost worthless, may be converted into good pasture. In many places, the heath has been extirpated, and the moorland changed into good pasture, and even into good arable land. It is sometimes found very profitable to break up such land, even at very considerable elevations, and afterwards to lay it down in pasture, the produce being much greater than it was before. Even in the most elevated tracts, drainage is beneficial; although it must always be considered whether or not drainage will pay. The highest sheep-pastures of the south of Scotland have been greatly improved by a kind of superficial drainage (*sheep drains*), consisting of mere open channels for water; but in the greater altitudes of the Highlands, and amidst their more rugged steeps, even this is out of the question. In some cases, chiefly of the more level moorlands, much improvement is effected by *paring and burning*, the surface being pared off by the *breast-plough* or *paring-spade*, and burned, generally in heaps, of which the ashes are spread upon the soil. The application of lime is of great benefit in many cases, as is also that of chalk and of marl, but the expense must always be considered, and many tracts of waste lands are so situated that the application of such manures is impossible.

Railways have rendered the reclamation of waste lands profitable in many districts, in which formerly it would not have been so.—The chalk *downs* of the South of England may, in great part, almost be considered as waste lands, although used for sheep pasture; but they have been found capable of great improvement, although in a slow and gradual manner, by tillage, and the application of manures.—Sands near the sea-shore are fixed by sowing certain grasses (see Ammophila), and are capable of further improvement by cultivation and the application of manures; particularly where the sand is in considerable part calcareous. The most barren and hopeless sands are those which are almost entirely silicious. Some time ago a company proposed to experiment on a large scale on sand of this kind, by conveying the sewage of London to the Maplin Sands on the coast of Essex. Very different opinions were expressed by scientific men as to the probable result of the experiment, which was important both as to the reclamation of wastes and the disposal of sewage. Liebig deemed the siliceous sands incapable of profiting by the rich manure ponred upon it. The company commenced their works, but failed to complete them.

WASTING PALSY is one the terms applied to the disease described in this work under its old name of Tabes Dorsalis.

WATCH, a small portable machine for measuring time, the construction of which is essentially the same as that of a clock (see Horology), except that the moving power is obtained from

the elastic force of a coiled spring instead of from a weight, and the movement regulated, so as to be isochronous, by a Balance and Balance-spring (q. v.) instead of a pendulum. The going part of a watch consists of a train of wheels and pinions, kept in motion by a spring, called the main-spring; the last and fastest wheel of the train, the scape-wheel or balance-wheel, acting so as to keep in vibratory motion a balance whose movement, again—which is made isochronous by the action of another spring called the balance-spring—regulates to a uniform rate the revolution of the scape-wheel, and consequently the motion of the rest of the train, and the uncoiling of the main-spring.

The main-spring is a thin ribbon of steel coiled in a barrel. The inner end of it is fixed to a strong spindle, the axis or *arbor* of the barrel, around which it is coiled, and the outer end is fixed to the inside of the barrel. By its tendency to uncoil itself, the spring sets the barrel in motion, and it produces as many revolutions of the barrel as it makes turns itself in unwinding (fig. 1). As its elastic force is greater when it is tightly coiled than when it has to some extent unwound itself, the spring, if its force were applied without modification to the watch-train, would act upon it unequally, the power exerted diminishing as the spring uncoiled; so much so, that the watch could not go uniformly



Fig. 1.

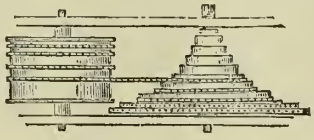


Fig. 2.

throughout the day, though it might keep time from one day to another. A piece of machinery, called a fusee, is employed to correct the variations in the force of the spring, and equalize the power exerted upon the train. The fusee is a cone with a spiral groove, connected with the barrel which contains the mainspring by a chain, one end of which is fixed at the broadest part of the cone, and the other end to the barrel (fig. 2). The barrel moves the fusee by means of the chain, which, as it runs off the sides of the fusee, is coiled upon the outside of the barrel. In winding a watch the key is placed on the axis of the fusee, and by the same movement the main-spring is coiled around its spindle, and the chain wound off the barrel, to cover the cone of the fusee. So when the spring is all coiled up, and its force upon the barrel is greatest, the chain is acting at the small end of the fusee, and its leverage upon the fusee is least; as the force of the spring diminishes, the chain having got to a broader part of the fusee, the leverage is increased; and the grooving of the fusee being, when perfect, arranged so that a section of the fusee along its axis would present two hyperbolas placed back to back, secures that the force of the spring, modified by the leverage of the chain, shall produce a uniform motion of the fusee. From the fusee this motion is communicated to the watch-train, the first wheel of the train—called the fussee-wheel or the great wheel—being set upon the fusee. The fusee is introduced in almost all English watches; but a great proportion of foreign watches, and most French spring clocks, have no fusee, and have the great wheel fixed on to the barrel. Accurate time-keeping is not to be looked for from such clocks or watches; but it is said that many of the main-springs made upon the continent are so skilfully contrived, that the force is pretty constant during the whole time of unwinding.

Between the train of wheels and pinions in a watch and that of a clock, until we come to the escapement, there is no difference, except that there is one more wheel and pinion in the watch-train than in the clock-train; the reason of which is, that the scape-wheel of a watch revolves, not like that of a clock, in a minute, but usually in about six seconds, making necessary an additional wheel to revolve in a minute and carry the seconds hand. A great variety of watch escapements are in use. The oldest, which is now going out of use, is the vertical escapement. It exactly corresponds to the crown-wheel escapement in clocks (see Horology). The accompanying figure shows a watch-train with this escapement. It may be useful also as indicating, in a general way, the arrangement of the wheel-work in a watch (fig. 3). The mainspring contained in the barrel B, sets in motion the

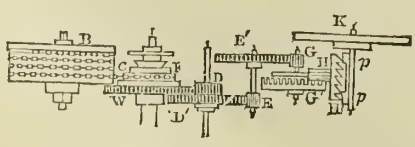


Fig. 3.

barrel, which, by means of the chain *c*, moves at a uniform rate the fusee F, along with which turns the fusee-wheel W, the first or great wheel of the watch-train. It will be easily seen how, from the great wheel, motion is communicated successively to the center-pinion D, and the center-wheel D′ (which turn in an hour); to the third-wheel pinion, E, and the third wheel, which is upon the same arbor, E′; and to the fourth or contrate-wheel pinion G, and the contrate-wheel G′. The upright teeth of the last-named wheel move the balance-wheel pinion H, and with it the balance-wheel or scape-wheel H′, which is fixed upon its arbor. The scape-wheel (and in this escapement the contrate-wheel also) is what is called, from its shape, a crown-wheel. Upon the arbor or verge of the balance K, are two pallets, *p*, *p*, at a distance from each other, equal to the diameter of the scape-wheel, and so placed that, as the scape-wheel revolves, its teeth give them alternately an impulse in different directions, which keeps up the vibratory motion of the balance. The balance is made to vibrate isochronously by the action of the Balance-spring (q. v.); and its vibration regulates the escape of the teeth of the scape-wheel, and so the motion of the whole train, exactly as that of the pendulum does in an ordinary clock. The vertical escapement is liable, though in a less degree, to the same objection as the old crown-wheel and the crutch or anchor escapements in clocks. There is a recoil of the scape-wheel after one of its teeth has been stopped by a pallet, which interferes more or less with the accuracy and uniformity of the motion of the train. See Horology.

Almost immediately after the invention of the balance-spring, attempts began to be made to introduce an escapment which would produce greater accuracy than the vertical escapement. Hooke, Huygens, Hautefeuille, and Tompion introduced new principles, each of which has since been successfully applied, though they all, from imperfect execution, failed at the time. The first real improvement was made by George Graham, the inventor of the dead escapement in clocks (fig. 4). This is called the horizontal escapement; it was introduced in the beginning of the last century, and it is still the escapement used in most foreign watches. The impulse is given to a hollow cut in the cylindrical axis of the balance, by teeth of a peculiar form projecting from a horizontal crown-wheel. Other forms of escapement in high estimation are the lever escapement, originally invented by Berthoud, improved by Mudge; the duplex escapement, the principle invented by Hooke, the construction perfected by Tyrer; and the

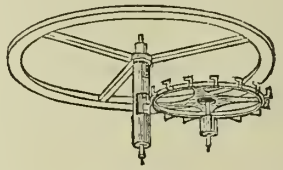


Fig. 4.

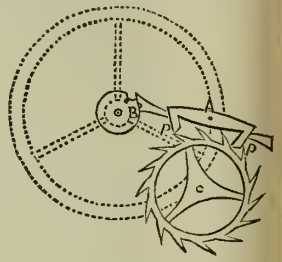


Fig. 5.

detached escapement of Berthoud, improved by Arnold and Earnshaw. The last-mentioned is that which is employed in marine chronometers and in pocket-chronometers, as watches made in all respects like chronometers are called. The lever escapement is that which is used in most English watches. In it the scape-wheel and pallets are exactly the same as in the dead escapement in clocks. See Horology. The pallets, *p*, *p* (fig. 5) are set on a lever which turns on their arbor, A; and there is a pin, B, in a small disc on the verge or arbor of the balance, which works into a notch at the end of the lever. The pin and notch are so adjusted, that when a tooth of the scape-wheel has got free, the pin slips out of the notch, and the balance is detached from the lever during the remainder of its swing; whence the name *detached* lever escapement, originally applied to this arrangement.

On the balance returning, the pin again enters the notch, moving the lever just enough to send the tooth next in order to escape from the dead face of the pallet on to the impulse face; then the scape-wheel acts upon the lever and balance; the tooth escapes, and another drops upon the dead face of the pallet, the pin at the same time passing out of the notch in the other direction, leaving the balance again free. This arrangement is found to give great accuracy and steadiness of performance. To prevent the teeth from slipping away while the balance is free, the faces of the pallets are slightly undercut, and this makes them secure while at rest; moreovor, there is a pin on the lever which moves through a notch on the balance disc, while the pin, B, moves through the notch in the lever, which is so adjusted as to guard against the lever moving and the teeth escaping, while the balance is free.

In watches, even more than in clocks, variations of temperature, unless provided for, produce variations in the rate of going, the increase or diminution of the temperature affecting to some extent the moment of inertia of the balance, and to a great extent the elastic force of the balance-spring. A rise in the temperature makes the balance expand, and therefore augments its moment of

inertia; it adds to the length of the spring, and thereby diminishes its elasticity, the elactic force of a spring varying inversely as the length; and the time of vibration of the balance, which depends upon the moment of inertia directly, and upon the elastic force of the spring inversely, is increased—the watch, that is, goes more slowly—in consequence both of the increase of the inertia and of the diminution of the elastic force of the spring. A fall in the temperature is attended by opposite results, the watch going more rapidly than before. A watch without a compensated balance would vary very much more than a clock without a compensation pendulum, but that being usually carried in the waistcoat pocket, it is kept at a pretty uniform temperature. To invent a satisfactory compensation was at one time the great problem for watchmakers.

The compensation can obviously be made in either of two ways—by an expedient for shortening the effective length of the balance-spring as the temperature rises, so as to increase the elastic force of the spring; or by an expedient for diminishing the moment of inertia of the balance as the temperature rises, so as to correspond to the diminution of the force of the spring. The first method was that made use of by John Harrison (q. v.), who first succeeded in making a chronometer capable of measuring time accurately in different temperatures; but an adaptation of the other method, invented about eighty years ago by Earnshaw, is that which is always employed now (fig. 6): *t a t'* is the main bar of the balance; and *t b*, *t' b'* are two compound bars, of which the outer part is of brass and the inner part of steel, carrying weights. *b*, *b'*, which may be screwed on at different places. The brass bar expands more with heat, and contracts more with cold than the steel bar; therefore, as the temperature rises, the bars, with their weights, bend inwards, and so the moment of inertia of the balance is diminished; as it falls, they bend outwards, and the moment of inertia is increased; and of course the diminution or the increase must be made exactly to correspond to the diminution or increase in the force of the spring.

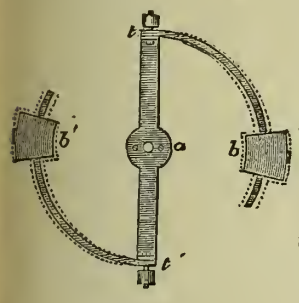


Fig. 6.

The chronometer is just a large watch fitted with all the contrivances which experience has shown to be conducive to accurate time-keeping—e. g., the cylindrical balance-spring, the detached escapement, and the compensation-balance. As a watch which will keep time in one position will often not do so equally well in another, marine chronometers are always set horizontally in a box in *Gimbals* (q. v.), an arrangement which keeps the chronometer horizontal, whatever the motion of the vessel.

The great importance of an accurate portable time-keeper at sea is for determining the Longitude (q. v.). This use was first distinctly pointed out by Sir Isaac Newton. A committee of the House of Commons, of whom this philosopher formed one, having been appointed on the 11th June 1714, to consider the question of encouragement for the invention of means for finding the longitude, the result of their meetings was a memorial containing an explanation of the different means proper for ascertaining the longitude, and recommending encouragement for the construction of chronometers as the best means of ascertaining it. An act of parliament was then passed, offering a reward for this purpose.

The first chronometer used at sea was invented by John Harrison. After many years of study it was completed in 1736. After several further trials and improvements, and two trial voyages to America, undertaken for the satisfaction of the commissioners, the last of which was completed on the 18th September 1764, the reward of £20,000 was finally awarded to Harrison.

Somewhat later than this, several excellent chronometers were produced in France by Berthoud and Le Roy, to the latter of whom was awarded the prize by the Académie Royale des Sciences. Progress was still made in England by Arnold, Earnshaw (the inventor of the compensation still in use), and Mudge, to whom prizes were awarded by the Board of Longitude, and under whom a perfection nearly equal to that of the present day was obtained. The subsequent progress of watch-making has been chiefly directed to the construction of pocket-watches on the principle of marine chronometers, or to the combination of accuracy with convenient portability. The adjusted lever watch is now made in Clerkenwell with a degree of accuracy which enables the performance to be warranted within an error of one second a day.

While the compensation of a chronometer can never be made perfectly accurate for all degrees of temperature, there are always two temperatures at which a well-constructed chronometer will go with perfect accuracy. The explanation of this lies in the act that while the variations of elastic force in the spring go on uniformly in proportion to the rise or fall of the temperature, the inertia of the balance cannot be made to vary as it should do, in exact correspondence to them inversely. The variation of the elastic force may be represented by a straight line inclined at some angle to a straight line divided into degrees of temperature; the corresponding changes of the moment of inertia will be represented by a curve, and this curve can coincide with the straight line representing the variations of elastic force only at two points, corresponding to two different temperatures. The particular points in the case of any chronometer are matter of adjustment. For instance, one chronometer may be made to go accurately in a temperature of 40°, and also in a temperature of 80°, at other temperatures being not so accurate; another chronometer to go accurately at a temperature of 20° and of 60°. It is manifest that the former would be adapted to voyages in a warmer, the latter to voyages in a colder climate. Apparatus for testing chronometers have been long in use in the Observatories at Greenwich and Liverpool. In the latter, there is now an extensive apparatus for this purpose, devised by the ingenious astronomer, Mr. Hartnup. In a room which is isolated from noise and changes of temperature, the chronometers are arranged on a frame under a glass case, so contrived that they may be subjected in turn to any given degree of temperature. The rate of each under the different temperatures is observed and noted, and the chronometers registered accordingly. These observations are of the greatest importance both to ship-captains and instrument-makers, who can have their instruments subjected to the observations on payment of a fee.

It may be stated that the main-spring had been employed as the moving force of time-keepers for about a century before the invention of the balance-spring; but very little is known about the action of these forerunners of the watch. A watch without a balance spring must have been a very rude and untrustworthy contrivance. The honor of first proposing the balance-spring is undoubtedly due to Dr. Hooke, though Huygens and De Hautefeuille also invented it independently much about the same time. —See Denison's *Rudimentary Treatise on Clocks and Watches;* Wood's *Curiosities of Clocks and Watches;* Benson's *Time and Time-tellers* (1875).

WATCH, on Shipboard, a division of the crew into two, or if it be a large crew, into three, sections; that one set of men may have charge of the vessel while the others rest. The day and night are divided into watches of four hours each, except the period from 4 to 8 P.M., which is divided into two *dog-watches* of two hours' duration each. The object of the dog-watches is to prevent the same men being always on duty at the same hours.

WATCHING AND WARDING, in Scotch Law, mean the services rendered by one who holds lands under burgage tenure. These services are merely nominal.

WATCH-RATES, in England, are the rates authorized to be levied in a parish or borough under the Watching and Lighting Act, 3 and 4 Will. iv. c. 90, for the purpose of watching and lighting the parish.

WATER (symb. HO,* equiv. 9, spec. grav. 1), in a state of purity, at the ordinary temperature of the air, is a clear, colorless,† transparent liquid, perfectly neutral in its reaction, and devoid of taste or smell. At a temperature below 32° it freezes, crystallizing in various forms derived from the rhombohedron and six-sided prism. See ICE; SNOW; FUSING AND FREEZING POINTS; HEAT. It appears from the researches of Arago and Fresnel, that notwithstanding the gradual dilatation of water below 39°, its refractive power on light continues to increase regularly, as though it contracted. Its density at 60°, and at the level of the sea, is taken at 1·000, and forms the standard of comparison for all solids and liquids, hydrogen being similarly taken as the standard of comparison for gases and vapors. Distilled water is 815 times heavier than air; a cubic inch weighs, in air at 62°, with the barometer at 30 inches, 252·458 grains, and *in vacuo*, 252·722 grains, the grain being $\frac{1}{7000}$ of the avoirdupois pound. See AVOIRDUPOIS, GALLON.

For all practical purposes, water may be considered as incompressible; but very accurate experiments have shown that it does yield to a slight extent when the pressure employed is very great; the diminution of volume for each atmosphere of pressure being

* During recent years Gerhardt's views as to the necessity of doubling the atomic weights of oxygen, carbon, sulphur, and a few other of the elements have been gradually gaining ground. Thus, the combining numbers of oxygen, carbon, and sulphur, instead of being 8, 6, and 16, are now fixed at 16, 12, and 32, and the corresponding symbols are indicated by a horizontal bar, which doubles the value of the symbol; $\ddot{O}$, $\ddot{C}$, and $\ddot{S}$ being written in place of O, C, and S. According to these views, the symbol for an equivalent of water is $H_2\ddot{O}$, or H_2O_2, in place of HO, and the combining number is 18 in place of 9 (see CHEMISTRY.)

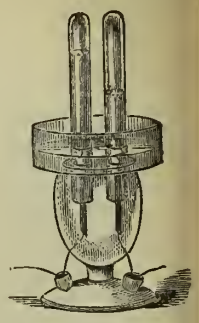
† Although water is colorless in small bulk, it is blue like the atmosphere when viewed in mass. This is seen in the deep ultramarine tint of the lakes of Switzerland and other Alpine countries, and in the rivers issuing from them; and in the water in the fissures and caverns found in the ice of the glaciers, which, except on the surface, is extremely pure and transparent; and the deep blue tint of the ocean is doubtless due to the water itself, rather than to the salts dissolved in it.

about 51-millionths of the whole.—See Miller's *Chemical Physics*, 3d ed. p. 41. Water evaporates at all temperatures, and under the ordinary pressure of the atmosphere, boils at 212°, passing off in the form of steam, which, in its state of greatest density at 212°, compared with air at the same temperature, and with an equal elastic force, has a spec. grav. of 0·625. In this condition it may be represented as containing, in every two volumes, two volumes of hydrogen and one volume of oxygen. See BOILING, STEAM, VAPOR.

Water is the most universal solvent with which the chemist is acquainted, and its operations in this respect are equally apparent, although on very different scales, on the surface of the globe and in the laboratory. This solvent action is usually much increased by heat, so that a hot aqueous saturated solution deposits a portion of the dissolved matter on cooling. Some substances are so soluble in water that they extract its vapor from the atmosphere, and dissolve themselves in it. Moreover, when water is heated in a strong closed vessel to a temperature above that of the ordinary boiling-point, 212°, its solvent powers are much increased. Pieces of plate and crown glass, acted upon for four months by water at 300° (in a steam-boiler), were found by the late Professor Turner to be reduced to a white mass of silica, destitute of alkali; while stalactites of siliceous matter, more than an inch in length, hung from the little wire cage which enclosed the glass—an experiment illustrating the action which goes on in the Geyser springs of Iceland, which deposit siliceous sinter. All gases are soluble in water, but water dissolves very unequal quantities of different gases, and very unequal quantities of the same gas at different temperatures. Some gases are so extremely soluble in this fluid, that it is necessary to collect them over mercury. For example, at 32°, 1 volume of water dissolves somewhat less than $\frac{1}{60}$th of its volume of hydrogen, and exactly $\frac{1}{60}$ of its volume of nitrogen, while it dissolves 506 and 1050 volumes of hydrochloric acid and ammonia gases: and while at 32°water dissolves 1·8 times its volume of carbonic acid, it dissolves only half that volume of the gas at 60°.

Water enters into combination with acids, basis, and salts. When an acid has once been allowed to combine with water, the latter can seldom be entirely removed unless by the intervention of a powerful base, which displaces the water, and allows of its removal by heat. For example, if sulphuric acid be largely diluted with water, and exposed to heat, watery vapor alone at first passes off; but as the temperature is raised to about 600°, a point is reached at which acid and water distil over together. The liquid at this stage of concentration is found to be composed of one equivalent of acid and one of water (HO,SO_3). The further separation of the water can only be effected by the addition of a base, as potash, oxide of lead, &c. Water which, as in this case, supplies the place of a base, is called *basic water*, and the compound is called a *hydrate*, or is said to be *hydrated*. Similarly, water combines with strong bases, such as potash and soda, and heat can only succeed in reducing a mixture of potash and water to a condition represented by one equivalent of each (HO,KO); and this last equivalent of water can only be removed by the addition of an acid. In this case, the water in combination with the base acts the part of an *acid*. These compounds also are *hydrates*. In these cases of acids and bases, the one equivalent of water cannot be removed without completely altering the chemical character of the body. (See, for instance, in the article SULPHURIC ACID, the difference between the properties of hydrated sulphuric acid and sulphuric anhydride.) In the case of many salts, however, a certain quantity of the water entering, so to speak, loosely into their composition may be expelled by heat without altering the properties of the salt. The water capable of being thus got rid of is called *water of crystallization*, and is taken up by the salt in the act of crystallizing. The form of the salt depends upon this water of crystallization. In chemical formulæ, this variety of water is represented by Aq instead of by HO. For example, in the formula for rhombic phosphate of soda—$2NaO,HO,PO_5 + 24Aq$—the HO represents an equivalent of basic water, while 24Aq represents 24 equivalents of water of crystallization.

It is less than a century since the ancient view, that water was one of the four elements, has ceased to be believed in. It is now known that it is a compound of oxygen with hydrogen in the proportion of one equivalent of each. Hence its symbol is HO, and its combining number 9. When converted into vapor, 9 grains of steam occupy the bulk of 8 grains of oxygen at the same temperature; hence the combining volume of aqueous vapor is equal to 2, if the combining volume of oxygen be taken as 1. That water is such a compound as has been just stated may be proved either analytically or synthetically; and the subject is one of so great importance in the history of chemistry, that we shall enter rather more fully than usual into the consideration of these two modes of proof. The following simple mode of separating water by voltaic electricity into its constituent elements is borrowed from Fownes's *Manual of Chemistry*: 'When water is acidulated so as to render it a conductor, and a portion interposed between a pair of platinum-plates, connected with the extremities of a voltaic apparatus of moderate power, decomposition of the liquid takes place in a very interesting manner; oxygen in a state of perfect purity is evolved from the water in contact with the plate belonging to the copper end of the battery, and hydrogen, equally pure, is disengaged at the plate connected with the zinc extremity, the middle portions of the liquid remaining apparently unaltered. By placing small graduated jars over the platinum-plates, the gases can be collected, and their quantities determined. The accompanying figure will show at a glance the whole arrangement; the conducting-wires pass through the bottom of the glass cup and away to the battery. When this experiment has been continued a sufficient time, it will be found that the volume of the hydrogen is a *very* little above twice that of the oxygen; were it not for the circumstance of oxygen being sensibly more soluble in water than hydrogen, the proportion of two to one by measure would come out exactly.'



In lecture-rooms, an ingenious but more complicated apparatus, devised by Kopp, is commonly used to illustrate the electrolysis of water. It has been shown by Mr. Grove that an extreme heat may, like electricity, be employed to decompose water into its constituents; and it is well known that if, in the form of steam, it be passed over red-hot iron, it parts with its oxygen to the metal, while the hydrogen is given off as gas. The synthetical proof of the composition of water is afforded by passing pure hydrogen and oxygen, in the ratio of two volumes of the former to one volume of the latter, into a strong glass tube filled with mercury, and exploding the mixture by an electric spark, when the gases are replaced by a corresponding quantity of moisture, and the mercury is forced into the tube so as to fill it. The most satisfactory form of this synthetical proof is, however, afforded by reducing pure oxide of copper at a red heat by hydrogen, and collecting and weighing the water that is thus formed. The apparatus required for this experiment, and the method of employing it, are given in Fownes's *Manual of Chemistry*, 9th ed., p. 131, and in Miller's *Inorganic Chemistry*, 3d ed., p. 52.

Owing to its extremely solvent powers, the *pure water* which we have been hitherto considering is never found in nature. The nearest approach to a natural pure water is *rain-water*, after a continuance of wet weather; but even this water always contains in 100 volumes about 2·5 volumes of atmospheric air, with a trace of ammonia; and in point of fact, it seems impossible to obtain water which does not contain this ingredient, for, after two distillations, Professor Miller found from 1·85 to 2·38 volumes of air in 100 volumes of water. In addition to rain-water, the other *natural waters* may be included under the heads of *Spring-water*, *Mineral Waters* (already considered in a special article), *River-water* (see WATER-SUPPLY), and *Sea-water* (see below).

This article would be incomplete without a brief notice of the prolonged and acrimonious controversy that was for many years carried on, and is probably now hardly to be regarded as settled, regarding the respective claims of different philosophers to be the true discoverer of the nature and composition of water. In the the year 1781. Cavendish made a long and careful series of experiments, which, unfortunately, were not published till January 1784, when his celebrated Memoir entitled *Experiments on Air*, was read to the Royal Society. In the interval (June 1783), his friend, Dr. Blagden, visited Paris, and on the authority of Cavendish, gave an account of the experiments proving the composition of water to Lavoisier; and this delay between the discovery and the date of publication caused his claims to one of the most marvelous discoveries the world ever saw, to be contested by an English and a French rival. James Watt and Lavoisier. It may be briefly stated, that Cavendish's experiments consisted in exploding, in various proportions, mixtures of hydrogen and atmospheric air, and of hydrogen and oxygen, and finding as the result a liquid which proved to be pure water. (Priestley and his friend, Mr. Warltire, had made similar experiments, and had noticed the deposition of moisture that followed the explosion, but failed to recognize in it anything but the condensation of aqueous vapors in the gases). The general conclusion to which Cavendish came was, in his own words, 'that water consists of dephlogisticated air united with phlogiston,' and as dephlogisticated air was his term for oxygen, and phlogiston his term for hydrogen, this statement corresponds to the modern view of the nature of water introduced by Lavoisier. As Lavoisier was from the first accused by the English chemists of having acted unfairly towards them, and as indeed his own claim dates only back to June 25, 1783, he may be dismissed from further consideration; and during the lives of the English claimants there were no public complaints on either side, although Watt, in private letters to his friends, hinted at Cavendish's incapacity and unfairness.

Hence, then—at all events, in this country—scientific men were startled, when Arago, then Secretary of the French Academy, published in 1838 the Eloge of Watt, which he had read as far back as December 1834, in which he charged Cavendish with deceit and plagiarism, inasmuch as he was said to have learned the composition of water, not by experiments of his own, but by obtaining sight of a letter from Watt to Priestley.

The battle now fairly began; the first blow being struck in August 1839, when the President of the British Association, the Rev. Vernon Harcourt, in his opening address vindicated Cavendish, and pointed out Arago's misstatement. At a subsequent meeting of the Academy, Arago, with Dumas to back him, defended his statements. Sir David Brewster (*Edin. Rev.*, January 1840) then sought to act as mediator; and the controversy, as might have been expected, went on with increased acrimony; and in the summer of the same year, when the President of the British Association published the Report he had delivered the preceding year, he added a postcript, replying to Arago, Dumas, and Lord Brougham (who had appended 'An Historical Note on the Discovery of the Theory of Water,' to Arago's Eloge). In 1841, Berzelius published what Dr. George Wilson terms 'a conditional judgment' in favor of Watt; and in 1845, in his *Lives of Men of Letters* (see *Life of Watt*, p. 400), Lord Brougham followed on the same side. Dr. Peacock (*Quart. Rev.*, 1845, p. 105), in reviewing his book, assailed his conclusions, and asserted the claims of Cavendish. In 1846, Mr. Harcourt (*Lond. and Edin. Phil. Mag.*, Feb. 1846) also replied to Lord Brougham; and in 1847, in the second edition of his *History of the Inductive Sciences*, Dr. Whewell maintained his old conviction of the claims of Cavendish. In 1846, the publication of the *Correspondence of the late James Watt on his Discovery of the Theory of the Composition of Water*, with an introduction by his kinsman, Mr. Muirhead, who was editor, and a letter from his son, formed a most important addition to the literature of this controversy. Finally, the question was discussed, in 1847, by Sir David Brewster in the *North British Review*, and in 1848, by Lord Jeffrey in the *Edinburgh Review*, both of whom advocated the claims of Watt. As we have no space to discuss Watt's real claims, we may here state that Dr. George Wilson, whose *Life of Cavendish* is in reality, a strictly impartial history of the water-controversy, maintains on very sound grounds that in reality Watt was informed of Cavendish's discovery through Priestley, as Lavoisier was through Blagden.

SEA-WATER.—For an accurate knowledge of the composition of sea-water, we are mainly indebted to the investigations of Professor Forchhammer of Copenhagen. Not very many years ago, the only elements known to exist in sea-water, in addition to those constituting water itself, were chlorine, iodine, bromine, sulphur, carbon, sodium, magnesium, potassium, calcium, and iron. To these twelve must now be added, (13) fluorine, discovered by Dr. George Wilson; (14) phosphorus, as phosphate of lime; (15) nitrogen, as ammonia; (16) silicon, as silica, in which form it is largely collected by sponges from sea-water; (17) boron, as boracic acid; (18) silver; (19) copper; (20) lead; (21) zinc; (22) cobalt; (23) nickel; (24) manganese; (25) aluminium, as alumina; (26) strontium, as strontia; (27) barium, as baryta. Several of these elements, however, exist in such small quantities that they can only be discovered indirectly, that is to say, in sea-weeds, marine animals, or in the stony matter deposited at the bottom of the boilers of oceanic steamers. The substances which, in respect of quantity, play the principal part in the composition of sea-water are chlorine, sulphuric acid, soda, potash, lime, and magnesia; those which occur in less but still determinable quantity, are silica, phosphoric acid, carbonic acid, and oxide of iron. In the elaborate tables which are annexed to his paper, Forchhammer has always calculated the single substances (chlorine, sulphuric acid, magnesia, lime, and potash) and the whole quantity of salt for 1000 parts of sea-water; but besides this, he has calculated the proportion between the different substances determined, referred to chlorine = 100, and of all the salts likewise referred to chlorine. This last number is found if we divide the sum of all the salts found in 1000 parts of any sea-water by the quantity of chlorine found in it; and he terms it the *co-efficient* of that sample of sea-water.*

This chemist divides the sea into seventeen regions, his reasons for doing so being that he could thus avoid the prevailing influence which those parts of the ocean which are best known, and from which he has taken most observations, would exert upon the calculations of the mean number for the whole ocean. In reference to the *salinity* of the surface of the ocean, he has made the following observations. (1.) The mean salinity of the Atlantic between 0° and 30° N. lat. is 36·169 (i. e., this is the quantity of salts in 1000 parts of water); the maximum, which is also the maximum of the surface-water of the whole Atlantic, being 37·908, and occurring in 24° 13′ N. lat., and about 5° W. from the coast of Africa, where no rivers of any size carry water from the land, and where the influence of the dry and hot winds of the Sahara is prevailing. This maximum is equal to the mean salinity of the Mediterranean, and is only exceeded by the maximum of that sea off the Libyan Desert, and that of the Red Sea. The minimum is 34·283 in 4° 10′ S. lat., and 5° 36′ W. long., close to the coast of Africa, where the large masses of fresh water which the great rivers of that region pour into the ocean exercise their influence. (2.) In the Atlantic, between 30° N. lat. and a line drawn from the north point of Scotland to the north point of Newfoundland, the mean salinity is 35·946, the diminution being due to the fresh water poured into it by the southern mouth of the St. Lawrence. (3.) In the Baffin's Bay and Davis' Strait region, the mean salinity is 33·281, and the salinity increases from latitude 64° towards the north, being in 64°, 32·926, and in 69°, 33·598. This peculiarity is owing (says Forchhammer) to the powerful current from the Parry Islands, which through different sounds passes into Baffin's Bay, where it is mixed with the great quantity of fresh water that comes into the sea from the West Greenland glaciers. Had this fact been known before the sounds that connect the Parry Archipelago with Baffin's Bay were discovered, it might have proved the existence of these sounds, because bays and inlets show quite the reverse: the further we get into them, the less saline the water becomes. (4.) From eleven observations on the Mediterranean between the Straits of Gibraltar and the Greek Archipelago, he confirms the old view of its great salinity; its mean salinity being 37·936, while that of the whole ocean is 34·388. Its maximum (39·257) falls between the island of Candia and the African shore; and its minimum (36·301) is at the Straits of Gibraltar. These results are due to the influence of Africa and its hot and dry winds. In salinity, the Mediterranean is only exceeded by the Red Sea, whose mean salinity is 43·067. (5.) The Black Sea, like the Baltic, is a mixture of salt and fresh waters. In three different experiments, the salinity varied from 18·146 to 11·880. At a distance of 50 miles from the Bosphorus, the proportions between chlorine, sulphuric acid, lime, and magnesia, were 100 : 11·71 : 4·22 : 12·64, while the normal oceanic proportions are 100 : 11·89 : 2·96 : 11·07; thus shewing a relative increase in the lime and magnesia. (6.) As the Caspian Sea is considered by many geologists to have been formerly in connection with the Black Sea, the results of Mahner's analysis of its waters are given. The salinity varied between 56·814 and 6·236, and the proportion between the chlorine, sulphuric acid, lime, and magnesia, is 100 : 44·91 : 9·34 : 21·48, which differs extremely from the normal proportion. Thus the Caspian Sea, if it ever had any connection with the Black Sea, must have entirely changed its character since that time—a change which might be occasioned by the different salts which the rivers brought into it, and which accumulated there by evaporation of the water; or which might be caused by the deposition of different salts in the basin of the Caspian Sea itself. (7.) The Atlantic between 30° S. lat. and a line from Cape Horn to the Cape of Good Hope, is less saline than the corresponding region north of the equator; and all the samples from the western part of this region have less, while the samples from the eastern part, nearer to the African coast, have considerably more sulphuric acid than the normal quantity. Does this, asks Forchhammer, depend upon the more volcanic nature of the west coast of Africa than the east American coast? (8.) In the sea between Africa and the East India Islands, the mean salinity is 33·868. The minimum (25·879) is from a place high up in the Bay of Bengal, and of course much influenced by the Ganges. It lies, however, about 300 miles from the mouth of that river; and another specimen taken 60 miles nearer the mouth has a salinity of 32·365, so that it would seem as if some other cause (possibly fresh-water springs at the bottom) had been in operation to weaken the sea-water at the minimum spot. (9.) In the Patagonian cold-water current, the mean salinity was 33·966; while three samples brought from the South Polar Sea, by the late Sir James Ross, had different salinities of 28·565, 15·598, and 37·513. Forchhammer cannot account for these discrepancies. All the specimens showed a great excess of sulphuric acid (12·47 in place of 11·88, as compared with 100 of chlorine), a result probably due to the volcanic nature of the antarctic continent. Forchhammer's analyses of waters from other of his 17 districts call for no remark; and the following are the general results of his investigations. 'If we except the North Sea, the Kattegat, Sound, and Baltic, the Mediterranean and Black Sea, the Caribbean Sea and the Red Sea, which have all the characters of bays of the great ocean, the mean numbers are the following:

	Sea-water.	Chlorine.	Sulphuric Acid.	Lime.	Magnesia.	All Salts.	Coefficient.
	1000	18·999	2·258	0·556	2·096	34·404	1.812
		100	11·88	2·93	11·03		
Equivalents,		429	45	16	82		

Thus it is evident that the sea-water, in its totality, is as little a chemical compound as the atmospheric air; that it is composed of solutions of different chemical compounds; that it is neutral, be-

* We give these details because the term *co-efficient* will now doubtless be permanently retained by writers on the chemistry of sea-water.

cause it everywhere in the atmosphere finds carbonic acid to neutralize its bases, and everywhere on its bottom and shores finds carbonate of lime to neutralize any prevailing strong acid; that lastly, the great stability of its composition depends upon its enormous mass, and its constant motion, which occasions that any local variation is evanescent compared to the whole quantity of salt.'

It will be seen that the Atlantic is that part of the ocean which contains the greatest proportion of salt, while some of the bays in the tropical or subtropical zone (the Mediterranean and Red Sea, for example) have a greater mean than the Atlantic; that on approaching the shores, the sea-water, as might have been expected, becomes more diluted, and consequently less saline; that the polar currents contain less salt than the equatorial; that the polar current of West Greenland contains more sulphuric acid than the water in any other region except the East Greenland and south polar currents (while in the ocean at large, the chlorine is to the sulphuric acid as 100 : 11·89; in the south polar current it is as 100 : 12·55). As in the case of the West Greenland current, there is no neighboring volcanic region to account for this excess. Forchhammer suggests that the absence of fucoidal plants, which have a great attration for sulphuric acid, may have an influence in bringing about this result;* that most lime occurs in the ocean in the second region, the middle part of the Northern Atlantic; and the least in the West Greenland polar current (the quantities being 3·07 and 2·77 respectively). Wherever, in other regions, the influence of land prevails, the lime also is in excess; thus, in the Black Sea, it was 4·221.

From these remarks on the *surface-water*, we pass on briefly to notice the difference of sea-water in *different depths*. On this subject, the result obtained from the analyses of specimens of sea-water taken from different regions, is so contradictory, that we shall simply quote the sentence with which Forchhammer commences this department of his subject: 'It would be natural to suppose that the quantity of salts in sea-water would increase with the depth, as it seems quite reasonable that the specific gravity of sea-water would cause such an arrangement. But this difference in specific gravity, relative to the increase in the quantity of salts, is counteracted by the decreasing temperature from the surface to the bottom. We have parts of the sea where the quantity of solid salts increases with the depth; in other parts, it decreases with the increasing depth; in other places, hardly any differences can be found between surface and depth; and lastly, I have found one instance where water of a certain depth contained more salt than both above and below. These differences are, to a great extent, dependent upon currents both on the surface and in different depths.'—*Op. cit.*, p. 229. Sometimes, salinity of the surface-water is the same as that of the deep: or one or more ingredients may vary in its proportions: for example, in the Mediterranean, while the deep water, generally, is richer than the surface-water in sulphuric acid, in some parts, as between Sardinia and Naples, the surface-water is the richer in that ingredient. There are few observations on the specific gravity of the sea-water at different depths. For the following observations, we are indebted to Sir James Ross. 'At 39° 16′ S. lat., 177° 2′ W. long. the specific gravity of the surface-water was 1·0274; at 150 fathoms, 1·0272; and at 450 fathoms, 1·0268: all tried at the temperature of 60° F., and showing that the water beneath was specifically lighter than that of the surface, when brought to the same temperature: our almost daily experience confirmed these results.'—*Voyage*, &c. vol. ii. p. 133.

The important questions—How did the salts which now occur in the sea come into it? Is it the land that forms the sea, or is it the sea that makes the land? Are the salts that are now found in sea-water washed out of the land by the atmospheric water? Has the sea existed from the beginning of the earth? And has it slowly but continually given its elements to form the land? and their answers, constitute the last part of Forchhammer's most philosophical and laborious Memoir. The following is, in a condensed form, his reply to these questions. Suppose a river had its outlet in a valley, with no communication with the sea; the valley would be filled with water till its surface was so great that the annual evaporation was equal to the annual supply. There would then be a physical, but not a chemical equilibrium, because the annual loss would consist of pure water, while the received water would contain various mineral or saline matters, which would go on increasing till chemical changes would occasion precipitation of different salts. Now, in the water of the assumed river, we should find the bases prevailing in the following order—lime, magnesia, soda, iron, manganese, and potash; while the acids similarly arranged, were carbonic, sulphuric, muriatic (chlorine), and silicic. Now, all these substances are found in sea-water, although in very different proportions. The ocean is, in point of fact, such a lake as we have here supposed, with all the rivers carrying their dissolved matters into it. 'Why, then,' our author asks, 'do we not observe a greater influence of the rivers? Why does not lime, the prevailing base of river-water, occur in a greater proportion in the water of the ocean? In all river-water, the number of equivalents of sulphuric acid is much smaller than that of lime, and yet we find in sea-water about three equivalents of sulphuric acid to one of lime. There must thus be in sea-water a constantly acting cause that deprives it again of the lime which the rivers furnish, and we find it in the shell-fishes, the corals, the bryozoa, and all the other animals which deposit carbonate of lime.' These animals not only deprive the water of its carbonate of lime, but they likewise decompose the sulphate of lime—a decomposition probably depending upon the carbonate of ammonia formed by the vital processes of these animals. The silica, which is always present in river-water, is appropriated by the varied sponges, diatoms, &c., and hence its scantiness in sea-water. With regard to the sulphuric acid conveyed into the sea, a small part enters into the composition of shells, corals, &c., and a greater part is attracted by sea-weeds, in which it undergoes reduction, as already described, while the balance remains in the sea-water. The magnesia of the river-water enters in small quantity into marine shells and corals, but only a small quantity is thus abstracted from sea-water, while the soda and muriatic acid, or chlorine, form, as far as we know, by the pure chemical, or organo-chemical action that takes place in the sea, no insoluble compound. 'Thus,' he concludes, 'the quantity of the different elements in sea-water is not proportional to the quantity of elements which river-water pours into the sea, but inversely to the facility with which the elements in sea-water are made insoluble by general chemical or organo-chemical actions in the sea; and we may infer that the chemical composition of the water of the ocean in a great part is owing to the influence general and organo-chemical decomposition has upon it, whatever may have been the composition of the primitive ocean.'

WATER-BED, called also the HYDROSTATIC BED, or FLOATING MATTRESS. It is well known that the life and health of every part of the animal body depend on the sufficient circulation through them of refreshed blood. See CIRCULATION. Now, when a person in health is sitting or lying, the parts of the flesh compressed by the weight of the body do not receive the blood so copiously as at other times; and if from any cause the action of the heart has become weak, the interruption will follow both more quickly and be more complete. A peculiar uneasiness soon arises where the circulation is thus obstructed, impelling to change of position; and the change is made as regularly and with as little reflection as the winking of the eyes to wipe and moisten the eyeballs.

A person weakened by disease, however, while generally feeling the uneasiness sooner, as explained above, and becoming restless, makes the changes with increasing fatigue; and should the sensations become indistinct, as in the delirium of fever, in palsy, &c., or should the patient have become too weak to obey the sensation, the compressed parts are kept so long without their natural supply of blood, that they lose their vitality, and become what are called sloughs or mortified parts. These, if the patient survives, have afterwards to be thrown off by the process of ulceration, leaving deep hollows to be filled up by new flesh during a tedius convalescence. Many a fever or other disease, after a favorable crisis, has terminated fatally from this occurrence of sloughing on the back or sacrum. The same termination is common in lingering consumptions, palsies, spine diseases, &c., and generally in diseases that confine the patient long to bed.

It was to mitigate all, and entirely to prevent most of the evils attendant on the necessity of remaining long in a recumbent posture, that the hydrostatic bed was devised by Dr. Neil Arnott, late one of the Queen's physicians. The bed may be shortly described as a mattress floating on water, with a loose sheet of caoutchouc cloth properly secured between it and the water, to prevent its being wetted. A person rests on it as a waterfowl does on its bulky feathers, with as little inequality of local pressure as if in a bath. A trough of the dimensions of a wide sofa or a bed, having six or seven inches depth of water in it, with the required caoutchouc covering, is the foundation, on which clothes and pillows are laid as in a common bed. A full description is given in Dr. Arnott's book, the *Elements of Physics* (6th edition, Longman & Co.). The bed not only prevents the occurrence of bed-sores, but by lessening antecedent distress, lessens also the danger of the illness.

On a sudden emergency, or when the need of the fluid support is not very urgent, local relief may be given by forming in any way a partial hollow or depression in a bed, and placing in it a

* In a paper read before the British Association in 1844, Forchhammer showed that the fucus tribe has a great attraction for sulphuric acid, and that the acid, when the plant undergoes putrefaction, is reduced to soluble sulphides and to sulphuretted hydrogen, which, with the oxide of the iron of the plant, which is partly dissolved and partly suspended, will form sulphide of iron. Thus, the sulphur will disappear from the water. He suggests that the diminution of sulphuric acid which he found in the Atlantic, between the equator and 30° N. lat. (11·75 in place of 11·89), may be due to the action of the Sargasso Sea.

water-sack or bag half-filled, so as to remain loose or slack. This approaches in effect the slack-sided cushion, which is another modification of the invention.



Water-budgets.

WATERBRASH. See PYROSIS.

WATER-BUDGET, a heraldic bearing in the form of a yoke with two pouches of leather appended to it, originally intended to represent the bags used by the Crusaders to convey water across the desert, which were slung on a pole, and carried across the shoulders. The Trusbuts, Barons of Wartre in Holderness, bore *Trois boutz d'eau*, three water-budgets, symbolizing at once their family name and baronial estate; and by the marriage of the heiress, similar arms came to be assumed by the family of De Ros, who bear gules, three water-budgets argent.



Water Scorpion.

WATER-BUG, the popular name of a tribe or section of Heteropterous insects, *Hydrocorisæ*, which live almost entirely in water, and feed upon other aquatic insects. The anterior portion of the first pair of wings is horny; the antennæ are very small, and concealed beneath the eyes. The *Hydrocorisæ* are divided into two families. *Notonectidæ*, and *Nepidæ*. Of the former, the Boat-fly (q. v.) is an example. The *Nepidæ* are popularly known as WATER SCORPIONS, from the form of their fore legs, which are efficient instruments for seizing their prey. Some of the *Nepidæ* are powerful insects, two or three inches long.

WA'TERBURY, a township and city of New Haven county, Connecticut, U. S., 33 miles south-west of Hartford, on the left bank of the Naugatuck River, at its confluence with Great Brook and Mad River, whose falls furnish abundant water-power. It is a well-built town, with a fine park and ornamental cemetery, 7 churches, 2 banks, and 30 large manufactories of rolled copper, brass, German-silver, plated ware, pins, hooks and eyes, buttons, lamps, clocks, percussion-caps, &c. It has been built up by small mechanics, and is the head-quarters of the brass business in the United States. Pop. in 1870, 13,106 (city, 10,826); in 1880, 20,269.

WATER CALTROPS. See TRAPA.

WATER CHESTNUT (*Marron d'Eau*), the name given in France to the edible seeds of the *Trapa natans* (see TRAPA).—The name Water Chestnut is also given to the edible tubers of the *Scirpus tuberosus*, a plant of the natural order *Cyperaceæ* (see BULRUSH and CYPERACEÆ), which is cultivated by the Chinese in tanks very abundantly supplied with manure. It is destitute of leaves, except a slender short sheath or two at the base of each culm. It is stoloniferous, and the tubers are produced on the stolons. They are in high estimation among the Chinese, both for food and as a medicine, and are eaten either raw or boiled. They are called *Pi-sti* or *Maa-tai*.

WA'TER-COLORS are painters' colors mixed with water and some adhesive material, as gum or size, instead of oil. Those intended for drawings on paper are prepared with great care, and are usually formed into dry cakes with gum. Those for coloring walls and scene-painting are roughly prepared with glue or size. These are often called Distemper Colors, from the Italian term *tempera;* see DISTEMPER.

WATER-COLOR PAINTING, the most delicate of the graphic arts, is in an especial sense an English art. It was in England first that it attained to the dignity of a recognized artistic pursuit, and came to be—what it now is—admittedly the rival of oil-painting in brilliancy and power. It has had a large share in the modern prosperity of the fine arts; and of late has been practised by eminent artists in various countries, as France, Germany, and Austria.

In the illumination of missals, water-colors were used mixed with the body white; and the same is true of the miniature-painting of the 18th c. Frescoes and painting in tempera were also in a sense works in water-color. But the art of water-color, as we now understand the term, had its origin in quite a different way. Dürer, and certain of the German, Flemish, and Dutch artists were accustomed to outline drawings with a reed pen, and fill in those outlines with an auxiliary flat wash. Gradually, the hard lines were replaced by touches with the brush, and the result was a monochrome in browns and grays, bistre or Indian ink. These again came to be tinted, and so suggested the full use of colors. Rembrandt often drew in brown, and added dashes of strong color; and Rubens produced something very like modern water-color drawings.

The modern art became emancipated from the old traditions by 'gradual disuse of the general shadow tint; and imitation of the local color, not alone of the objects themselves, but of every modification resulting from light, dark, half tint or distance, a method which at once led to far greater truth and richness than could ever have been attained by merely passing color over the universal shadow tint.' The stained drawing gradually gave way to the more perfect tinted drawing. But the tinted style predominated till 1790; and it may be said that the water-colors of the 18th c. were tinted monochromes. It was in the 19th c. that Girtin and Turner showed what scope and power there were in the art.

Artists who used the stained and tinted manner were Malton (1726—1801), Paul Sandby, R.A. (1725—1809), often called, though without justification, 'the father of water-color art;' also, all in the last half of the 18th c., Grimm, Webber, Clevely, Pars, and Rooker. Wheatley, Westall, and Gilpin used water-color as well as oil. Rowlandson, Cristall, Hills, Wright, Mortimer, Gresse, Hearne, J. R. Cozens, and Dayes greatly promoted the growing art. Nicholas Pocock (1749—1831) displayed a new richness and force. John Smith (Warwick Smith) first got beyond the weakness of mere tinting. Thomas Girtin (1773—1802) attained great richness of tone and breadth; his compositions were grand but simple; he massed light and shade in broad and sometimes abrupt forms. J. M. W. Turner (1775—1851: see TURNER) soon distanced all his predecessors and contemporaries, and in his hands water-color painting became a new art. He wholly abandoned preliminary tinting; minute details are imitated in local color; his work is marked by breadth, fullness, warmth as well as grace. Other more or less important names are those of Delamotte, Varley, J. J. Chalon, A. E. Chalon, Samuel Prout, Peter de Wint, Liverseege, Cotman, David Cox (q. v.), Essex, Richardson, Newton, Copley, Fielding, Robson, W. Hunt, Ross, Harding, Cattermole, Holland, Penley, Lewis, Houghton, and Pinwell; more recent are Birket Foster, Sir John Gilbert, Herkomer, &c.

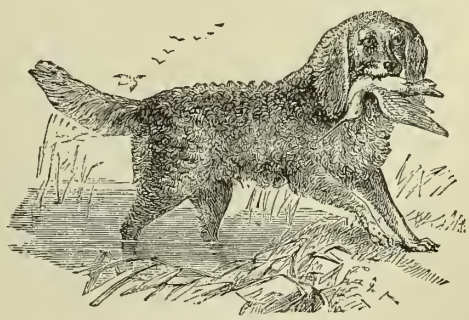
At present water-color paintings may be divided into three kinds: (1) Those where the coloring is mainly transparent; (2) where it is usually opaque; (3) where transparent, semi-transparent, and opaque colors are freely used in combination. The quick drying of the water-color pigments is favorable to rapid execution; and greater clearness of color is attained than is practicable in oils. The progress of the art has been greatly promoted by modern chemistry developments in the preparation of the colors—great variety of really permanent colors being now procurable. These are various pigments ground with gum or other mucilage, and may be kept in cakes, the usual vehicle for moistening and applying them being gum arabic and water. But for artists they are now usually prepared so as to be kept moist in small earthenware pans or metallic tubes.

The Society of Painters in Water-colors was instituted in 1804; it held its first exhibition in 1805; and its annual exhibitions are now as crowded as those of the Royal Academy. Formal recognition of its dignity was accorded in 1882, when the society obtained a charter, and became the Royal Society of Painters in Water-colors. There are other similar associations, as the Institute of Painters in Water-colors. An admirable collection illustrative of the history of the art may be studied in the South Kensington Museum.

See Redgrave's *Introduction* to the Catalogue of Water-colors at South Kensington (1877); P. G. Hamerton's *Graphic Arts* (1882).

WATER-CRESS. See CRESS.

WATER-DOG, a kind of dog, of which the Poodle (q. v.) is



Water Spaniel.

regarded as a sub-variety. The head is rather large and round, the ears long, the legs rather short, the general form compact, the hair everywhere long and curly. The Water-dog of England, common before the poodle had been introduced from the continent, is still much esteemed by professional wild-fowl shooters, and by the fishermen of the north-eastern counties. It is about 18 or 20 inches high at the shoulder. The hair is coarser and crisper than that of the poodle. This dog was formerly sometimes used in London for the brutal sport of hunting and worrying domestic ducks, placed in a pond for the purpose. It is an intelligent and affectionate kind of dog, although not of much beauty.

WATER-DROPWORT (*Œnanthe*), a genus of plants of the natural order *Umbelliferæ;* having ovatocylindrical fruit, not prickly nor beaked, each carpel with five blunt convex ribs, and single vittæ in the interstices; the calyx teeth lanceolate; the petals obcordate and radiant, with an inflected point; the partial involucre of many rays; the flowers of the circumference on long



Water-dropwort (*Œnanthe crocata*).

stalks and sterile, those of the center subsessile and fertile. A number of species are natives of Britain, large perennial plants, with a strong and generally disagreeable aromatic smell, and compound or decompound leaves. The COMMON W. (*Œ. fistulosa*) and the HEMLOCK W., or WATER HEMLOCK (*Œ. crocata*), are both common in wet places in Britain and throughout Europe, and both are narcotic acrid poisons. The roots of the latter have some resemblance to small parsnips, and hence fatal accidents have frequently occurred.—The FINE-LEAVED W., called Water Fennel by the Germans (*Œ. phellandrium*, formerly known as *Phellandrium aquaticum*), is also common in ditches and ponds both in Britain and on the continent. It has a jointed root-stalk (*rhizome*), with tufted whorled fibres, and a strong zigzag stem dilated at the base. The leaves are decompound. The fruit has a peculiar aromatic but disagreeable smell. It is not so poisonous as the other species just named. It was at one time erroneously regarded as a specific against pulmonary consumption; but it has been advantageously employed in pulmonary complaints.

WATEREE′, a river of the U. S., formed by the junction of the Catawba and Fishing Creek in North Carolina, runs south-east into South Carolina, where it unites with the Congaru to form the Santee. Steamboats ascend the W. to Camden, 200 miles from the sea.

WA′TERFALL is a break in the continuity of slope of the channel of a river or stream, so abrupt that the body of water *falls* from the higher to the lower level. Waterfalls occur most frequently in mountainous countries, where the streams from the mountain sides enter the valleys. It is only when the side of the valley is composed of hard rock that there can be a waterfall; in friable strata the stream wears out a ravine or side-valley. These mountain waterfalls, however, are generally rather curious and picturesque than grand, the volume of water being in most cases comparatively insignificant, though the height of fall is occasionally very great. All mountain waterfalls necessarily change their aspect from season to season—in winter, a roaring torrent plunging headlong into the abyss; in summer, often a mere film of water trickling down the face of the precipice. Waterfalls in comparatively level districts are not nearly so common, and their height of fall is insignificant compared with that of mountain cataracts; but the much greater volume of water, its steady and even flow to the head of the precipice over which, in solid column, it descends with a thundering plunge, place such waterfalls among the grandest of nature's phenomena. It is where the course of a large river passes from a higher to a lower plateau, and where the upper plateau is edged with rock, that the grander cataracts are formed. If the rocks are of the same hardness from top to bottom, the edge of the escarpment, supposing it to be perpendicular at first, becomes worn off, and a slope or *rapid* is formed. But when the upper edge is hard and the under strata soft and friable, the reverberation of the spray wears away the softer parts below, leaving a projecting ledge at the top, which breaks off, piece by piece, as it becomes too much undermined, so that the fall is constantly receding. The question of the rate of regression of waterfalls has not hitherto occupied much attention, and has only been estimated in the case of Niagara, Bakewell giving its annual value at 1 yard, while Lyell limits it to about a third of this.

Some of the most remarkable waterfalls of the world are the Yosemite, California, in a valley of the same name; a fall 2556 feet in entire height, but broken into three leaps; the Orco Falls at Monte Rosa, 2400 feet; Gavarnie (Pyrenees), 1400 feet; Staubbach (Switzerland), 1000 feet; Maanelvan (Norway), 940 feet; Niagara (q. v.); Zambezi (q. v.); Missouri; the great Kaietur fall in British Demerara, over 700 feet. The cataracts of the Velino and Anio, in Italy, are beautiful artificial imitations.

WATER FLEA (*Daphnia*), a genus of *Entomostraca*, of the order *Cladocera*, and family *Daphniadæ*. One species, *D. monoculus*, is abundant in pools and ditches in Britain. It comes to the surface in the mornings and evenings, but keeps near the bottom during the heat of the day. It swims by taking short springs, whence its popular name. It feeds on minute particles both of animal and vegetable substances. It is a beautiful object for the microscope; the whole interior organization being visible through the transparent carapace. The male is much smaller than the female, and comparatively rare. The eggs, after leaving the ovary, are retained in a cavity between the body and the carapace, until the young have attained almost their perfect form.

WA′TERFORD, a maritime county of the province of Munster, Ireland, is bounded on the N. by the counties of Tipperary and Kilkenny, on the E. by Wexford, on the S. by the Atlantic, and on the W. by the county of Cork. Its greatest length from east to west is 52 miles, and its breadth, north to south, 28; the total area being 721 sq. m., or 461,563 acres, of which 325,345 are arable, 105,496 waste, 23,468 in plantations, 526 in towns, and 5779 under water. The pop. in 1851 was 164,051; in 1871, 123,310, of whom 116,839 were Roman Catholics, and 5090 Protestant Episcopalians; and in 1881 it was 112,009. In 1880, there were 17,000 pupils at the national schools. There were 86,195 acres under crops of all kinds in 1881, oats being the principal crop. The live-stock in 1881 comprised 12,522 horses, 97,839 cattle, 49,600 sheep, and 42,719 pigs.

The fishing-grounds on the coast, once thought inexhaustible, are now said to be unproductive. The coast-line extends from the estuary of the Suir, Waterford Harbor, to that of the Blackwater at Youghal, and is partly flat, partly rocky, but in general very dangerous for shipping. The rocky district contains some remarkable caverns. The surface is in general mountainous; the principal ranges being Knockmeledown, the Cummeragh, Monevolagh, and Drum. The Cummeragh Mountains are the loftiest, and abound in wild and picturesque scenery. The Suir (q. v.) and the Blackwater (q. v.) are the chief rivers. There are no lakes worthy of note. The climate is moist, and the soil, over a considerable part of the county, is marshy; but the upland districts are well suited for tillage, and the lower pasture-lands, although inferior in fattening properties to those of the great central plain, produce excellent butter, which is exported in large quantities. In geological structure, the mountains present the old and new slate, separated by red and gray quartz rock and quartzose slate. Of quarry slate, there are two principal varieties, which are raised extensively for local use. The valleys belong to the limestone series, being an outlying prolongation of the great bed of the central plain. Lead, iron, and copper are found. The former two have proved unprofitable, but the copper-works at Bonmahon and Knockmahon have for many years been very productive. Marble of several colors and of considerable beauty is quarried near Cappoquin and Whitechurch, and potter's clay of good quality is found at Kildrum, near Dungarvan. The chief occupations of the population are pasturage and dairy-farming; but a considerable manufacture both of cotton and linen has been recently introduced at Portlaw, and the shipping-trade has of late years become active and profitable.

W. is divided into eight baronies. The most considerable towns besides Waterford City (q. v.) are Dungarvan, Carrick-beg—properly a suburb of Carrie-on-Suir, which is in Tipperary—Lismore, Cappoquin, Tallow, and Tramore. Clonmel, although chiefly in Tipperary, lies partly within this county. W. returns five members to parliament—two for the county, two for Waterford City, and one for the borough of Dungarvan. The county constituency in 1878–9 was 3223. The net annual value of property in the county, with the city, is £316,685. This district, in common with the adjoining county of Wexford, is believed to have been anciently peopled by a Belgic colony. The Danes also formed a settlement at the mouth of the Suir. From the date of the invasion, W. became a stronghold of the English, large grants having been made by Henry II. to the family of Le Poer; and in all the alternations of the subsequent struggle with the Irish population, it continued for the most part a firm center of English influence. The county abounds with antiquities ecclesiastical and military, and of the Celtic and Danish, as well as the Anglo-Norman period.

WATERFORD, a city, capital of the county of the same name, but itself a county of a city, and a parliamentary borough, is situated in N. lat. 52° 16′, W. long. 7° 8′, on the river Suir, 12 miles

from the sea, and 97 south-south-west from Dublin, with which city it is connected by the Great Southern and Western, and Waterford and Limerick Junction Railways, as also by the Waterford and Kilkenny Railway. The pop. in 1861 was 23,293, of whom 20,429 were Roman Catholics, and 1969 Episcopalians of the Protestant Church; in 1871, 23,349, of whom 20,604 were Roman Catholics, and in 1881, 29,181. Eight newspapers are published in W. The city, with the exception of an inconsiderable suburb, with which it is connected by a bridge of thirty-nine arches, 852 feet long, opening for the passage of ships, lies on the right bank of the Suir, along which a handsome and spacious quay extends for a distance of nearly a mile, and from which the city ascends gradually in well-built streets.

Vessels of 2000 tons are now enabled to discharge their cargoes at the quay; but there is an anchorage for still larger ships about six miles lower down the river, at Passage. The chief public buildings are the Protestant and Roman Catholic cathedrals, the Protestant episcopal palace, the (Catholic) college of St. John, the Model National School, and the city and county court-houses. In addition to the union work-house, there is an infirmary, a dispensary, a fever hospital, a district lunatic asylum, and a penitentiary. The affairs of the municipality are administered by a mayor and corporation consisting of ten aldermen and thirty councilors; those of the port, by a body of commissioners, twenty-four in number, elected by the Corporation and the Chamber of Commerce. The chief trade is with England, in the export of butter, pork, bacon, corn, flour, eggs, and live-stock. The annual value of property under the Valuation Act was, in 1879, £53,214. Steam-navigation has received a great impulse, and there is now a ship-building yard, with patent slip, graving-bank, and dock, on the Kilkenny bank of the river.

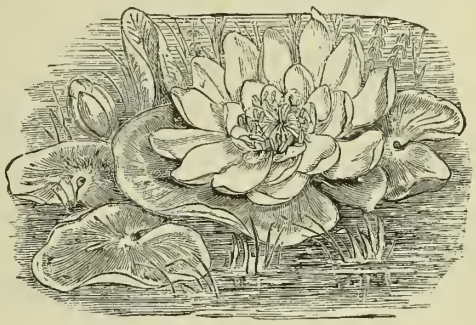
W. is originally of Danish foundation; but at the invasion, the city was taken by assault by Strongbow, by whom it was enlarged, and made a place of strength. It received a charter from John, which was forfeited under James I., but restored by Charles I. in 1626. But few remains of its ancient buildings are now to be seen.

WATER-GLASS, the soluble silicates of potash or soda, or a mixture of both. It is usually prepared by boiling silica with caustic alkali under pressure, about 60 lbs. to the square inch, in a digester. When pure and solid, it has the appearance of common glass, and is slowly soluble in boiling-water. A solution of water-glass is used, mixed with sand, &c., to form artificial stone. It is also spread on the surface of stone to protect it from decay, as it sinks in and cements the particles together; and it enters into the composition of some kinds of cement. In the art of Stereochromy, or Fresco-painting (q. v.), water-glass is now much used. It has also become useful in certain dyeing processes, having in some cases been found to answer the purpose of dunging.

WATER-HEN. See GALLINULE.

WA'TERLAND, DANIEL, D.D., a clergyman of the English Church, prominent in the theological controversies of the first half of the 18th century. He was born on the 17th February 1683, at Waseley in Lincolnshire, of which parish his father was the rector. After going through the usual course of study at Magdalen College, Cambridge, he was admitted into orders; and in 1713 he became rector of Ellingham, on the nomination of the Earl of Suffolk. It was shortly after this that he published his first book, *Advice to a Young Student, with a Method of Study for the first Four Years*—an unpretentious but useful work, which soon became very popular, and brought its author into notice. King George I. appointed him one of his chaplains in 1717. About this period he began to be engaged in theological controversy, one of his earliest works being a criticism of a book by Dr. Whitby, in which a severe attack was made upon Bishop Bull's *Defence of the Nicene Creed*. Whitby answered him; W. rejoined; and in 1719 the latter expanded his writings upon this subject into his *Defense of Christ's Divinity*. This work was sharply criticised by Dr. Clarke and other Arians; to whom W. replied in a work published in 1724. Upon the same subject, he, in 1720, preached and published a series of sermons at the request of the Bishop of London. Within a few years after this he passed through a rapid course of promotion in the Church. In 1721 he was appointed rector of the parish of St. Augustine in the City of London; in 1724 he got the Chancellorship of the Cathedral of York. He was appointed a canon of Windsor in 1727, and Archdeacon of Middlesex in 1728. He held along with the latter appointments the valuable living of Twickenham. During these years he was indefatigable in controversy; not only keeping up a paper war against the Arians, but entering the lists against free-thinkers, such as Middleton and Tindal, and against those of the Anglican body who did not share his doctrines upon the subject of the Trinity and the Eucharist. *A Critical History of the Athanasian Creed;* (1724); *A Review of the Doctrine of the Eucharist* (1737); and *Scripture Vindicated* (1734), are considered among the most noteworthy of his productions. In 1738 were published two volumes of his sermons, edited by one of his friends—the one upon Justification, the other upon the Communion of Infants. W. died on the 23d December 1740. A complete edition of his works, accompanied by a pretty full Memoir of his life from the pen of Bishop Van Mildert, was published at Oxford in 1823, in ten volumes 8vo; an eleventh volume, containing a general index, was added in 1828.

WATER-LILY, a name commonly enough given to the different species of *Nymphæa* and *Nuphar*, and also of *Nelumbium*, all genera of the natural order *Nymphæaceæ* (q. v.), and indeed often extended to all the plants of that order. Britain produces three species—*Nymphæa alba*, the White Water-lily; and *Nuphar luteum* and *Nuphar pumilum*, called Yellow Water-lilies. The two former are frequent in still waters in most parts of the island; *Nuphar pumilum* is more rare, and chiefly found in Scotland. All have heart-shaped leaves, floating on the water. The beautiful and fragrant white flowers of *Nymphæa alba* float upon the water;



White Water-lily (*Nymphæa alba*).

the flowers of the yellow water-lily, which are of comparatively little beauty, are raised by their stalks a little above it. The seeds of these, as well as of the White-lily of the Nile (*Nymphæa lotus*—see LOTUS), are farinaceous, and are sometimes used for food. The Turks prepare a cooling drink from the stems of *Nuphar luteum*.—The SWEET-SCENTED WATER-LILY of North America, *Nymphæa odorata*, has a large white flower of great beauty, and of very sweet smell. Not only *Nymphæa lotus*, but also *N. rubra* and *N. pubescens*, are regarded as sacred plants by the Hindus. *N. cærulea* was also held sacred by the ancient Egyptians.

WATERLOO', BATTLE OF, the decisive conflict which annihilated the power of Napoleon I., was fought, 18th June 1815, in a plain about 2 miles from the village of W., and 12 miles south from Brussels. Agreeably to the unanimous resolve of the Allies to attack Napoleon on all sides, and crush him as they had done in 1814, British and Prussian troops were stationed in the Netherlands, under the command of Wellington and Blücher respectively, in order to attack France on the north. Napoleon, on his side, well aware that for a considerable time no weighty attack could be made on France except by these forces, and fully recognizing the immense advantage to be gained by destroying one enemy before the others could come up, rapidly concentrated the bulk of his troops; and with a suddenness and secrecy which defied all effective counter-preparations, crossed the Belgian frontier, and fell with one part of his forces on the Prussians at Ligny (q. v.), and with the other part, under Ney's immediate command, on the army of the Prince of Orange at Quatre-Bras (q. v.). The Prussians—as Wellington, after learning Blücher's dispositions for the battle, had foretold—were, after a contest of the most obstinate description, completely defeated; but the Prince of Orange, by the aid of the reinforcements promptly forwarded to him by the English commander, succeeded in withstanding Ney's attack. In the plan preconcerted by the Allied generals such a result was not unforeseen, and in accordance with their scheme of firm resistance and retreat if necessary (to allow time for the Russians and Austrians to assemble on the eastern frontier of France), Blücher retreated northwards (instead of eastwards, as Napoleon expected) nearer the place of rendezvous with Wellington at Mont St. Jean; while early on the morning of the 17th, the Anglo-Netherlanders retired along an almost parallel route till they reached the forest of Soignies, in front of which they were formed in battle-array, facing southwards. Napoleon, imagining that the Prussians were in total rout, and that their complete dissipation would easily be accomplished by Grouchy's division (33,000), which he had sent in pursuit, crossed to Quatre-Bras with the rest of his troops, and uniting with Ney, marched in pursuit of Wellington, arriving on the plain of W. in the evening.

The two armies which then confronted each other, though nearly equal in strength, were composed of very different materials. The French army, numbering from 69,909 to 72,247 men (according to French authorities, English historians varying in

their estimate from 74,000 to 90,000, though its exact strength cannot be ascertained, owing to the loss of the official returns), was composed of veteran troops, who had enthusiastically ranked themselves once more under the standard of the chief who had so often led them to victory. The Anglo-Netherlands army, which numbered 69,894, of whom only 25,389 were British, 6793 of the king's German legion, 10,995 Hanoverians, 6303 Brunswickers, 2926 Nassauers, and 17,488 Netherlanders, consisted, with the exception of a small number of Peninsular veterans, wholly of young soldiers, a large proportion of whom had never been under fire; the Hanoverians were only militia, some of them being fit but for garrison-duty; while the behavior of many of the Belgian troops during the battle showed plainly enough that they mainly increased the *numerical* strength of the army, as they left it to the Dutch soldiers to vindicate the wrongs of the Netherlands. The French had 240, while their opponents had only about 156 guns. With such an army, to maintain even a defensive conflict with an army of veterans, commanded by the greatest general of the time, was a task which (laboring under a mistake as to the exact superiority in number of his opponents) it required all Wellington's rare tenacity of purpose to undertake; yet undertake it he did, depending on Blücher's promise to join him an hour after midday.

On the morning of the 18th, the two armies found themselves ranged in battle-array opposite each other: the Allies, posted on a line of eminences, had their left wing resting on Frischermont, the farm-house of La Haye Sainte in front of their center, while their right wing curved convexly round behind Hougomont, and rested on Braine Merbes. The French were ranged on a parallel row of eminences, having La Belle Alliance in their center, with some divisions of cavalry and infantry in reserve behind the right wing; Kellermann's dragoons behind the left wing; and the Guard, stationed with the 6th corps, in the rear. Skirmishing had continued all the morning; but the first serious attack was not made till between eleven and twelve, when a part of the first corps advanced against Hougomont, with the view of masking the more important attack to be made against the allied left. This preliminary assault, however, though unsuccessful, was maintained with great vigor for a considerable time; till Napoleon, dreading a further loss of time, prepared to make his grand attack on the left center. At this time (half-past one P.M.), he learned that the advanced guard of the 4th Prussian corps (Bulow's) was appearing in front of St. Lambert, 2—3 miles to his right; and being forced to detach his 6th corps (Lobau's) with the reserves of cavalry behind his right wing, to keep them in check, he had to modify his grand plan of attack on the Anglo-Netherlanders, and accordingly ordered Ney to break through their center.

At two P.M., after a furious preliminary cannonade, from which Wellington sheltered his men (as at various other times during the battle), by retiring them to the reverse of the slope, Ney advanced against the left center with 20,000 men, but had only succeeded in putting to flight a Belgian brigade, when he was attacked and driven back by Picton's division, his retreating columns charged and broken by the English cavalry, and 2000 prisoners taken. Nevertheless, after a brief space, Ney returned to the charge, and carried La Haye Sainte, though his repeated attacks on the infantry in position were constantly repulsed, and his retreating columns severely handled by the British cavalry, who, disordered by success, were as often overthrown by the French cuirassiers. By this time (half-past four P.M.), Bulow had succeeded in deploying from the woods, and, advancing against Planchenoit, in the rear of the French right, carried it after a vigorous conflict. Lobau's corps, however, aided by a reinforcement from the Guard, speedily retook the post, and driving the Prussians back into the wood, secured the French right flank for a time; Napoleon, though now learning that another Prussian corps (the 1st, under Ziethen) was coming up by Ohain to join the Allied left, being still confident that he could destroy the Anglo-Netherlanders before the Prussians could render effective aid. During the conflict with Bulow, Ney had been warmly engaged with the center and right of the enemy, who had made various attempts to regain the wood of Hougomont and La Haye Sainte, and had supported his repeated attacks with not only his own cavalry, but (by, at any rate, the 'tacit consent' of the emperor) with the cuirassiers, lancers, and chasseurs of the Guard, and the whole of the mounted reserve, without, however, producing any result other than a great slaughter on both sides, and the useless sacrifice of 18,000 of the finest cavalry ever seen. Napoleon now resolved on another vehement assault on the immovable British center, and directed against it in succession two columns, one composed of four battalions of the Middle Guard, and the other of four battalions of the Middle and two of the Old Guard, supporting them with flank attacks of other infantry divisions, of cavalry, and with a dreadful fire of artillery.

The advancing French were met with a well-sustained fire from every piece which could be brought to bear upon them; the first attacking column was fairly driven down the slope by the English Guards, and the second was totally routed by a bayonet-charge of Adams' brigade, the British cavalry following up the fugitives. Ziethen had now (7 P.M.) joined the left of the English line; Bulow, further reinforced, had carried Planchenoit, and was driving the French right wing before him; and the combined attack on the retiring masses of the French by the whole effective force of the Anglo-Netherlanders on the one side, and of the Prussian cavalry on the other, converted an ordinary, though severe defeat into a rout unparalleled in history. The magnificent cavalry, wantonly destroyed by Ney in fruitless attacks upon an 'impracticable' infantry, would then have been of incalculable service, but they were no longer to be had. The last square of the Guard still stood its ground, to protect the flight of the Emperor; but it was speedily surrounded, and on the soldier-like refusal of Cambronne to surrender, was in a moment pierced through, and broken to pieces. From this time all resistance was over; the roads southwards, especially that to Genappes, were crowded with fugitives fleeing for their lives from the pursuing cavalry; and though the English light cavalry, exhausted with their severe work during the battle, soon ceased the pursuit, it was kept up with great energy throughout the whole night by the Prussian troopers, who seemed bent upon at once avenging the defeats of Jena, Auerstadt, and Ligny, and glutted their fierce animosity by an indiscriminate slaughter. The total loss in this battle was, from the obstinacy and determination with which it was contested, necessarily large; the figures are: British and Hanoverians, 11,678; Brunswickers, 687; Nassauers, 643; Netherlanders, 3178; a total of 16,186; which, added to 6999 Prussians, gives the aggregate allied loss, 23,185. The French had 18,500 killed and wounded; 7800 prisoners (some French accounts raise the total list of *hors de combat* to 32,000), and 227 cannon captured.

This great battle has given rise to numerous controversies among the British, French, and German historians of the great struggle between Europe and Napoleon—the points in dispute being, (1) as usual, the numbers engaged on each side, (2) the ability shown by each general in his dispositions for the conflict, and (3) the relative share of the British and Prussians in producing the final result. These questions can be briefly and satisfactorily answered. The strength of the English army is known from official estimates; the French army, as shown by its manœuvres throughout the day, was more numerous, and though its amount cannot, with perfect accuracy, be ascertained, it was certainly over 70,000, and under 80,000; but the fact that many Belgians in the Duke's army took to their heels as soon as the French marched towards them, and fled direct to Brussels, increased the disproportion, already sufficiently great, between the two armies; the Prussians had only 35,000 men under fire at W., and half of these only for about half an hour. Fault has been found with Wellington for giving battle in front of a wood, but the accusation is foolish, as several good roads traversed the wood, thus affording means of retreat, if necessary, and the wood could have been held by skirmishers to protect the retreating infantry. Napoleon's faults were chiefly—the late hour at which he (not calculating on the arrival of the Prussians at all, and certainly not without Grouchy) commenced the conflict, and the reckless manner in which his cavalry reserves were wasted; and his neglecting to take into account the steadiness—a steadiness new to one of even his experience—with which, as he was warned by Soult who knew it only too well, the British infantry were wont to maintain their ground. As to the third point, there is no doubt that Bulow's attack on Blanchenoit distracted Napoleon's attention, and drew off 10,000 of his forces; but though the Prussians had not come up, the battle could not have been otherwise than a drawn battle; however, the effect of their successful attack on the French right, by taking in flank also the squadrons which recoiled before the invincible steadiness of the British, was the conversion of an otherwise drawn battle into a glorious victory.

Each of the three nations claims its right to give name to this famous conflict—the French calling it after Mont St. Jean, a château in rear of the British line; the Prussians after La Belle Alliance; while the true victors on the bloody field assert their rightful claim, and will hand it down to all future ages as the *Battle of Waterloo*. See Colonel Chesney's *Waterloo Lectures* (1868).

WATER-MARK, the manufacturer's mark on various kinds of paper. See PAPER.

WATER OUSEL. See DIPPER.

WATER-POWER. The value of water-power depends much on the nature of the source of supply, whether steady or otherwise. Where streams supplying water-power are liable to fall off much in dry weather, large impounding reservoirs are necessary to keep the mills from being stopped during summer. These, however, being generally expensive concerns, are seldom made for one mill, but rather by some association of mill-owners; and often by a water-company or commission for supplying a town with

water, to afford compensation to the mills by storing up flood-water, for what is abstracted for the use of the town. On small streams, there is generally a pond provided fit to hold a night's water, or, perhaps, even a Sunday's, in addition; but in the case of large rivers, there is, in general, only a weir or dam across the river to direct the water into the intake lade. When the inclination in the bed of the stream is small, the lades require to be proportionally long, to give sufficient fall, and are often above a mile long or more from the intake to the lower end of the tail or discharge lade, where the water is returned to the stream. The rise and fall of the tide has been frequently used for driving water-wheels.

The most usual, and generally the most eligible, mode of applying water to the driving of machinery is by means of a vertical wheel; and the wheel is put in motion either by the water acting on blades or floats by impulse derived from its velocity acquired in falling, or by the weight of water being applied to one side of the wheel. The former mode of applying the water is generally adopted in low falls, say under six feet or thereabout, and to what is called an undershot wheel—i. e., a wheel where the effective head of water is below the level of the center; and to make the application efficient, that portion of the periphery of the wheel measuring from the point of impact of the water to a point directly below the center, requires to be surrounded by a casing generally of stone, but sometimes of cast-iron, called the arc, closely fitted to the extremity of the floats, so as to prevent any considerable escape of water.

The wheel, which may be either of timber or of cast-iron, or partly of both, consists (fig. 1) of axle, *a*; arms, *b*; floats, which

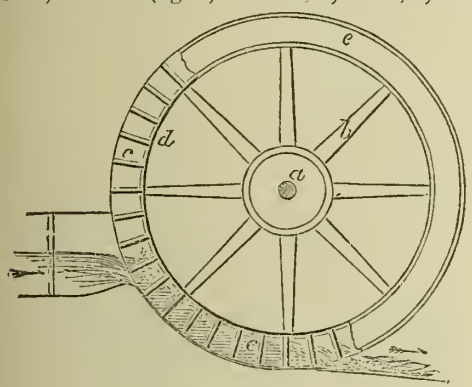


Fig. 1.

are generally radii of the circle, but are sometimes set a little obliquely to the radius, pointing up stream, *c*; and generally there are also a sole, *d*, being a lining round the circumference at the lower edge of the floats, having openings for the escape of air; and a shrouding or circular plate, *e*, at each side of the wheel, and of the same depth as the floats.

Sometimes, when there is very little fall beyond the mere current of the stream, the floats simply dip into the water like the paddles of a steamer, in which case, no sole or shrouding is required; and to make allowance for the rise of the water in the tail-lade during floods, which is generally called *back-water*, and seriously impedes and sometimes stops the motion of the wheel, occasionally the wheel and its arc are so constructed as to be capable of being raised or depressed together, without throwing the machinery out of gear. This is done in the case of the Inverness water-works, where the wheel is liable to be much affected by the rising and falling of the river Ness.

Sometimes, in this country, and often on the continent, the machinery is all on board a vessel moored in a river, so as to rise and fall with the level of the water, and thereby keep its water-wheel always immersed to the proper depth. At the old London Bridge water-works, the wheels which rose and fell with the tide were worked by the current of both the flood and ebb.

The other mode of applying the water to a vertical wheel by making it act by its gravity, is the more perfect and economical mode, where circumstances will admit of it, and is generally adopted in falls of any considerable height, say of six feet and upwards, and where the water can be let on above the level of the center. The wheels are called respectively *breast* and *overshot wheels*, according as the water is let on more near to the level of the center or to the crown of the wheel; and they have, instead of straight floats, curved or kneed buckets, according as they may be made of iron-plate or of wood, and of such a shape as to retain the water down to the lowest possible point. There are generally in good wheels ventilating openings in the sole for the escape of air. The overshot wheel has this disadvantage that, as the water has little or no power until considerably past the top center, the wheel is burdened with a useless weight of water.

The direct overshot wheel has the water run, without changing its direction, right over the top, as in fig. 2; which arrangement

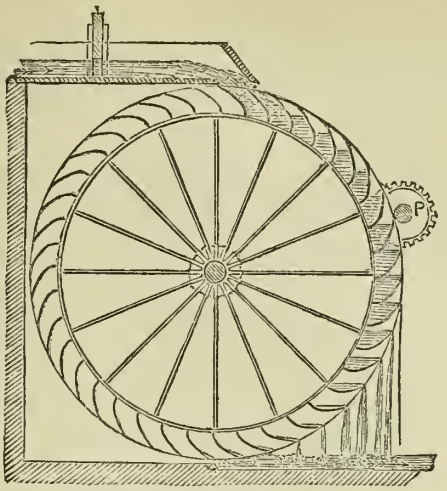


Fig. 2.

has this advantage that, as the top of the wheel moves in the same direction as the stream, it gets the benefit of the whole initial velocity and impulse of the water; but, on the other hand, the bottom of the wheel, if at all immersed in water, which it generally is to some extent, meets with obstruction by moving against the current.

The *pitch-back overshot* is a modification of the last, making the water to pass alongside the wheel, and then to return and be let on the top of the wheel in a contrary direction, as in fig. 3. This

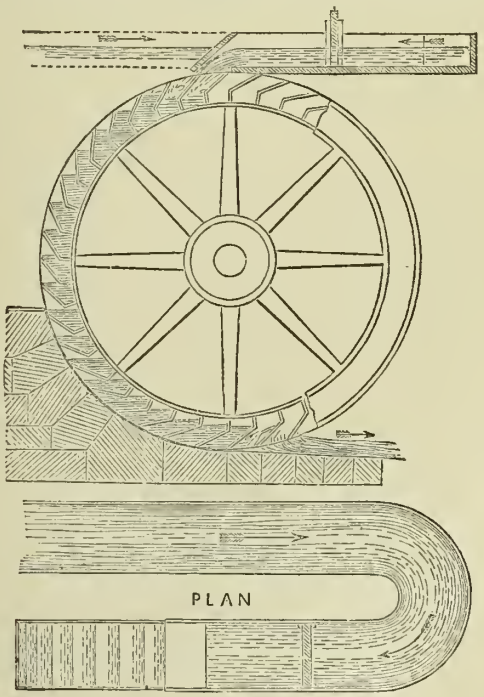


Fig. 3.

requires longer and more complicated troughs, and by the change in direction, part of the impulse from the water is lost, but the bottom of the wheel moves in the direction of the tail-water, and is not liable to be impeded by being immersed in it.

On the whole, it is generally thought better to apply the water at about 30 degrees from the top of the wheel. In such high-breast or nearly overshot wheels, the water is let on to the buckets over the top of the sluice, which is made to open by lowering, and shut by lifting, as in fig. 4. In this way, however small may be the quantity of water, it is always applied at the higest possible level, which is of importance when it is its weight multiplied by the height of descent, and not its impulse, that yields the effective power.

The structure of the overshot and breast wheel is nearly the same as that of the undershot, excepting in the substitution of curved buckets, as in figs. 2 and 4, or angular buckets, as in fig.

3, for straight floats; but even in the undershot wheel the floats are sometimes made with a slight curvature.

In any description of wheel, the motion may be taken off the axle by torsion, which necessarily requires rigidity in the arms, as in figs. 1 and 3; or it may be taken directly off the periphery, when the power is applied to a pinion P, working into segments either external, as in fig. 2, or internal, as in fig. 4, attached to

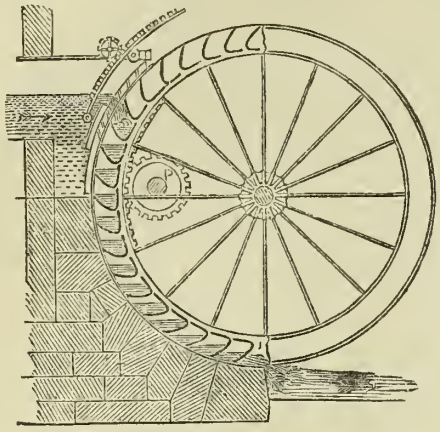


Fig. 4.

the shrouding. In this arrangement, there is no torsion of the axle, or transverse strain on the arms, and therefore the latter are more often made of round wrought-iron rods, with a slight axle. This wheel is much lighter than with the massive axle and the strong wooden or cast-iron arms, and is called a *suspension* or *spider wheel*.

In reckoning the power of water, its weight being 62½ lbs. to a cubic foot; theoretically, 528 feet, falling vertically 1 foot a minute, would be equal to 1 Boulton and Watt horse-power of 33,000 lbs. lifted 1 foot a minute; but the effective power is far short of that, and 60 per cent. of it, requiring 880 cubic feet, falling 1 foot a minute, is generally reckoned a fair allowance for an effective horse-power. Seventy-five per cent., requiring 704 feet, falling 1 foot a minute, is about the highest that has ever been spoken of, and it is doubtful whether even more than 70 per cent. has ever been attained; while with low falls and imperfectly constructed wheels, it is often reckoned that a horse-power requires nearly 1000 cubic feet a minute.

The velocity of the periphery of an undershot wheel is usually from 500 to 600 feet a minute, and that of a bucket-wheel, overshot or breast, from 300 to 450 feet. It is seldom that the whole height of a fall can be advantageously made use of; for if the wheel be placed so low as to get the benefit of the whole height of the fall in low states of the water, very often it is liable in floods, to have the lower rim immersed, and to be obstructed or stopped by back-water.

The most extensive application of water-power to one work in Scotland, or probably in Britain, is that of Deanston Cotton Mills, on the river Teith, 6 miles above Stirling, where there are in one house four wheels, 36 feet in diameter, and 12 feet in breadth, and having a volume of water of 8¼ millions of cubic feet in 10½ hours a day—falling 33 feet a minute. The most systematic application of water-power, however, is probably that of the Shaws Water-works, now the property of the corporation of Greenock. There the yield of nearly 7000 acres of hill-ground is stored up in reservoirs of a capacity of 320,000,000 of cubic feet, and conveyed by an aqueduct of about 6 miles in length to the outskirts of Greenock, which it reaches at the level of 512 feet above the level of the sea, and is then divided into two lines of falls, one having 1200 cubic feet a minute for 12 hours a day, and the other the equivalent quantity of 1066 feet for 13½ hours a day, divided each into 19 falls, for which those already appropriated pay per annum from £1, 15*s*. to £4, 5*s*. per horse-power, according to their distance from the center of the town, and their height above its level. One foot of fall for each line is reckoned 1·8 horse-power, which is a very high computation, being 79·2 per cent. of the theoretical horse-power. At the 'Cotton Mill,' where both lines of falls are combined, there is the largest, or nearly the largest water-wheel in existence. It is 70 feet 2 inches in diameter, 13 feet wide, with 166 buckets, having a depth of 17 inches. It has 2266 cubic feet of water per minute, with a fall of 64 feet 4 inches, and is therefore nearly 200 horse-power. By the Shaws computation, it would be 218 horse-power. It is a spider wheel, taking the power off the circumference.

Of horizontal wheels: In the proper turbine (from Ital. *turbino*, a whirlwind), the water passes either, first, vertically down through the wheel between fixed screw-blades, which give it a spiral motion, and then strikes similar blades attached to a movable spindle, but placed in the opposite direction, so that the impact of the water communicates a rotatory motion to the blades

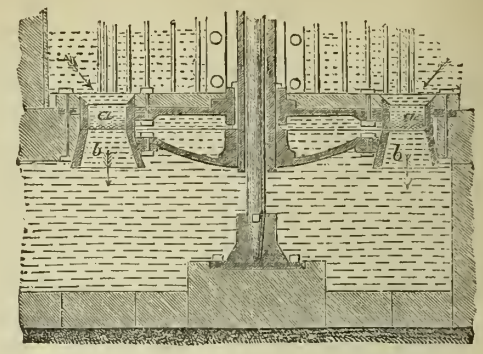


Fig. 5.

and spindle, as shown in fig. 5, and in fig. 6 an enlargement of the parts, the fixed blades being marked *a*, *a*, and the movable portion of the machine *bb;* or, second, a modification of the fore-

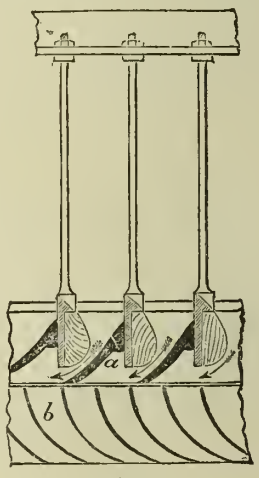


Fig. 6.

going is to pass the water from the center horizontally outward through fixed curved blades, *a*, *a*, figs. 7 and 8, so as to give it

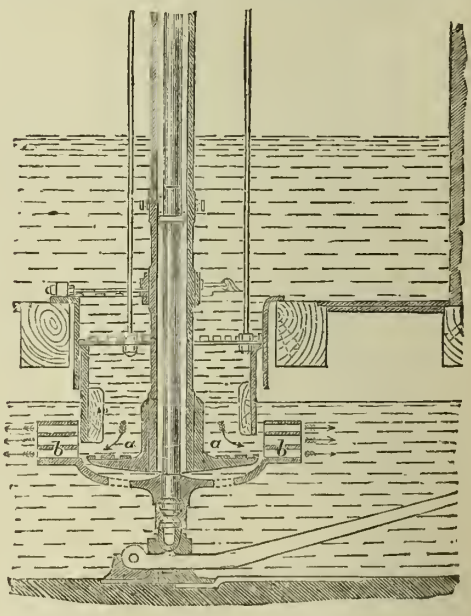


Fig. 7.

rotatory or tangential motion, and thereby cause it to act on the blades of the wheel, *bb*, which revolves outside.

In the reactionary wheel, which is in principle almost identical with Whitelaw and Stirret's wheel, previously described under the article BARKER'S MILL, the water is admitted at the cent

of the wheel from below, passes to the circumference between curved blades of the wheel, and escapes by tangential orifices at the circumference, there being valves made to open more or less, according to the quantity of water and to the power required.



Fig. 8.

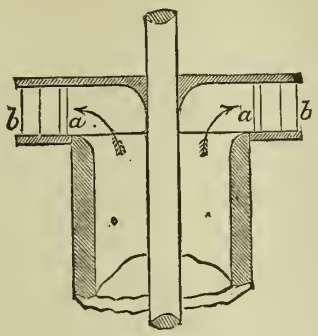


Fig. 9.

This form of turbine is shown in figs. 9 and 10, where the water enters at *aa*, and escapes by *bb*.

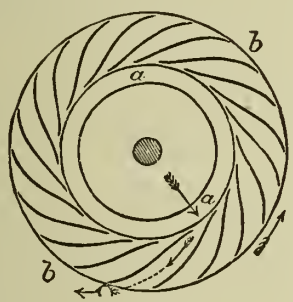


Fig. 10.

The vortex wheel of Professor Thomson (figs. 11 and 12) takes in the water after descending through the tubes, *a*, *a*, at the circumference, where, by means of fixed blades, *b*, *b*, it acquires a tangential motion, and then passes through between the curved

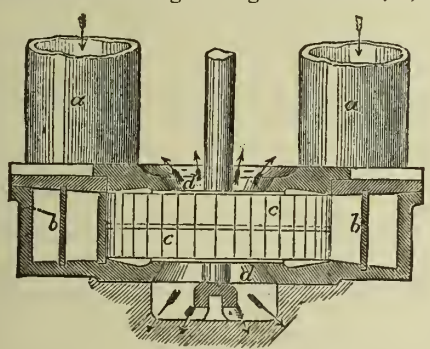


Fig. 11.

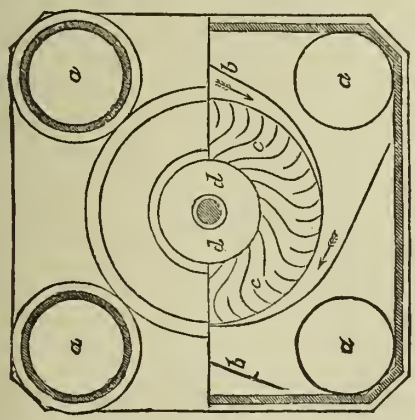


Fig. 12.

arm, *cc*, of the wheel, and escapes at the center, *dd*. As the two last described wheels work always under water, they are not liable to be obstructed by back-water, or to have their power lessened thereby more than what *is* due to the diminished fall, and they are understood to yield a good percentage of power, sometimes stated at 75 per cent.; but all turbines are somewhat delicate, and liable to be choked by leaves or twigs, unless the water be carefully strained. Although only a few horizontal wheels have been described, their name is legion, and it would take a book to mention them all, or to describe their respective merits.

The reciprocatory hydraulic engine, as shown in fig. 13, works exactly on the same principle as the ordinary non-condensing

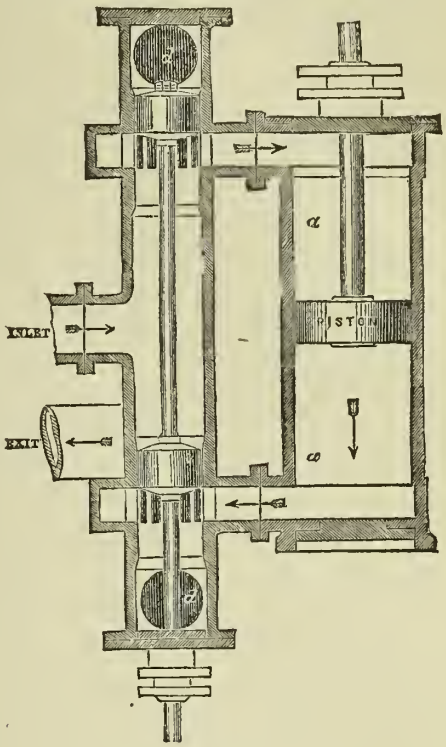


Fig. 13.

steam-engine. The water, under considerable pressure, is admitted at one end of a cylinder, *a*, the exit valve, *d*, at that end being simultaneously closed, while it is shut off from the other end, and the exit valve, *d*, there opened; and so the alternating action of the valves and of the piston goes on continuously. To work smoothly and effectively, the piston ought to be of large diameter, in proportion to the length of stroke, and to go slowly; otherwise the quick jerking is apt to shake and to injure the engine; and generally it is better to have two cylinders and pistons working together, as that enables them to work more equally, and to turn the crank without the use of a fly-wheel.

Both the turbine and the reciprocatory engine have been made use of as water-meters.

The turbine and the reciprocatory engine have the advantage of being able to take the use of a fall much greater in height than the diameter of the largest wheel that can be made; but for all ordinary falls, a good breast or overshot wheel, or even an undershot, is, on the whole, generally considered better.

WATER-PROOFING. See CAOUTCHOUC. Besides the application of caoutchouc, peculiar methods have been employed to render cloth impervious to water, at the same time allowing the passage of air, the absence of this property in the impermeable caoutchouc manufactures having been found disadvantageous. Two plans are adopted for water-proofing woollen cloths, without rendering them quite impervious to air—the first is to dip the cloth into a solution of soap, and thoroughly rub it into the texture, after which it is dipped into a solution of alum; a decomposition of the soap and alum is effected, and the minute openings between the fibres are in some way partly filled so as to exclude water. In the second plan, the cloth is dipped into a solution of gelatine or isinglass, and afterwards in a solution of galls. A kind of tanning process is the result, the gelatine which has pervaded the cloth being rendered as insoluble as leather by its union with the tannin of the galls.

WATER-SPOUT. See WHIRLWIND.

WATER-SUPPLY. Water is one of the primary wants of human life, no less essential than air and food; hence the strong and religious interest that has always been attached to the means of its supply. In the earliest records of civilization, we read of the digging of wells, and of quarrels about the possession of them. The 'Pools of Solomon,' near Bethlehem, which remain now almost as perfect as when they were built, were

connected with a scheme for supplying Jerusalem with water. In Assyria and Persia, from the earliest times, water has been conveyed to towns from astonishing distances in open channels or canals, and in subterranean tunnels, or *kanats*. In Egypt also, and in China, gigantic works for conveying water, both for domestic use and for irrigation, have been in existence from remote antiquity. Nor were these undertakings confined to the eastern hemisphere; we have evidence of the existence of kindred works in pre-Christian America. The ancient city of Mexico, which was built on several islands near the shore of the lake, was connected with the mainland by four great causeways or dikes, the remains of which still exist. One of these supported the wooden aqueduct of Chapoltepec, which was constructed by Montezuma, and destroyed by the Spaniards when they besieged the city. Hydraulic works on a great scale had also been executed by the Incas of Peru. Of all the ancient nations, the Romans paid the greatest attention to the supply of water, and carried the construction of *aqueducts* to the greatest perfection and magnificence. If we except the supply of New York from the Croton river (see AQUEDUCT), and that of Glasgow from Loch Katrine, the efforts to supply modern cities are as yet insignificant compared with those of the Romans. The last-named works, finished in 1858, can convey 50 million gallons a day a distance of 26 miles.

It is only since the beginning of the sanitary movement, occasioned by the repeated visitations of cholera beginning with 1832, that the subject of water-supply, and more especially the *quality* of water-supply, has seriously occupied public attention. The result of every inquiry and every day's experience has been to bring out more strongly the decided effects on the health of a community arising from the quantity and quality of the water at their command; and as the river and surface sources of supply near the chief seats of population are becoming every year more contaminated by Sewage (q. v.), the drainage from manured land, the droppings of animals, and the refuse of manufactures, enterprise and engineering skill must be directed either to procuring a supply of pure subterranean spring water from the chalk or other absorbent strata, or to bringing pure water from greater distances than hitherto. In 1867, a royal commission was appointed to inquire into the condition of the water-supply of London; and numerous schemes were laid before them. Mr. Bateman proposed to utilize the high drainage-grounds of North Wales, from which the river Severn is supplied, having an area of 204 square miles. The water was to be conveyed for the most part in an open aqueduct, 173 miles long, and capable of carrying 230 millions of gallons a day, to service-reservoirs on the high land near Stanmore, about ten miles from London (from which it was to be delivered, at high pressure, by means of pipes, to the whole city). The total cost was estimated at £11,400,023. On the ground of the distance, the committee reported against the proposal; as, on like grounds, they also did against a rival scheme for taking the supply from the Lake districts of Cumberland and Westmoreland. Owing to the exceptionally great rainfall in these regions (140 inches on an average), it is calculated that the two lakes of Ullswater and Haweswater, with a drainage of 100 sq. m., receive together an average daily discharge of 550 million gallons. From this water it was proposed to supply not only the metropolis, but the principal towns of the north-west of England; but from various causes the scheme was abandoned.

A bill has lately passed both Houses of Parliament to supply Manchester with water from Thirlmere. The Thames water has in some respects a superiority over the soft waters usually obtained from high gathering-grounds. It is well aërated, and keeps well. Recently, a covered conduit, 80 miles long, has been constructed, which conveys 8 million gallons of pure chalk spring-water from the sources of the Dhuis, in Champagne, to Paris; and operations are about complete to brink the chalk springs of the Vanne, calculated to yield 22 million gallons a day, also to Paris, a distance of 104 miles.

The chief points of interest on this subject may be arranged under the heads of the Sources of Supply, the Qualities of Water, and the Arrangements for its Conveyance and Distribution.

Sources of Water.

The ultimate source of all *fresh* water is Rain (q. v.). When it has fallen on the earth, it presents itself chiefly in the forms of surface-water, rivers, and springs.

Surface-collection.—Rain-water, as it is formed in the upper regions of the atmosphere, is the purest that nature supplies; but in descending, it brings with it whatever impurities are floating near the surface, which, in the neighborhood of towns, are numerous, consisting of various gases, together with soot and other floating particles, organic and inorganic. Rain-water has a strong affinity for organic impurities—that is, the corrupting ingredients derived from vegetable and animal bodies, and which are diffused over every surface in the vicinity of living beings; hence, when collected from the roofs of houses, it has a tendency to rapid putrefaction. Being free from saline ingredients, it is excellent for washing, but is not generally pleasant to drink.

But if we resort to a barren district of rock, destitute of vegetation, and remote from the pollution of towns, we may obtain water with comparatively little organic impurity. Notwithstanding several defects, it happens in various places that a surface-supply is the best that can be had.

Rivers.—The water obtained from running streams is in part what has flowed immediately from the surface, and in part the water of springs, shallow or deep. In any case, a considerable amount of contact with the ground has taken place, and in consequence saline and organic matter is liable to be dissolved in a greater or less degree. The extent of the impregnation, as well as the kind of material dissolved, will depend on the rocks and strata of the river-basin.

River-waters, besides the qualities they derive from their primitive sources, are apt to contain mud, decayed leaves, the exuviæ of fish and other matters in suspension, and are thus deficient in the clearness and transparency so essential to the satisfaction of the eye in a drinking-water. Moreover, the water partakes of the extremes of summer and winter-temperature. But the great objection to water from rivers is their general pollution from the manure used upon the land, sewage, and manufactures, so that there are now few rivers left from whose lower course a supply could be taken for domestic purposes. On the other hand, the supply from one of our large rivers is boundless and unfailing; and it conveys the surface-drainage and spring effusions of a large tract of country, without incurring any trouble or expense as to the original sources. Rivers that issue from lakes are generally the purest, as the suspended matter has time to be precipitated.

Springs.—The qualities that recommend water to the eye and to the palate belong in a pre-eminent degree to spring-water (see SPRING): it is clear, sparkling, and of an agreeable and uniform temperature at all seasons of the year (about 50° Fahr.); it is well aërated, and is totally free from the offensive taint so common in all other waters, as well as devoid of the animalcules generated by organic impurity; and where a sufficient number of springs can be collected to suffice for a town, it is the most desirable of all sources of supply. About a quarter of the water brought to Edinburgh is spring-water collected on the slopes of the Pentlands.

Quality of Water.

Perfectly pure water is hardly to be found; rain-water, and even artificially distilled water, are only approximates. The chief impurities may be considered under the heads of Mineral Matter in Suspension, Mineral Matter in Solution, and Organic Matter.

Mineral Matter in Suspension.—When running water comes upon a loose bottom, it carries the finer particles of sand and earth along with it. If the water comes into a position of perfect stillness, the matters thus floated gradually sink to the bottom again. Particles of clay, owing either to their excessive fineness or to their adhesive attraction for water, subside very slowly, and impurities of this nature are not easily remedied. Besides earthy matter, compounds of iron and lead are also in some circumstances present in a solid state, and may be got rid of by filtering. To separate clay-powder from water, the practice has long been resorted to in India and China of putting in a piece of alum, which seems to produce a kind of coagulation.

Dissolved Mineral Matter.—Spring-water, which is generally clear and sparkling, holding no solid matter in suspension, is seldom without a large amount of dissolved mineral matter, sometimes as much as 2 parts in 1000, commonly from 1 in 1000 to 1 in 20.000. River and surface water also contains more or less dissolved minerals (see MINERAL WATERS). The great bulk of the solid matter held in solution in ordinary waters consists of the salts of soda, potash, lime, and magnesia. The most material are the salts of lime and magnesia, as they are the causes of what is called 'hardness' in water, which we shall speak of more particularly afterwards. The most important salt of lime is the soluble hydric carbonate formerly known as *bicarbonate*, which is derived from chalk or limestone. Chalk or limestone is a *carbonate* of lime (otherwise *calcic carbonate*)—that is, a compound of lime with one equivalent of carbonic acid (carbonic dioxide)—and is almost insoluble in water; but when water containing an excess of carbonic acid—as is the case with spring-water especially—passes over limestone, it gives the carbonate a double dose of carbonic acid, and converts it into bicarbonate, which is soluble. The waters having bicarbonate of lime for their chief impurity are familiarly spoken of as the chalk-waters. The other salt of lime often present in water is the *sulphate* or *gypsum*. The important distinction between the bicarbonate and the sulphate lies in the fact, that the first, the bicarbonate, may be in great part precipitated, or thrown down in a solid form, by boiling, which drives off the solvent carbonic acid; whereas the second, the sulphate, cannot be so precipitated. The chief effect of the boiling takes place in the first five minutes.

Apart from its hardness, it has been made a question whether

water containing salts of lime is injurious or not to the human constitution. Dr. Lankester holds that there is evidence to prove that carbonate of lime in large quantity is positively injurious; and most physiologists are agreed that pure water is the best for securing the health of animals and man.

With regard to magnesia, its salts are well known to act as powerful medicines when taken in large doses, and it may be presumed are not altogether without effect in the small quantities existing in ordinary magnesian waters. A foreign physician has lately made the observation, that magnesia is the characteristic ingredient of waters in the districts where the diseases called *cretinism* and *goitre* abound.—Of salts of *soda* and *potash*, the principal is common salt, or the chloride of sodium. Sodic sulphate (Glauber's salt) occurs along with the chloride in the salt-springs of watering-places as well as in the sea-waters. None of all these salts have any effect on the hardness. In the case of sea-water, which is very hard, the effect is not due to common salt, but to the lime and magnesian salts dissolved in it; were it not for these, sea-water would be perfectly suitable for washing, although not for drinking.—Salts of *iron* in considerable quantity make what are technically named *chalybeate* waters, which belong to the medicinal class. When the iron exists in the spring as carbonate, which is the most usual case, on exposure to the air, it is changed into the per-oxide, and falls down in the form of an ochery precipitate. Salts of iron give an inky taste to the water, and a yellowish tint to linen washed in it.

Hardness in Water.—The quality of hardness in water is commonly recognized by the difficulty experienced in washing, and by the amount of soap necessary to form a lather. This quality is injurious also in the preparation of food; but its action is most universally felt in washing operations. It occasions the chapping of the skin, an enormous waste of soap, an extra labor, and a corresponding tear and wear of clothes. Every grain of chalk contained in water decomposes 10 grains of soap; and thus the hardening matter contained in 100 gallons of water, such as is supplied to London, will destroy 35 ounces of soap—that is, the first 35 ounces of soap added to this quantity of the water will disappear without forming any lather, or having any cleansing effect. Soap is a compound, formed of an alkali (soda or potash) joined to an oily acid. When a salt of lime, then, is present in the water, the lime decomposes the soap, and combines with the oily acid to form a lime-soap, which is insoluble, and has no detergent properties.

The most usual hardening ingredients are the salts of lime. Salts of magnesia and of iron are also hardening salts. Salts of soda and potash have no hardening effect. Dr. Clark, formerly Professor of Chemistry in Marischal College, Aberdeen, has devised a scale of hardness which is now universally employed in the chemical description of waters. The hardening effect that would be produced by one grain of chalk dissolved in a gallon of water is one degree of hardness; in like manner, four grains per gallon would produce four degrees of hardness; ten grains, ten degrees; and so on. The degrees are expressed in numbers—thus, 1°, 4°, 10°, 15°, are one, four, ten, fifteen degrees respectively. The degree of hardness of any particular water can be readily and exactly determined by Dr. Clark's Soap Test (q. v.).

Next to washing, the deleterious consequences of hardness are felt in various culinary operations, especially in the furring of boilers and cooking utensils, and in the infusion of tea. It is a fact of universal experience that hard water requires more tea than soft water to make an infusion of the same strength, and also renders the infusion muddy. Sub-carbonate of soda in crystals, by decomposing the earthy salts, improves the water; but if more is added than what will exactly decompose the earthy salts present, it injures the fine flavor of the tea. It may be stated generally, that for the purposes of washing and cooking, a water of less than 6° is soft, but above this point the hardness becomes objectionable. At 8°, the water is moderately hard; at 12°, it is very hard; at 16°, the hardness is excessive; and much above this, it is intolerable.

To make these observations more intelligible, we may mention a few instances of known waters, with their place in the scale. In Keswick, the water is under half a degree of hardness; in Lancaster, it is 1½°; and in Manchester, 2°. The water of the Dee at Aberdeen, which is used for the supply of the town, is 1¼° of hardness. The water of Loch Katrine is of great purity, having only two grains of solid matter of all kinds in the gallon and 1° of hardness. The waters of the Welsh mountains, from which it has been proposed to supply London, have on an average less than 2°. The river Clyde, which formerly supplied Glasgow, is 4½°, and may also be reckoned a soft water. The Thames at London, as well as the New River, is about 14°, while many of the tributaries of the Thames rise as high as 16°; but being all chalk-waters, they may be materially softened by boiling. Springs from the chalk commonly range from 16° to 18°; but particular springs are to be met with in some parts of the world four or five times as hard, from the presence of bicarbonate of lime. The water of the Treasury pump in London has from 50° to 60° of hardness. In many parts of the continent, hard waters abound; but the testing of waters has not been so much attended to there as in this country.

The evidence laid before the Royal Commission above referred to went to prove that there is no reason whatever to suppose that the hardness of the Thames water, which averages about 15°, would be in the least degree prejudicial to health. It appears that the hardness of springs is generally considerable; and that surface-waters may be collected in a state that is to be considered soft (4°·94).

Lead in Water.—Injurious effects have frequently arisen from the contamination of water with lead, derived from leaden pipes and cisterns. Some kinds of water are known to act powerfully on a leaden surface, and others scarcely at all; but the qualities and circumstances on which the action depends have never been satisfactorily determined. Distilled water, and soft lake and river waters in general, act most decidedly, but by no means in proportion to their softness. The presence of air in the water seems one essential condition; light also increases the action, as does the presence of vegetable matter; it has been observed that when leaves drop by chance into a lead cistern, the spots where they lie become visibly corroded. The water of Loch Katrine, according to extensive sets of experiments by distinguished chemists, is allowed to have an intense action * on lead under certain circumstances—viz., '*1st*, If the lead be bright and highly polished; and *2d*, If the lead and water be freely exposed to the access of air.' But it 'does not exert any noxious action on lead when the metal is in its ordinarily dull state.' The coating formed on the surface of the metal is held to protect it from further chemical action. Still there are opposing facts to show that this protective action is not always to be relied on; and that water that has passed through any considerable length of lead pipe, or stood for some time in a short one, or in a cistern, should never be used without care; a ninth part of a grain of lead per gallon has been known to derange the health of a whole community. Dr. Clark made the unexpected discovery that sand-filters completely separate the lead.

Organic Impurities.—The contamination of water by vegetable and animal substances takes place in various ways. The most obvious and abundant source of this class of ingredients is the sewage and refuse of towns; and next in order may be ranked the contact with soils rich in organic matter. Among organic impurities may be classed offensive gases, such as carburetted, sulphuretted, and phosphuretted hydrogen; vegetable fibres in a state of rottenness; putrefying products of the vegetable or animal kingdoms; starch, muscular fibre, &c.; urea and ammoniacal products; vegetable forms—algæ, confervæ, fungi, &c.; animalcules—infusoria, entomostraceæ, annelidæ or worms, &c. Water falling on a growing soil, and running off the surface to lie in stagnant ponds, is in very favorable circumstances for being tainted with vegetable and animal life. Water-plants will spring up and feed numerous tribes of animalcules, and each pool will be a constant scene of vitality. In such a state, the water is usually unfit for drinking; the palate instantly discerns a disagreeable taint, and no one will use it who can do better. The surface-water of a district overgrown with peat-moss has usually a peaty flavor, as well as a dark and dirty color. The infusion of peat does not breed animalcules, being a strong antiseptic; but it is an objectionable ingredient nevertheless. Very slow filtration has been found to remove the color of the infusion in some degree, but not entirely. Lime removes the peat most effectually, but there is both expense and risk in applying it. It is perhaps doubtful whether any specific unwholesomeness can be justly attributed to peat-water; but it is unpalatable, and the use of it is shunned by the inhabitants of peaty districts, and even by cattle. The presence of peat in the lands used as collecting-grounds for surface-water—and it is generally such worthless tracts that are so employed—is a disadvantage attending that mode of supply.

Chalk-water, which, as it issues from a spring, is perfectly free from organic matter, has a source of contamination within itself. When exposed to light and air, the duplicate dose of carbonic acid that keeps the chalk dissolved, becomes decomposed; and the carbon of the decomposed acid gives rise to a green vegetation, which soon acquires an offensive marshy smell.

Organic matter in a putrefying state forms the worst kind of contamination that water can have. Though we may not know the precise effects of these impurities on the animal system, the single fact of their rendering the water repulsive to the taste and nauseous to the stomach would be sufficient to condemn their use. What is disagreeable to the senses, must be presumed to be unwholesome in addition, until the contrary is proved. Though no one has ever yet gone the length of maintaining, as a general truth, the wholesomeness of water abounding in vegetation, insects, and decaying matter, yet the water of the Thames, even within the influence of the tides, where it is contaminated by the

* The water of Loch Katrine is remarkably well aërated, having 7¼ cubic inches of air per gallon, of which 2½ inches are oxygen. Dr Clark had a suspicion that the oxygen may turn out to be in some different state or modification from common oxygen.

whole sewage of the metropolis, found defenders until lately, on the plea that the amount of impurity was too small to do harm. This ground is at length given up; but Thames water above Teddington Lock is still sanctioned as safe water for the companies to supply to the inhabitants of London, notwithstanding the sewage of the numerous populous towns that the river receives above that point. As to this plea of smallness of amount, the highest medical authorities hold that it is impossible to say how small a quantity of organic matter in a state of fermentation may not do harm. We are not, however, left merely to presume that organic impurity in water is prejudicial to health. During the cholera visitation of 1853—1854, a gigantic experiment was undesignedly made on half a million of human beings.

It so happened that a certain district of London was supplied by two rival water-companies, the two mains running often side by side, and some houses taking water from the one, and some from the other. The whole inhabitants were living alike in all respects save one—viz., that one company drew its water from high up the Thames, where it was of comparative excellence, while the other drew its water from low down the river, where it was profusely contaminated with town-drainage. Among this population, there were more than 4000 deaths from cholera; and when the epidemic had subsided, an inquiry was made, house by house, as to those deaths, and as to the water-supply of the several houses where they had occurred. The inquiry was conducted with every precaution, to avoid sources of fallacy; and the result was this: in the one set of houses, the mortality per 10,000 of the population was 37; in the other set of houses it was 130—that is to say, the cholera death-rate was 3½ times as great in the one set as in the other.

It is a common notion that *every drop of water teems with life;* but this is a mistake. Deep wells, and spring-water in general, contain little or no living organic matter. Consequently, it is quite possible to obtain a liquid perfectly free from animalcules and vegetation. The presence of living creatures, vegetable or animal, discernible either by the naked eye or by the microscope, is a proof of organic taint in the water, and is one of the tests of this kind of impurity. With respect to rain-water, Dr. Hassall states, in his evidence before the General Board of Health: 'I have made several examinations of rain-water immediately after its descent to the earth, obtained in both town and country, and can confidently assert that it does not, in general, contain any form of living vegetable or animal matter.' The conditions necessary for the development of vegetation and animalcules over and above the presence of matter for them to feed on, are *air, light,* and *stillness.*

With regard to the probable effects on health of living creatures contained in water, Dr. Hassall's observations are worthy of attention: 'All living matter contained in water used for drink, since it is in no way necessary to it, and is not present in the purest waters, is to be regarded as so much contamination and impurity —is therefore more or less injurious, and is consequently to be avoided. There is yet another view to be taken of the presence of these creatures in water—viz., that where not injurious themselves, they are yet to be regarded as tests of the impurity of the water in which they are found.'

Means of purifying Water.

The mechanical impurities of water, or the solid particles rendering it muddy or milky, may in most cases be removed by mechanical means. The two processes for this purpose are *subsidence* and *filtration.* The effects of subsidence are strikingly seen in the case of rivers that pass through lakes. See GENEVA, LAKE OF. The subsidence of solid particles depends on their own weight, as compared with the weight of an equal bulk of water. To favor the process, the most perfect stillness should be allowed. It is expedient to have partitions placed in the subsiding reservoirs at short intervals, more effectually to prevent the agitation of the water. The water should be run off from the top, and not from the bottom. By making the bottom of the subsiding reservoir form a declivity from opposite sides, and providing means to let off the water occasionally from its lowest depth, it is possible to get quit of the subsided mud. It is always found of advantage in clearing water from solid particles, whether by subsidence or by filtration, to mix together streams of different qualities.

In constructing an artificial filter on a large scale, a basin is formed, having the floor nearly level, but slightly inclining towards a center line, and made water-tight by puddling the bottom and sides with clay. On the floor is laid a series of layers of gravel, coarse at first, and getting gradually finer upwards; next, a layer of slate-chips or sea-shells, then one of coarse sand, on which is placed the actual filtering layer of fine sand. The depth of this layer is from twelve to thirty inches, that of the entire mass from four to six feet. The water being admitted gently on the top of the sand, sinks down and is conducted by a series of channels, generally of tile-pipes, into the main drain. A filter in a clean state will pass from twelve to eighteen vertical feet of water in twenty-four hours. The solid matter intercepted does not penetrate more than three-fourths of an inch into the sand, so that, by removing a very thin film from the surface, the filter is again clean. What is scraped off the top, is capable of being washed and put again to use. 'This process of filtration,' says Professor Clark, 'is efficacious in removing mechanical impurities to an extent that could scarcely be believed without seeing the process.'

The cleansing power of sand can hardly be accounted for on the theory of mere mechanical interception. Though there is no chemical action, strictly speaking, there is no doubt that the attraction of adhesion is at work—a power that plays a greater part in natural processes than has generally been assigned to it. Some substances manifest this adhesive attraction more strongly than sand, and have therefore still greater efficacy as filters; though practically, and on the large scale, sand is the most eligible. Powdered charcoal has long been known as a powerful filtering medium, attracting and detaining especially organic matter. Animal charcoal, or that derived from burning bones, is still more efficacious than wood charcoal. A filter of animal charcoal will render London porter almost colorless.

According to recent researches, it would seem that loam and clay have similar properties, and may be made available as filters. Professor Way states that 'they have powers of chemical action for the removal of organic and inorganic matters from water to an extent never before suspected.' The filthiest liquids, such as putrid urine and sewer-water, when passed through clay, dropped from the filter colorless and inoffensive. The clay used was that known as pipe-clay.

For filters for domestic use, see FILTER.

Softening of Water rendered Hard by Chalk—Clark's Process.—This is one of the most beautiful applications of science to the arts of life that could perhaps be named. We extract the inventor's own account of it (retaining the old nomenclature) as read at the meeting of the Society of Arts:

'In order to explain how the invention operates, it will be necessary to glance at the chemical composition and some of the chemical properties of chalk; for while chalk makes up the great bulk of the matter to be separated, chalk also contains the ingredient that brings about the separation. The invention is a chemical one for expelling chalk by chalk. Chalk, then, consists, for every 1 lb. of 16 oz., of lime, 9 oz.; carbonic acid, 7 oz.

'The 9 oz. of lime may be obtained apart, by burning the chalk as in a lime-kiln. The 9 oz. of burnt lime may be dissolved in any quantity of water not less than 40 gallons. The solution would be called lime-water. During the burning of the chalk to convert it into lime, the 7 oz. of carbonic acid are driven off. This acid, when uncombined, is naturally volatile and mild; it is the same substance that forms what has been called soda-water when dissolved in water under pressure.

'Now, so very sparingly soluble in water is chalk by itself, that probably upwards of 5000 gallons would be necessary to dissolve 1 lb. of 16 oz.; but by combining 1 lb. of chalk in water with 7 oz. additional of carbonic acid—that is to say, with as much more carbonic acid as the chalk itself contains—the chalk becomes readily soluble in water, and when so dissolved, is called bicarbonate of lime. If the quantity of water containing the 1 lb. of chalk with 7 oz. additional of carbonic acid, were 400 gallons, the solution would be a water of the same hardness as well-water from the chalk-strata, and not sensibly different in other respects.

'Thus it appears that 1 lb. of chalk, scarcely soluble at all in water, may be rendered soluble in it by either of two distinct chemical changes—soluble by being deprived entirely of its carbonic acid, when it forms lime-water, and soluble by combining with a second dose of carbonic acid, making up bicarbonate of lime.

'Now, if a solution of the 9 oz. of burnt lime, forming lime-water, and another solution of the 1 lb. of chalk and the 7 oz. of carbonic acid, forming bicarbonate of lime, be mixed together, they will so act upon each other as to restore the 2 lbs. of chalk which will, after the mixture, subside, leaving a bright water above. This water will be free from bicarbonate of lime, free from burnt lime, and free from chalk, except a very little, which we keep out of account at present for the sake of simplicity in the explanation. The following table will show what occurs when this mutual action takes place:

Agents.			Products.
Bicarbonate of lime in 400 gallons.	Chalk . .	16 oz.	= 16 oz. of chalk
	with		
	Carbonic acid	7 oz.	
Burnt lime in 40 gallons of lime-water		9 oz.	= 16 oz. of chalk

A small residuum of the chalk always remains not separated by the process. Of 17½ grains, for instance, contained in a gallon of water, only 16 grains would be deposited, and 1½ grains would remain. In other words, water with 17½° of hardness, arising from chalk, can be reduced to 1½°, but not lower.

'These explanations will make it easy to comprehend the successive parts of the softening process.

'Supposing it was a moderate quantity of well-water from the chalk-strata around the metropolis that we had to soften, say 400 gallons. This quantity, as has already been explained, would contain 1 lb. of chalk, and would fill a vessel 4 feet square by 4 feet deep.

'We would take 9 oz. of burnt lime, made from soft upper chalk; we first slack it into a hydrate, by adding a little water. When this is done, we would put the slacked lime into the vessel where we intend to soften; then gradually add some of the water in order to form lime-water. For this purpose, at least 40 gallons are necessary, but we may add water gradually till we have added thrice as much as this; afterwards we may add the water more freely, taking care to mix intimately the water and the lime-water, or lime. Or we might previously form saturated lime-water, which is very easy to form, and then make use of this lime-water instead of lime, putting in the lime-water first, and adding the water to be softened. The proportion in this case would be one bulk of lime-water to ten bulks of the hard-water.'

It is of importance that the lime-water—that is, the softening ingredient—be put into the vessel first, and the hard water gradually added, because there is thus an excess of lime present up to the very close of the process. Instead of lime-water, the lime itself may be put at once into the vessel, and some of the water to be softened gradually added to dissolve it. The softened water thus obtained has no action on lead-pipes or cisterns, as many soft waters have. One ton of burned lime, used for softening, will produce three and a half tons of precipitate. The present water-supply of the metropolis, if subjected to Clark's process, would deposit about fifty tons of chalk daily.

The process is now and has been in successful use on a large scale at various works constructed under the direction of Mr. Homersham, C. E., London, some of them twenty to twenty-five years since, and others more recently, for softening spring water derived from the chalk, the oolitic, the lower greensand and other geological formations, for the supply of Aylesbury, Aston Clinton, and Mentmore in Bucks; the city of Canterbury with its suburbs, and Herbert Hospital, in Kent; Castle Howard in Yorkshire; Caterham, Godstone, Nutfield, Redhill, and Warlingham in Surrey; Park Place Henley in Oxfordshire; Tring in Herts. Works have also been more recently constructed for supplying softened spring-water to Sandringham, Norfolk, the seat of his Royal Highness the Prince of Wales, and to Bushey and Stanmore, Middlesex.

The process should always be carried out in suitable covered reservoirs, and is then found to be as conveniently applicable, and even more so, for softening large as small quantities; and spring-water varying 18 to 20 degrees of hardness by Clark's scale is thus readily softened down and supplied to the consumers at from 2½ to 4½ degrees of hardness. The process for several years past has been in use at Sandhurst, 105 miles north-west of Melbourne, in Australia, for lessening the amount of organic matter always found to exist in surface-water impounded in large open reservoirs or artificial lakes, and for this purpose is very superior to filtration through sand. Indeed, in the warm climate at Sandhurst, the amount of organic matter becomes so great as to plug up the pores of the sand, and render filtration impracticable.

Natural Process of Purification from Organic Matter.—Although, by means of sand and other filters, or of the liming process, organic contamination of water may be much reduced, there still remains enough to render the water unsafe for use. Is water then, once corrupted with organic matter, hopelessly and permanently so? This question can be answered in the negative. Filthy water has a tendency to purify itself, and this in two ways. In the first place, in any shallow stream of polluted water, such as the kennels of a street, there may be observed long brushes of a sort of slimy vegetation adhering to every projection of the bottom. All this matter has been disengaged from the water, which thus flows away so much the purer. The second and most effective part of the natural purification consists in the actual decomposition of the impurities. The nitrogen of the decaying matter, then, goes to form nitric acid, which, uniting with bases, forms salts of the class called *nitrates*, of which saltpetre is one. Thus, what was in a state of putrefactive change, offensive to the senses, breeding loathsome insects, and causing dangerous disorders, is changed in course of time into a stable and harmless product. This process is constantly going on in rivers and other waters containing organic matter.

In the case of streams passing through populous districts, the contamination goes on at a rate far beyond the power of natural purification; but we can easily conceive how a river, very much contaminated with organic impurities at one part of its course, may, after flowing a long way through an uninhabited tract, be almost restored to its natural state. The process is one of oxidation, and takes place at the expense of the free oxygen, of which, in healthy normal water, there ought to be 29 per cent. of the entire volume of gases held in solution.

The oxidation is much favored and hastened when the water percolates or filters very slowly through porous beds of earth. If the filtration has been sufficiently prolonged to convert all the decaying matter into carbonic acid or nitrates, the water will be pure, as far as the organic taint and the presence of animalcules are concerned, and will, in fact, be neither disagreeable nor unwholesome, the amount of the dissolved carbonates or nitrates being unimportant.

Dr. Smith has proved by direct experiment that decomposing organic matter passed through a filtering-bed is changed into nitric acid. 'A jar, open at both ends, such as is used with an air-pump, was filled with sand, and some putrid yeast, which contained no nitric acid, was mixed with pure water, and poured on the sand, and allowed to filter through. The production of nitric acid was abundant.' It is not improbable that other earthy matters, such as loam and clay, may have a still more decided influence in hastening the formation of the nitrates; and perhaps by imitating more closely the slow mode of filtration by which nature converts surface-water into spring-water, it may yet be practicable to make the most contaminated waters fit for use.

Conveyance, Storage, and Distribution.

Into the engineering operations connected with the conveyance of water from its source to the town to be supplied, we need not enter, beyond noticing, that when the source is below the level of the houses, steam or other power is necessary to lift or propel the water to the necessary height; while in the more general and more desirable case of the source being higher than the place where the supply is to be delivered, the water is made to flow by its own gravitation, either in a channel or culvert with a continuous descent, as in the ancient Aqueduct (q. v.), or in the simpler and more economical modern plan of a line of cast-iron pipes following the inequalities of the surface. The annexed diagram represents an outline of this mode of conveyance; where *a* is a



Fig. 1.

lake or reservoir situated in a mountainous district, and *b* a town separated by several miles of irregular country; the course of the pipes is indicated by the dotted line, and the pressure of the water at *a* suffices to make the water rise at *b* to a height nearly equal to that of the head. In many cases, both principles are employed, the water flowing for the most part in a gently sloping conduit, tunneled through hills where necessary, and being carried through valleys in tubes descending and ascending—an inverted siphon, as it is called. The Croton Aqueduct, which supplies New York, is carried across the Manhattan Valley, upwards of 100 feet deep, in this way. The Glasgow supply from Loch Katrine flows mainly in a sloping channel carried through tunnels and over bridges; but there are four miles of iron pipings across valleys.

The extent of the storage in reservoirs depends on the nature of the supply. If water is derived from perennial springs, whose minimum flow equals the maximum demand, the storage may be the least possible. If a river is the source, the reservoirs should be large enough to hold such a stock as will carry the consumers over the periods when the river is polluted by rains; they should also be large, on the principle of allowing time for purification by subsidence, especially if artificial filtration be not employed. In places where the supply is obtained from surface-drainage, or from a small stream, the practice is to build reservoirs capable of containing a five or six months' supply, it being necessary to provide against the greatest droughts that ever happen in any season.

The reservoirs should be deep, so as to prevent vegetation; and the distributing or service reservoirs should be roofed.

In distributing water over a town, two different methods have been adopted, known respectively as the *intermittent* and the *constant* systems of supply. On the intermittent system, water is laid on once a day, or once in two or three days, as the case may be, and fills a tank attached to every separate house, and from this tank the water is drawn off as required. The feeding-pipe of such a tank or cistern is provided with a ball-cock (see fig. 2), which ingeniously shuts off or admits the supply, as the cistern may be full or empty. On the constant system, no tank is absolutely needed, but the house-pipes are kept constantly charged through their unbroken connection with the distributing reservoir, which must therefore be higher than the highest house to be served. The intermittent supply was until lately employed everywhere in the metropolis; but it is universally admitted that the other system is vastly superior in every respect.

The disadvantages of the intermittent practice have been strongly set forth in all the recent official Reports on sanitary im-

provement: the expense of the erection and repair of cisterns, the trouble requisite to keep them clean, the contamination of the water by the neighborhood of sources of pollution, the frequent waste of water that occurs, the difficulties imposed on the poorer class of tenements where cisterns are not provided—are a few of the objections urged against this mode of supply. In a letter in the *Times*, 3d January 1866, Dr. H. Jeaffreson thus describes the condition, in regard to water-supply, of the centers of typhus infection in Lambeth, Southwark, Bethnalgreen, &c. 'Those houses the best supplied have each a butt, holding about 80 gallons, into which water flows from a stand-pipe for from ten minutes to half an hour each day, and is supposed to supply the wants of 20 persons for cooking, the washing of their persons, house, and linen, and for the rinsing down of the w.-c. at such times as it may suit the caprice of any one of the inmates. At other places, a larger butt, but in relation to the number of persons proportionally smaller, supplies a whole court of ten or more three-roomed houses, which have no back-yards, and a population of 150 people—members of 30 different families. On Sundays, even this supply is absent, the water of the day before is gone, and in many houses, that for the Sunday cooking has to be begged from neighbors who may have provided themselves with a larger butt, who are more provident or more dirty. More than nine-tenths of these water-butts have no covers; and fully half are so placed as to catch the drippings from the foul eaves of the houses, and are lined internally with scum and slimy vegetation.'

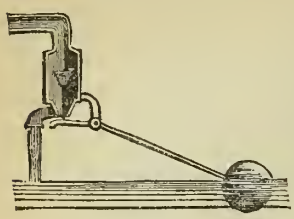


Fig. 2.

One important advantage, arising from the constant system, is the ease with which water can be had in time of fires. The water being supplied at high-pressure, all that is necessary is to affix a hose to the water-plug in the street, when a jet corresponding in height to the pressure is obtained, which can be immediately directed against the fire.

The ratio of the supply to the population varies in different towns. In Edinburgh, it is 47 gallons for each individual; in Glasgow, it is 50 gallons. This includes the water furnished to works of various kinds. The eight companies that supply London pour into the city and suburbs not much less than 100,000,000 gallons daily, which gives 206 gallons per house (including manufactories), or 26 gallons to each person. Notwithstanding this, owing to the neglect of the proprietors, 'thousands of the poor get but little of it directly any day, and none at all on Sundays.'

Cisterns, Pipes.—Owing to the action of water on lead, already described, it is desirable to avoid the use of that metal in connection with very soft lake or river water. With regard to lead *pipes*, if the precaution is taken when the water has stood for any time in them, of allowing the first portions to run off before any is taken for use, little danger can arise; but either lead *cisterns* should be wholly avoided, or means taken to ascertain whether they contaminate the water; and if so a remedy should be applied. There are various substitutes for lead as a lining for cisterns. Slate slabs are highly recommended. Gutta-percha is also found to be an easily fitted, cheap, and durable lining. For a few days, the water tastes of the naphtha used in applying the lining; but afterwards, no kind of water, not even acids, have any action on the gutta-percha. Pipes of gutta-percha may also be used; they are cheap, and easily fitted up.

Common Wells.—The simplest of all water-supplies is that of a cottage or farmhouse in the country, with a good spring rising to the surface close by; and yet what a poor use is usually made of such a precious boon! The country well is generally a simple cavity to receive the spring, rudely lined, it may be, with stones, but with open mouth, into which dust and dead leaves are blown by every wind, and foul surface-water is trickling from all sides. Being exposed to the light, there is generally a profuse vegetation on the bottom and sides, and, in addition to these impurities, it is further muddied by the dipping in of buckets, often dirty on the outside. Who has not been disgusted, when asking a drink at a cottage, to get water thick with dust and visible impurities, knowing, at the same time, that it might be so easily remedied? A surface-spring should always be covered, and made to issue by a pipe; half a day's labor to create a fall, and a clay drain-tube, will generally convert a filthy puddle into a crystal fount. It is singular to see this blindness to the impurity of water in people otherwise cleanly enough. This is a subject worth the attention of country physicians and clergymen. The evil effects of drinking impure water are not confined to towns. May not the putrid sore throat and malignant fevers that often sweep away whole households in the country, especially in autumn, be partly owing to the cause now pointed at?

Deep wells should invariably be covered, and carefully protected from the infiltration of superficial ooze. The situation of pump-wells is often singularly ill chosen in this respect. See Artesian Wells.

WATER-TABLE, a set-off in a wall sloped on top to throw off the rain.

WA'TERTOWN, capital of Jefferson County, New York, U. S., on the Black River, 86 miles north-west from Utica, and 182 from Albany; has manufactories of cotton, woollen, flour, paper, iron castings, machinery, &c. An ice-cave extends partly under the village. Pop. in 1880, 10,697.

WATERTOWN, a city of Wisconsin, U.S., on Rock River, and the Fond du Lac and Rock River Railway, 40 miles east-by-north from Madison. The city is built on both sides of the Great Bend, where rapids with a fall of 24 feet afford water-power for flouring and saw mills, foundries, and manufactories of agricultural implements, furniture, woollen mills, and potteries. Settled in 1836. Pop. in 1880, 7883.

WA'TERVILLE, a village of Maine, U.S., on the right bank of the Kennebec River, at Ticonic Falls, 82 miles north-north-east from Portland. Around the falls are clustered saw-mills, plough, axe, hoe, and scythe factories, machine-shops, tanneries, &c. W. has a Baptist College, with 100 students, and library of 15,500 volumes, an academy, &c. Pop. in 1876, 4000.

WATER VIOLET. See Hottonia.

WA'TERY GRIPES is the popular name for a form of serous diarrhœa occurring in infants, in which there are copious discharges of thin watery motions, often limpid, or almost colorless, and occasionally intermixed with flakes or shreds. This form of diarrhœa may be induced in weakly children by sudden impressions of cold on the surface, so as to check perspiration; or it may be brought on by cold drinks taken when the body is heated.

The exhaustion brought about by the copious excretions from the bowels is sometimes so great that the case might be mistaken for one of cholera. On the occurrence of such an attack, the child should at once be wrapped up in warm flannel, placed in bed, with a bag of hot dry bran over the belly; and some arrow-root, with a little brandy, given frequently in teaspoonfuls or larger doses according to age; and the medical attendant should be at once sent for. If medical aid cannot be readily procured, opium must be carefully used to check the profuse evacuations. One of the best preparations is Aromatic Powder of Chalk and Opium, every 40 grains of which contain 1 grain of opium. From 3 to 5 grains of this powder, with a quarter of a grain of ipecacuanha, may be given, and repeated every three or four hours for two or three times, unless any head-symptoms (due to the opium) are perceived.

WA'TFORD, a market-town in the county of Hertford, on the banks of the Colne, 18 miles north-west of London. Straw-plait is manufactured, and silk-spinning and malting are carried on; and there are two large paper-mills. Pop. (1881) 10,073.

WA'TLING ISLAND, one of the Bahamas (q. v.).

WA'TLING STREET, one of the great Roman highways of Britain, commencing at Dover, passing through Canterbury and Rochester to London, and thence through Uriconium and Chester to Caer-Seiont, the ancient *Segontium*, in Caernarvonshire. From Uriconium, a branch proceeded north by Manchester, Lancaster, and Kendal, into Scotland. Traces of the ancient road are still to be found in many parts of its course, and in some it is still an important highway. A street in London retains its name. The origin of this name is very uncertain; the most probable supposition is that the original name was *Stratum Vitellianum*.

WATSON, Richard, an English divine, born at Heversham, Westmoreland, in August 1737. He was educated at Cambridge, where (though he knew little of the science) he became Professor of Chemistry in 1764, and taught with some success. In 1771, he became regius professor of Divinity—a subject he had not, it appears, up till then very diligently prosecuted; and was soon known as an ingenious, eloquent, and copius author of theological works. He obtained several livings, was archdeacon of Ely, and in 1782 became bishop of Llandaff. Besides innumerable sermons, addresses, essays, and charges, he published a famous *Apology for Christianity, in a series of Letters addressed to Edward Gibbon, Esq.* (1776); *An Apology for the Bible* (1796). His own orthodoxy was disputed by some in his lifetime. W. died 4th July 1816. His autobiography, *Anecdotes of the Life of Richard W.*, was published by his son in 1817.

WATT, James, mechanician, engineer, and man of science, famous as the improver, and almost the inventor of the steam-engine, was born at Greenock in Scotland on the 19th of January 1736. His father was a blockmaker and general merchant at Greenock, was long a member of the council of that burgh, and for a time a magistrate. Two members of James W.'s family—his grandfather and his uncle—had had some local reputation for scientific or engineering ability. The former was a teacher of mathematics, surveying, and navigation at Crawfordsdyke, near

Greenock; the latter practised as a land-surveyor and engineer with great success at Ayr. The grandfather, Thomas Watt, had been brought early in life to Lanarkshire from the neighborhood of Aberdeen, where his family had previously lived. The father of Thomas Watt, the great-grandfather of James, is said to have farmed a little property of his own in Aberdeenshire, and to have been killed while fighting on the side of the Covenanters against the Marquis of Montrose.

James W. was very weakly as a child, and being unable to go to school with regularity, he became, to a great extent, his own instructor. What schooling he did get, he got in the schools of his native town. He early manifested a turn for mathematics and calculations, and a great interest in machines, and accordingly—his father's business, for which he had been destined, having greatly declined—he was, at the age of 18, sent to London, to learn the trade of a mathematical instrument maker. Ill-health compelled him to return home about a year after; but he had made good use of his opportunities in London; and on his health improving, he resolved to set up as a mathematical instrument maker in Glasgow. The incorporation of hammermen of that city put difficulties in his way; but the authorities of the university took him by the hand, appointed him mathematical instrument maker to the university, and gave him the use of premises within their precincts. He occupied these premises from 1757 to 1763. They seem to have been badly situated for his business, for which, moreover, at that time there was but little room in Glasgow; and W. during those years was scarcely able to make a living. In 1763, he got a place of business in the town, and after that, he did somewhat better; still, he had to eke out his income by making or mending fiddles (which he was able to do, though he had no ear for music), or doing any mechanical job which came in his way; and no work requiring ingenuity or the application of scientific knowledge seems to have come amiss to him. At length, in 1767, he fell upon a new and a more lucrative occupation. In that year, he was employed to make the surveys and prepare the estimates for a canal projected to unite the Forth and the Clyde. This work could not be carried out at the time, because it failed to obtain the sanction of parliament; but W. had now made a beginning as a civil engineer, and henceforth he got a good deal of employment in this capacity. He made surveys for various canals, for the improvement of the harbors of Ayr, Port-Glasgow, and Greenock, and for the deepening of the Forth, the Clyde, and other rivers.

One of the tasks committed to him was to decide whether a projected canal between the Firth of Clyde and the Western Ocean should be made by way of Crinan or of Tarbert; and the last—also the greatest—undertaking of this kind on which he was employed was a survey for a canal between Fort-William and Inverness; a work which has since been executed on a greater scale by Telford. In his surveys, he made use of a new micrometer, and of a machine, also of his own invention, for drawing in perspective—the latter of which appears to have been for several years about this time one of his sources of income. The Reports which he drew up in the capacity of engineer are said to have been remarkable for perspicuity and accuracy.

Living in the college at Glasgow, in constant intercourse with the professors of the university, with access to books, and with much unemployed time on his hands—having, too, a great love of knowledge, and a lively interest in mechanical novelties, W. had been a diligent student of science, and experimenter in the application of science to the arts. As early as 1759, his attention had been directed to the capabilities of steam as a motive-force by Mr. Robison (q. v.), afterwards Professor of Natural Philosophy in the university of Edinburgh, who was then a student in Glasgow. It had occurred to Mr. Robison that steam-pressure might be used to propel wheeled-carriages; but it does not appear that either W. or he attempted to carry out this idea. In 1761 or 1762, however, W. made a series of experiments on the force of steam, using a Papin's Digester. These do not seem to have led to any results; and it was not till the winter of 1763—1764, that he began the investigations which ended in his improvement of the steam-engine. During that winter, a working model of the Newcomen engine, kept for the use of the natural philosophy class in the college, was sent to him to be put in repair. W. quickly found out what was wrong with the model, and easily put it into order. But in doing this, he became greatly impressed with the defects of the machine, and with the importance of getting rid of them.

The Newcomen engine (see STEAM-ENGINE), was still but little used, and only for pumping water out of mines. It was a cumbersome machine, and it required so much fuel that the expense of working it had restricted, and must always have restricted its use. It was not a steam-engine at all. It was worked by means of the atmospheric pressure; steam being only used in producing, by its condensation, a vacuum in a cylinder, into which—the vacuum made—a piston was depressed by the pressure of the air. The steam issuing from a boiler was admitted into the cylinder until it filled it, when the supply was cut off by a self-acting cock; and then the steam was condensed in the cylinder by means of a jet of water. The water so greatly cooled the cylinder that the greater part of the steam at each stroke of the piston was wasted in heating its walls; and on the other hand, much of the injected water was heated to the boiling-point, and gave off steam, which resisted the descent of the piston. W. found that about four-fifths of the steam, and consequently of the fuel, was wasted; and he saw that to make the machine work economically, two apparently incompatible conditions must be obtained—first, that the walls of the cylinder must constantly be of the same temperature as the steam which came in contact with them; and second, that the injected water must never be heated up to 100°, the boiling-point *in vacuo*. He now experimented upon the conducting power of various substances, and made trial of a cylinder made of wood steeped in oil; but with this cylinder, though it cooled less rapidly than a metallic one, there was still far too much waste of steam.

Constantly, from the end of 1763, occupied with the subject of steam, he at length, early in 1765, hit upon the expedient which solved all his difficulties—the separate condenser, an air-exhausted vessel, into which the steam should be admitted from the cylinder and there condensed. The separate condenser at once prevented the loss of steam in the cylinder which had arisen in the process of condensation; and there was no difficulty in keeping it cool, so as to prevent the undue heating of the injection-water. He had now got a perfectly economical engine on Newcomen's principle, but he did not rest content with this—he resolved to make steam his motive-power. Closing the cylinder at both top and bottom, and connecting the piston with the beam, to which it was to communicate motion, by a piston-rod passing through a stuffing-box, he admitted the steam by suitable valves alternately above and below the piston, to push it downwards and upwards in turn; and this done, his invention was substantially complete. He had at last made a real steam-engine, capable of being worked with a comparatively small expenditure of fuel, and of yielding any desired amount of power. Comparing his invention with the atmospheric engine of Newcomen, it must be admitted that it is not without justice that the popular voice has awarded him the name of inventor of the steam-engine.

W., soon after perfecting his model, formed a partnership with Dr. Roebuck, then of the Carron Iron Works, for the construction of engines on a scale adapted to practical uses; and a model was erected at Kinneil, near Borrowstounness, where Dr. Roebuck then lived. But Roebuck got into difficulties; and nothing further was done until, in 1773, W. entered into a partnership with Matthew Boulton of Soho, near Birmingham, when, Roebuck's interest having been re-purchased, the manufacture of the new engine was commenced at the Soho Iron Works. A patent for his invention had been taken by W. in 1769. He got from parliament a prolongation of his patent for 25 years in 1775.

The advantages of the new engine were in no long time found out by the proprietors of mines; and it soon superseded Newcomen's machine as a pumping-engine. W. afterwards made numerous improvements in its construction (for the most important of which see STEAM-ENGINE); and in conjunction with his partner Boulton, he immensely improved the quality of the workmanship employed in building engines and other machines. In the years 1781, 1782, 1784, 1785, he obtained patents for a series of inventions—among them, the sun and planet motion, the expansive principle, the double engine, the parallel motion, and the smokeless furnace, of most of which the chief purpose was to make steam-pressure available for turning machinery in mills. The accomplishment of this—extending the application of the new power to the arts—was of scarcely inferior importance to the invention of the steam-engine itself. The first contrivance invented by W. for this purpose was lost to him through the treachery of a mechanic, who had been employed in making the model, who sold it to a manufacturer named Prickards, who got a patent for it for himself. The application to the steam-engine of the governor (see STEAM-ENGINE) was W.'s crowning improvement. He made numerous inventions unconnected with the steam-engine, several of which he patented, but they are all of minor importance.

He retired from business in the year 1800, giving up to his two sons his interest in the extensive and prosperous business which Boulton had created at Soho. He died at Heathfield in Staffordshire, on the 25th August 1819, in his 84th year. W. was twice married: first in 1763, to his cousin, Miss Miller; and a second time shortly after his removal to Birmingham, to a Miss M'Gregor of Glasgow. He had a most extensive and accurate knowledge of the physical sciences, to several of which he made important contributions—and an almost unsurpassed fund of general information. (His claims to be considered the discoverer of the composition of water are considered in the article WATER.) He was elected a Fellow of the Royal Society of Edinburgh in 1784; a Fellow of the Royal Society of London in 1785; a corresponding member of the Batavian Society in 1787; and in 1808, a corresponding member, and afterwards a foreign member, of the Insti-

tute of France. The university of Glasgow conferred on him the degree of LL.D. in 1806. His statue, the funds for which had been raised by a public and almost a national subscription, was erected in Birmingham in 1824; and his statue is now to be seen in the streets of many of our larger towns. The honors paid to his memory and to himself in his later years appear to have been deserved by his personal qualities, no less than by the immeasurable benefits which his inventive talents have conferred upon the human race.

WATTEAU, ANTOINE, was born at Valenciennes, in the year 1684. In 1702, he betook himself to Paris, where for some time he worked as assistant to a scene-painter. When this employment failed him, by the retirement of his master from Paris, he employed himself in copying pictures. The talent which he showed in this humble walk of the art drew the attention of Gillot, a popular painter of the day, who engaged him to assist in his studio. In no long time, it was found that the pupil excelled his master, who speedily relinquished the field in his favor, and became an engraver. The success of W. was now assured; he was made a member of the French Academy, and became by special favor *Peintre de Fêtes Galantes du Roi*. In 1718, he visited England, it is believed chiefly on account of his health, and to consult a certain Dr. Meade, then famous, for whom, during his stay, he painted one or two pictures. He remained about a year, without, as it should seem, much benefit. After his return home, his health gradually declined; and in 1721, he died at Nogent, near Paris.

In virtue of their charming color and graceful design, the pictures of W. continue to please, though his reputation as an artist is now but a faint echo of that which, in his lifetime, he enjoyed. He employed himself chiefly in painting small landscapes, with something of the nature of the *Fête Galante* going on in them—idylls in court-dress, which, as preserving for us the fopperies of the time, are not without a certain value distinct from their properly artistic one.

WATTLE. See ACACIA.

WATTLE-BIRD (*Anthochæra carunculata*), an Australian bird, of the family of Honey-eaters (*Meliphagidæ*). It is about the size of a magpie, grayish brown above, each feather striped, and bordered with white; the tail brown, long, wide, and graduated. It derives its name from a pendulous reddish wattle on each side of the throat. It feeds chiefly on honey and insects extracted from the flowers of *Banksias*, these trees continuing in flower most of the year. It is a bold and active bird, and drives away all other birds from the part of the tree which it occupies.

WATTS, ISAAC, was born on July 17, 1674, at Southampton, where his father had a boarding-school. He was educated at the grammar-school of his native place, and afterwards sent, at the age of 16, to an academy in London, kept by Mr. Thomas Rowe, an Independent minister. Here his devotion to his studies was so excessive as to permanently injure his constitution. In 1696, he became tutor in the family of Sir John Hartopp, at Stoke-Newington, with whom he remained six years. During the latter part of this time, he officiated as assistant to Dr. Chauncey, minister of the Independent Church in Mark Lane, to whose post he succeeded in 1702. His health was throughout infirm; and in 1712, he was prostrated by an illness so violent that he never thoroughly recovered from its effects, though he lived for many years afterwards. A visit which he paid to Sir Thomas Abney, at Theobalds, for change of air, resulted in his domestication in the establishment till his death, 36 years afterwards, on November 25, 1748. As his health permitted, he continued to discharge his clerical duties, and to occupy himself with literary pursuits. His theological works were numerous, but are now quite forgotten. His treatise on *Logic*, though long since superseded, had in its day a considerable reputation, and was adopted as a text-book by the university of Oxford. By his well-known Hymns for children, his reputation has been chiefly perpetuated. So lately as 1837, his *Horæ Lyricæ* were republished, with a Memoir by Southey. In Johnson's *Lives of the Poets*, a notice of him is likewise to be found.

WATTS, THOMAS, a distinguished philologist and librarian, was born in London early in the present century. At school he studied Latin and French, and in due time Greek as well; but he principally distinguished himself by his attainments in English. He read every book that came in his way, and he wrote apparently with the utmost ease, tales, essays, and poetry, very much above the average, not alone of school-boy composition, but of the magazine-writing of the day. To a knowledge of the classics and French, W. soon added an acquaintance with the other languages of the Latin family—as Italian, Spanish, and Portuguese; likewise with the German, Dutch, Swedish, Danish, and Icelandic. The facility with which he acquired these several languages, encouraged him to undertake, from time to time the study of some of the oriental tongues, viz., Hebrew, Arabic, Persian, Turkish, and even Chinese. In each of these he made considerable progress, but cannot be said to have mastered any of them as he did those languages before named, and as he subsequently mastered the Russian, Polish and Hungarian. There are few Englishmen who know anything of the three languages last named, which W. could read and translate with the utmost ease—being as familiar, in fact, with their great writers as he was with those of Germany or France. It remains only to mention that W. was also well acquainted with the Welsh language and literature, besides having some knowledge of the Gaelic and Irish as well. Upwards of 20 languages have thus been named with which he was well acquainted. No other Englishman has approached him as a linguist, considering the *variety* as well as the *number* of languages which he acquired; while of foreigners, it is not too much to say that Mezzofanti alone appears to have surpassed him.

In 1832, W. first became a 'reader' in the Reading-room of the British Museum, where, in studying some of the languages mentioned, he became acquainted with the deficiencies in the literature of other countries under which our national library then labored. In 1837, the Rev. Mr. Baber, then keeper of the Printed Books, purchased, at his recommendation, a small collection of Russian books, which W. offered to catalogue as a volunteer. This brought him the acquaintance of Mr. Panizzi, who, becoming aware of his attainments, recommended him for employment in the library. Accordingly, he was engaged as an assistant in the department of Printed Books, January 1838. At that time the books were being transferred from the old rooms in Montagu House to the new library. It was W.'s duty to assist in the rearrangement of the books, and when this was finished, he was intrusted with the responsible duty of arranging and placing on their shelves, according to subjects, all the new works purchased or otherwise acquired for the library. For this his vast acquirements as a linguist eminently qualified him. In other respects also his knowledge of languages was brought to bear in the service of the Museum. He drew up lists of desiderata in all the languages of Europe. It was at his suggestion also that the first large orders were given for American books. 'The object' (says W. in a letter to the principal librarian in 1861, printed by order of the House of Commons in 1866) 'which has been kept in view during the last three-and-twenty years has been to bring together from all quarters the useful, the elegant, and the curious literature of every language; to unite with the best English library in England or the world the best Russian library out of Russia, the best German out of Germany, the best Spanish out of Spain, and so for every language from Italian to Icelandic, from Polish to Portuguese.

'In the five languages in which it now claims this species of supremacy, in Russian, Polish, Hungarian, Danish, and Swedish, I believe I may say that, with the exception of perhaps fifty volumes, every book that has been purchased by the Museum within the last three-and-twenty years has been purchased at my suggestion. I have the pleasure of reflecting that every future student of the less known literatures of Europe will find riches where I found poverty.' The number of books classified and arranged by W., while only an assistant in the library, is reckoned at about 400,000 volumes, and of these as many as 100,000 were arranged upon a plan of his own invention, now known as 'the elastic system.' 'One of the advantages,' he says, in the letter before mentioned, 'obtained by this system is, that when the new library, which surrounds the new Reading-room, was ready for the reception of books, these 100,000 volumes were removed to their new locality without the necessity of altering a single press-mark: had the operation of altering the press-marks been still required, as under the former system, the amount of labor necessary to effect it would have been enormous, and the expense not less than some thousands of pounds.' Here it may be mentioned that it was W. who first suggested the erection of a library and large reading-room in the vacant quadrangle, where now rises the splendid dome erected under the auspices of Panizzi. The suggestion was originally made in a series of articles contributed anonymously to the *Mechanics' Magazine* for 1836 and 1837, since that time acknowledged by W. as his own. In one of these, speaking of the quadrangle, he says: 'The space thus unfortunately wasted would have provided accommodation for the whole library. A reading-room of ample dimensions might have stood in the center, and been surrounded on all four sides by galleries for the books, communicating with each other, and lighted from the top.'

In 1856, W. was promoted to be assistant-keeper of the Printed Books; and on the opening of the splendid new Rreading-room in 1857, he was most fitly appointed its superintendent. In August 1866, W. was appointed keeper of the department of Printed Books. He died 9th September 1869. W. was a member of the Philological Society of London; he was also an honorary member of the Hungarian Academy, to which he was elected at the same time as the late Lord Macaulay. Among the literary productions of W. may be mentioned: 'Notes of a Reader,' contributed to a weekly periodical entitled *The Spirit of Literature*, 1830; numer-

ous poetical pieces contributed to Linnington's *Rhetorical Speaker and Poetical Class-Book*, 1833; *A Letter to Antonio Panizzi, Esq., on the reputed Earliest Printed Newspaper, 'The English Mercurie, 1588,'* 1839; *A Sketch of the History of the Welsh Language and Literature* (reprinted from Knight's *English Cyclopædia*), 1839; more than a hundred biographies of eminent men. Russian, Hungarian, Bohemian, &c., contributed to the same *Cyclopædia;* numerous articles in the *Biographical Dictionary* of the Society for the Diffusion of Useful Knowledge; papers in the *Transactions of the Philological Society*, among which are an 'Essay on the Hungarian Language,' and a biographical notice of Cardinal Mezzofanti; also contributions to the *Quarterly Review*, the *Athenæum*, and other literary periodicals.

WAUKE'GAN, a city and port of Illinois, on the west shore of Lake Michigan, 35 miles north-by-west from Chicago, and 50 miles south of Milwaukee, connected with both by railway. The town is handsomely built on a bluff, 50 feet above the lake, and has 9 churches, an active trade, and is becoming a summer resort. Pop. (1880) 4012.

WAVE, the name given to a *state of disturbance* propagated from one set of particles of a medium to the adjoining set, and so on; sometimes with, sometimes without, a small permanent displacement of these particles. But the essential characteristic is, that energy (see FORCE), not Matter (q. v.), is on the whole transferred. The theory of wave-motion is of the utmost importance in physical science; since, besides the tide-waves, wave in the sea, in ponds, or in canals, undulations in a stretched cord (such as a pianoforte wire), or in a solid (as sound-waves or earthquake-waves), we know that sounds in air are propagated as waves (see SOUND), and that even light (see UNDULATORY THEORY) is a form of wave-motion.

The general investigation of the form and rate of propagation of waves demands the application of the highest resources of mathematics; and the theory of even such comparatively simple cases as the wind-waves in deep water (the Atlantic roll, for instance), though easily enough treated to a first, and even to a second and third approximation, has not yet been thoroughly worked out, as fluid friction has not been taken account of. In this article, therefore, we will merely *state* some of the more important conclusions which mathematical analyses has established in the more difficult of these inquiries, comparing them with the observations of Scott Russell and others; while we give at full length the very simple investigations of the motion of a wave along a stretched chord, and of the propagation of a particular kind of sound-wave.

To find the rate at which an undulation runs along a stretched cord, as, for instance, when a harp-string is sharply struck or plucked near one end, a very simple investigation suffices. Suppose a uniform cord to be stretched with a given tension in a smooth tube of any form whatever, we may easily show that there is a certain velocity with which the cord must be drawn through the tube in order *to cease to press on it at any point*, that is, to move independently of the tube altogether. For the pressure on the tube is due to the tension of the cord; and is relieved by the so-called Centrifugal Force (see CENTRAL FORCES) when the cord is in motion.

If T be the tension of the cord, r the radius of curvature of the tube at any point, the pressure on the tube per unit of length is

$$\frac{T}{r}.$$

If m be the mass of unit length of the cord, v its velocity, the centrifugal force is

$$\frac{mv^2}{r}.$$

These are equal in magnitude, and so destroy each other, if

$$T = mv^2.$$

Hence, if the cord be pulled through the tube with the velocity thus determined, there will be no pressure on the tube, and *it may therefore be dispensed with*. If we suppose the tube to have a form such as that in the figure, where the extreme portions are in one straight line, the cord will appear to be drawn with velocity

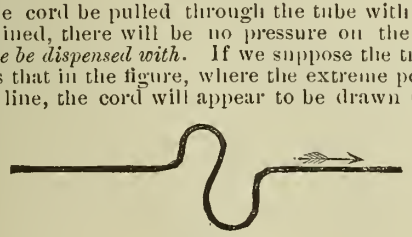


Fig. 1.

v, along this, the curved part being occupied by each portion of the cord in succession: presenting something like the appearance of a row of sheep, in Indian file, jumping over a hedge.

To a spectator moving in the direction of the arrow with velocity v, the straight parts of the cord will appear to be at rest, while an undulation of *any* definite form and size whatever runs along it with velocity v, in the opposite direction. This is a very singular case, and illustrates in a very clear manner the possibility of the propagation of a *solitary* wave.

Thus we have proved that the velocity with which an undulation runs along such a cord is

$$\sqrt{\frac{T}{m}}.$$

If l be the length of the cord in feet, w its whole weight, W the appended weight by which it is stretched, $g = 32{\cdot}2$ feet, the measure of the earth's gravity, this becomes

$$\sqrt{\frac{W}{w}lg}.$$

This formula is found to agree almost exactly with the results of experiment. We can easily see why it should be to some small extent incorrect, because we have supposed the cord to be inextensible, and perfectly flexible, which it cannot be; and we have neglected the effects of extraneous forces, such as gravity, the resistance of the air, &c.

Let us next consider the motion of air in a cylindrical tube, in the particular case in which the leg of a vibrating tuning-fork is applied at one end. This is a simple case of the propagation of sound-waves. We shall treat it by a synthetical process, somewhat like that given by Newton.

As we have already seen (see PENDULUM), a simple vibration such as that of a pendulum or tuning-fork is the resolved part, in a definite line, of the uniform motion of a point in the circumference of a circle. What we have now to show is, that such a motion of all the particles of air in the pipe, the *phase* of the vibration (or the position of the particle in its path at any instant) depending on its distance from the end of the tube, is consistent with mechanical principles. When this is done, it will be easy for us to trace, in this particular example, the process by which the wave is propagated from one layer of the fluid to the next. We must now consider (a little more closely than in PENDULUM or SOUND) the nature of the simple vibration of each particle of the air.

Suppose P to move, with uniform velocity V, in the circle APB, and let PQ be drawn perpendicular to the fixed diameter, OA. Then the acceleration of P's motion is $\frac{V^2}{OA}$ in the direction PO.

Hence in the motion of Q, which is a simple vibration, we have, by the rule for resolving velocities and accelerations (see VELOCITY),

$$\text{Velocity of Q} = \frac{PQ}{OA}V \text{ in the direction QO;}$$

$$\text{Acceleration of Q} = \frac{OQ}{OA}\frac{V^2}{OA} \text{ in the direction QO.}$$

Next consider two particles of air near one another in the axis of the tube, or the masses of air in two contiguous cross-sections of the tube. If the phase of vibration were the same for both, they would be *equally* displaced from their original positions, and the air between them would be neither compressed nor dilated. Hence, that a wave may pass, the phases must be different. Let, then, Q represent the position of the one particle, or layer, in its line of vibration at any instant; Q′, the simultaneous position of the other. The first will be displaced through a space OQ from its position of rest; the second, through a space OQ′; and their distance will therefore be altered by the amount QQ′, which may be taken to represent the compression or dilatation. But it is easy to see that, as P and P′ move round, QQ′ is always proportional to PQ. Hence the compression or dilatation of the air in any cross-section of the tube is proportional to the velocity with which it is moving. Hence the difference of pressures before and behind any such section is proportional to the difference of velocities—i. e., to the acceleration of the motion while the section passes over a space equal to its own thickness. And this is consistent with mechanical principles, for the *mass* of air in the section is constant, while the difference of pressures before and behind produces the acceleration, and should therefore be proportional to it.

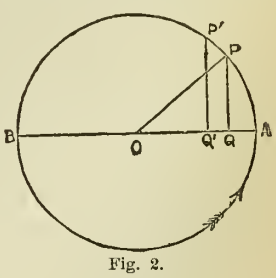


Fig. 2.

The particles of air in cross-sections of the tube therefore vibrate, each in the same period as does the tuning-fork, but the phase is *later* for each section in proportion to its distance from the fork. Where the phase is one or more whole vibrations later than that of the fork, the motion is exactly the same as that

of the fork, and *simultaneous* with it. At all other points, it is the same as that of the fork, but not simultaneous. Thus, the greatest displacement of the fork is immediately shared by the layer next it, later by the next layer, and so on. Thus, a *wave* of displacement travels along the tube from one section to the next, while each particle merely oscillates backward and forward through (in general) a very small space about its position of rest.

The reader who has followed the little geometrical investigation above will have no difficulty in proving for himself that the velocity with which the wave travels is proportional to

$$\sqrt{\frac{p}{\rho}},$$

where p is the pressure, and ρ the density of the air. The easiest mode of doing this is to express, in terms of these and other quantities, the equation given us by the laws of motion,

$$\text{Mass} \times \text{Acceleration} = \text{Difference of pressures},$$

and to assume that Hooke's (q. v.) Law holds, even during the *sudden* compression of air. This, we know, is not the case; so that a correction has to be applied to the above expression, depending on the heat developed by sudden compression or lost in sudden rarefaction, by each of which the elastic force of the air is *increased*. But this has been already discussed in SOUND.

The above formula shows us, however, that the velocity of sound is not affected by the pressure of the air—i. e., the height of the barometer—since, in still air, p is *proportional* to ρ. The velocity does depend on the temperature, being, in fact, proportional (*ceteris paribus*) to the square root of the temperature measured from absolute zero. See HEAT.

We see also from the formula that the velocity is inversely as the square root of the density of the gas—the pressure being the same. Thus, a sound-wave travels about four times faster in hydrogen than in air.

Also we see that, within the limits of approximation we have used, the velocity does not depend upon the intensity, pitch, or quality of the Sound (q. v.). The investigations which seem to lead to slight modifications of this conclusion are too recondite to be introduced here. We can only mention, also, the beautiful investigations of Stokes (q. v.) connected with the extinction of a sound-wave as it proceeds, partly by fluid friction, partly by radiation. And we may conclude by stating that the result of a completely general investigation of the velocity of a sound-wave gives, to a first approximation, the result we have deduced from the study of a simple particular case.

We now come to the consideration of waves in water. Of these there are several species. One, however, we may merely mention, as its theory is the same as that just briefly discussed. This is a sound-wave, or *wave of compression*, in water. Its velocity is considerably greater than that of sound in air (see SOUND). The others, which are commonly observed on the surface of water, depend on mere changes of level, and their effects; and in studying them, we may consider water as incompressible.

The first of these is what is called a *long* or *solitary* wave. Its essential characteristic is, that its length is great compared with the depth of the liquid in which it moves. To this class belong the tide-wave (see TIDES), and the long wave which accompanies a canal-boat, and which we see slowly traversing the canal when the boat is stopped. Scott Russell has made many interesting observations on this wave, all of which accord well with the results of the mathematical theory of its propagation. The velocity of this wave depends solely on the depth, not on the density of the liquid in which it moves—and in a uniform canal the velocity is that which would be acquired by a stone falling freely through a space equal to half the depth of the water. Another characteristic of this wave is that, after it has passed, it leaves the water bodily transferred through a small space along the bed of the canal—forwards or backwards, according as it consists of an elevation or a depression of the water-surface.

Scott Russell has shown that the most favorable rate at which a canal-boat can be drawn is when its velocity is such that it rides on the crest of the solitary wave. If drawn at any other speed, it leaves the solitary wave behind, or is left by it; and in either case, part of the horse's work is expended in producing fresh solitary waves. An excellent mode of observing these waves is to tilt slightly a rectangular box containing some water, and restore it to its original position. A long wave is thus formed, which is reflected repeatedly at the ends of the box, and whose rate of motion may be accurately observed by watching the image of a candle reflected at the surface of the water. If the sides of the box be made of glass, and some light particles be dispersed through the water, their motions enable us to discover all the circumstances of the propagation of this wave.

We next come to what are called *oscillatory* waves in water or other liquids. To this class belong all waves whose length from crest to crest is small compared with the depth of the liquid; from ripples on a pool to the long roll of the Atlantic. They are never observed as solitary waves, their general characteristic being their periodical recurrence. And by watching a piece of cork floating on the surface, we see that it moves forwards when at the crest of the wave, and backwards through an equal amount when in the trough. Also it rises while passing from trough to crest, and sinks from crest to trough. Mathematical investigation, confirmed by experiments with floats at sea, and with short waves in the glazed box before described, shows that each particle of the water describes a *circle* about its position of rest in the verticle plane in which the wave is advancing. Particles at greater and greater depths describe smaller and smaller circles. The diameters of these circles diminish with extreme rapidity.

At a depth equal to the distance from crest to crest (i. e., the length of the wave), the displacement of the water is already only $\frac{1}{535}$th of that at the surface. At the depth of two wave-lengths, it is about $\frac{1}{800.000}$th of that at the surface. Thus we may see to how small a depth the ocean is agitated even by the most tremendous wind-waves; for, according to Scoresby, 43 feet is about the utmost difference of level between crest and trough in ocean-waves. If the wave-length be 300 feet (which is a large estimate), then at a depth of 300 feet the water-particles describe circles whose radii are only the $\frac{1}{535}$th of a foot, or about four-tenths of an inch; and at 600 feet this is reduced to $\frac{1}{1200}$th of an inch; while the depth of the Atlantic is in many parts more than three or four miles. In this case, the velocity of propagation of the wave has been shown to be

$$\sqrt{\frac{gl}{2\pi}},$$

where g is, as before, 32·2 feet; l is the wave-length in feet; and π is the ratio of the circumference of a circle to its diameter (see QUADRATURE OF THE CIRCLE). Thus, the velocity of an oscillatory wave in deep water is proportional to the square root of its length. This fact has been of use as an analogy in helping us to account for the *Dispersion* (see REFRACTION) of Light, where, by experiment, we know that the waves of red light are longer than those of blue light, and also that they travel faster in refracting media.

When the depth is not infinitely great compared with the length of a wave, theory and experiment agree in showing that the motion of each particle takes place in an ellipse whose major axis is horizontal. These ellipses diminish rapidly in length as we descend in the liquid, but still more rapidly in breadth, so that, as was to be expected, the particles *at* the bottom oscillate in horizontal straight lines. The expression for the velocity of propagation is now by no means so simple as in the previous cases—but is easily shown to include the values already given.

So far, the first approximation. A section of the surface made by a vertical plane in the direction of the wave's motion, is shown to be bounded by the *Harmonic* Curve, or Curve of *Sines*, the form assumed by a vibrating string (See SOUND); from which it follows that the crests are similar to the troughs. The second approximation makes the troughs flatter, and the crests steeper, and also shows that the particles are, on the whole, carried *forward* by each successive wave. The amount of this progression diminishes rapidly with the depth below the surface. A third approximation shows that the velocity is, *ceteris paribus*, greater the greater is the height of the waves.

When waves advance towards the shore, their circumstances change, in general gradually, from those of oscillatory waves to those of waves of translation, as the depth of the water becomes less and less considerable in comparison with the length of the wave; and it is found by experiment that they 'break,' as it is called, when the depth of the water is about equal to the height of the crest above the undisturbed level. All the curious phenomena of breakers are thus easily explained by the results we have already given, when they are considered with reference to the gradual alteration of the depth of the water.

Finally, we must notice a singular phenomenon often observed, viz., that of a series of waves breaking on the coast, every eighth, or ninth, or tenth, &c. is seen to be higher than its predecessors or successors. The explanation is simple enough, and points to the simultaneous existence of two or more sets of oscillatory waves of different lengths, due in general to quite distinct causes, which reach the shore together.—For further information on this subject the reader is referred to papers by Stokes in the *Cambridge and Dublin Math. Journal*, vol. iv., and the *Cambridge Phil. Trans.*, vol. viii., and to Airy's 'Tides and Waves' in the *Encyclopædia Metrop.*

This might lead us to consider the very interesting case of '*Coexistence of Small Motions*' presented by the Interference (q. v.) of such waves; but we have already in various articles (see POLARIZATION, SOUND, UNDULATORY THEORY) given sufficient examples to illustrate the great principle.

There remains the consideration of the propagation of waves in elastic solids, among which, at least so far as luminiferous vibrations are concerned, it appears that the Ether (q. v.) must be

ranked. This is a subject of a higher order of difficulty than any of those before mentioned, and, in the case of light at least, has not yet been treated in a thoroughly satisfactory manner, though such men as Cauchy, Neumann, Maccullagh, Green, and Stokes have written profound memoirs upon it.

WAVRE, a town in the province of South Brabant, Belgium, 15 miles south-east of Brussels, has a pop. of 5900, who are mostly engaged in the manufacture of hats, leather, and cotton-yarn. W. is better known as the scene of a desperate and protracted conflict between the French and Prussians, on the 18—19th June 1815. The former, under Grouchy, Gerard, and Vandamme, advanced against the Prussians at the same time as Napoleon directed the troops under his immediate orders against Wellington at Waterloo (q. v.), and being much superior in number (32,000 to 15,200), drove the Prussians, under Thielman, into W., where they defended themselves with desperate firmness, repulsing thirteen different assaults in the course of the 18th. On the following morning, Thielman, who had heard of the victory at Waterloo, attacked Grouchy, but was repulsed with vigor, though the urgent orders of Napoleon forced the latter to retreat to Laon, instead of following up his success.

WAX. Under this term, chemists include various matters of a well-known (so-called *waxy*) appearance, derived both from the animal and the vegetable kingdoms. While in their general relations they approximate to the Fats, they differ materially from the latter in their chemical composition; those of them which have been carefully examined, being found to consist partly of mixtures of alcohols and compound ethers, and partly of free fatty acids. Their general properties may be thus laid down: They are solid or semi-solid matters; are easily broken when cold, but at a moderate warmth are soft and pliable, and fuse at a temperature below 212°. They have a peculiar glistening appearance, are lighter than water, are insoluble in that fluid and in cold alcohol, but dissolve readily in ether; they are combustible, and burn with an illuminating flame, are non-volatile, and when heated in a free atmosphere, undergo decomposition. In this category are included spermaceti (which has been already considered), bees' wax, Chinese wax, and other less known kinds, as palm or vegetable wax (obtained from the bark of *Ceroxlyon andicola*, by the action of hot water and pressure), Carnahuba wax (an exudation from the leaves of a Brazilian palm), sugar-cane wax, &c.

Bees' wax is an animal secretion formed by the bees from sugar, and constitutes the material of which the cells of the honey-comb are composed. It is obtained by expressing the honey, and fusing the residue in boiling-water. In this state it is of a yellow color (*Cera flava*). It may be bleached, so as to form white wax (*Cera alba*), by being exposed in thin slices to the action of solar light, or by the action of nitric acid. (Chlorine readily destroys the color, but renders the wax unfit for candle-making, as a portion of the hydrogen of the wax is replaced by chlorine, and the candles, when burning, evolve irritating vapors of hydrochloric acid gas). From the researches of Sir B. Brodie (*Phil. Trans.*, 1848, 1849), it appears that wax consists of three different substances, *myricin*, *cerin*, and *cerolein*, which are separable from one another by means of alcohol.

Myricin, which is insoluble in boiling alcohol, constitutes more than two-thirds of the bulk of ordinary wax. *Cerin*, or *cerotic acid*, which dissolves in boiling alcohol, but separates on cooling, varies in quantity in different specimens. In one sample of genuine bees' wax, Brodie found that it constituted 22 per cent., and it was always present in European samples, while in Ceylon wax it was entirely absent. This curious variation in the nature of an animal secretion, under different conditions of life, resembles the variations sometimes noticed in the acids of butter, in which the butyric and caproic acids of one season are replaced in another by vaccinic acid, differing from the former acids in the amount of oxygen alone. *Cerolein*, the substance soluble in cold alcohol, is a greasy body, constituting 4 or 5 per cent. of ordinary wax. Without entering into chemical details, we may observe that bees' wax yields the following derivatives: Cerotic acid or cerin, $HO,C_{54}H_{53}O_3$; cerylic alcohol or cerolin, $HO,C_{54}H_{55}O$; melissylic alcohol or melissin, $HO,C_{60}H_{61}O$; melissic acid, $HO,C_{60}H_{59}O_3$; palmitic acid, $HO,C_{32}H_{31}O_3$; myricin, $C_{92}H_{92}O_4$; and melene, $C_{60}H_{60}$.

Chinese Wax ($C_{108}H_{108}O_4$) is supposed to be the produce of a species of insect of the Coccus family, and consists principally of cerotic acid, in combination with oxide of ceroyl.

Both yellow and white bees' wax occur in the Pharmacopœia. The characters and tests, as given in that work, are—*Of yellow wax:* 'Firm, breaking with a granular fracture, yellow, having an agreeable honey-like odor; not unctuous to the touch, does not melt under 140°, yields nothing to cold rectified spirit, but is entirely soluble in oil of turpentine; boiling-water in which it has been agitated, when cooled is not rendered blue by iodine.' *Of white wax:* 'Hard, nearly white, translucent; not unctuous to the touch, does not melt under 150°.' The iodine test is used because wax is often adulterated with starch. Wax was formerly much employed internally as an emollient medicine, in cases of suspected ulceration of the intestines. At present, it is only used as an external agent, being an ingredient of many ointments and plasters.

The commercial value of bees' wax is very great; and if it were possible to ascertain the total of the quantity produced, it would cause great surprise at the amount of valuable material derived from a source apparently so insufficient. Its chief uses are for candles, modeling, medicinal cerates or ointments, besides many minor purposes. Nearly 500 tons are annually imported into Great Britain, the value of which is about £80,000; but so large is the quantity consumed in the ceremonies of the Greek and Roman churches, that Russia alone consumes more than four times that amount, and the various Catholic countries probably ten times as much. The INSECT WAX of China, or Pe-la, has lately been imported in small quantities, and used in the manufacture of candles by Messrs. Price & Co.; but it is far too costly for general use (see WAX INSECT). In China, this wax is very highly valued, and is so costly as to be used only by the highest classes; it is white, and breaks with a crystalline fracture and pearly lustre. Of Vegetable Wax, there are four distinct kinds known in commerce. The first in importance is the JAPAN WAX, which is almost as white and compact as refined bees' wax, which it closely resembles; it was first brought to Great Britain in 1859, and since then, some very considerable importations have taken place. It is said to be obtained by boiling the seeds of a species of RHUS (*R. succedanea*). It has only been used in making candles. BRAZILIAN VEGETABLE WAX is also an article of regular importation, but only in small quantities; it is obtained from the leaves of *Corypha cerifera*, the Carnahuba Palm of the Brazilians. It forms a glossy varnish-like covering; and when the leaves are gathered, and begin to shrink from withering, it cracks and peels off, and is collected and melted into masses. It is hard and brittle, and of a dull yellow color. The candlemakers have used it for mixing and improving other materials. In Brazil, candles are wholly made of it, or half the quantity of stearine is added.

The VEGETABLE WAX of the Andes is also yielded by a palm (see WAX PALM). Although much used in Mexico, it has not yet become of commercial importance to Europe. It is chiefly used for candles in the churches. MYRTLE WAX, though rarely seen in Europe, is much used in the British colonies of North America, and the United States, and at the Cape of Good Hope; it is also in use in Brazil. It is procured by boiling the berries of *Myrica cerifera* in North America, and probably from other species in Brazil, and at the Cape of Good Hope. It resembles bees' wax very much, except that it has a greenish-yellow instead of a yellow color. It is only used for candle-making. See CANDLEBERRY.

Of the manufactured compounds called wax, the following are the chief—viz., SEALING-WAX (q. v.). MODELLERS' WAX, used by artists for modeling small works. It consists of equal parts of bees' wax, druggists' lead-plaster—olive oil and yellow resin, and just sufficient whiting added to produce the consistency of putty. GILDERS' WAX consists of four parts of bees' wax, well mixed by melting with one part each of verdigris and sulphate of copper.

The bees' wax of commerce is of a dirty yellow color, and mixed with many impurities. It has, consequently, to undergo a process of bleaching, by which it is rendered quite white and pure. The usual process is to melt the wax with boiling-water, and stir them together for a short time, so as to separate the impurities from the wax. It is then allowed to rest for a short time, and the pure wax floats on the top; and when cold, is taken off in a cake, the lower part of which is often discolored with the dirty water. This is scraped off, and mixed with the next lot to be operated upon. The purified portion is next remelted, and is then allowed to trickle from the melting-pan on to a wooden cylinder, revolving rapidly, and partly immersed in pure cold water, in a large cistern. This throws it into the water in the form of fine thin feather-like flakes, which cool and harden instantly in the water. When all is run off, the wax is removed from the water, and laid on linen cloths, placed on tables in a field for the air to bleach. From time to time, the flakes are turned over and examined; and when the bleaching effect of the air seems to have stopped, the wax is remelted, and converted into flakes in the cistern, and replaced in the bleaching-ground until it is quite white.

WAX, MINERAL, is a natural product known under the name of Ozokerit. It used only to be found in small quantities oozing from rocks of coal formation, though near Edinburgh, candles, as curiosities, were made of it by the miners; but this hydrocarbon is now got near Newcastle, in Wales, in Galicia and Roumania, in Utah and California, and has now become an important commercial article for the manufacture of candles. When found, it has a dark, rich-brown color, slightly greenish and translucent in thin films; but when refined, it resembles well-bleached bees wax. Its melting-point is about 60°.

WAX-CLOTH, a name sometimes given, but very erroneously, to FLOOR-CLOTH (q. v.).

WAX-FLOWERS. An elegant use is found for bees' wax in the manufacture of wax-flowers. The wax for this purpose is bleached and prepared in thin sheets of various colors, which are cut out into the shapes for petals and leaves, according to the kind of flower to be imitated. They are easily made to adhere, either by a slight amount of heat, or a little melted wax.

WAX INSECT (*Coccus sinensis;* see COCCUS), a very small white insect, a native of China, of the same genus with the Cochineal and Kermes insects, and with the Scale insects, which are the pest of our greenhouses, valuable on account of the wax which it produces. It is found about the beginning of June on the branches of certain trees, on the juices of which it feeds, particularly on those of a kind of Sumach (*Rhus succedaneum*). The wax is deposited on the branches as a coating which resembles hoar-frost. This is scraped off towards the end of August, melted in boiling-water, and strained through a cloth. See WAX. The Chinese W. I. has been introduced by the French into Algeria.—Another W. I. is found in South America, but is not yet well known, nor has its wax become an article of commerce.

WAX-MYRTLE. See CANDLEBERRY.

WAX-PAINTING is an art of great importance, better known, however, under the name of Encaustic Painting (q. v.).

WAX-PALM (*Ceroxylon*—or *Iriartea—andicola*), a lofty palm, found in the Andes, on the eastern borders of Peru, at an elevation of 3000 feet and upwards above the level of the sea. It grows to the height of 160 feet, and on the cicatrices of the fallen leaves, a resinous secretion is produced in great abundance, composed of



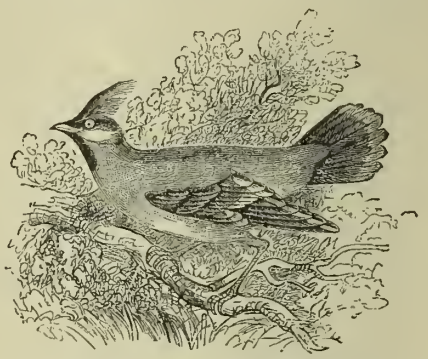
Wax Palm (*Ceroxylon andicola*).

about two parts of yellow resin, and one of a kind of wax, more brittle than bees' wax. This wax exudes also from the leaves, and is whitish, almost inodorous, except when heated, when it gives out a resinous odor. It is used by the inhabitants of the country in which it is produced for making candles, but is usually mixed with wax or tallow. It is probable that the W. P. would succeed well in the south of Europe, as its native climate is not dissimilar. The usual method of obtaining the wax is by felling the tree. Each tree yields about 25 lbs. The wax is scraped off, melted, and run into calabashes. The timber of this palm is very hard and durable; the leaves are used for thatching, and the fibres for cordage. The tree is a beautiful one, with a stately stem, and a head of large pinnate leaves.—In some of the northern provinces of Brazil wax is obtained from the Carnaluba Palm (q. v.).

WAX-SCULPTURE. The use of wax for sculpture is believed to be of very ancient origin; and not only have the tombs of Southern Italy yielded many specimens of the portraits of the deceased modeled in wax, but many fine bronzes in antiquarian collections bear evident marks of having been modeled in wax by the process called cire-perdue. This consists in producing a model in wax, and then coating it with clay or other material in a soft state; this is allowed to harden; and the wax is then melted out by heat, and the molten metal poured in. A very fine cast of the wax-figure is thus obtained; but, of course, the wax-model of the artist is lost, after the first copy is taken; hence, such specimens are very highly prized by connoisseurs. During the 14th and 15th centuries, the art of modeling in wax, or ceroplastics, was much practised, especially in Italy and in Germany, by many of the first artists, even Michael Angelo not excepted; and many of their original works in wax are still preserved. They were chiefly, however, in low relief, although very fine statuettes were also produced by men of great eminence.

WAX-TREE (*Vismia*), a genus of plants of the natural order *Hypericaceæ*, having a 5-parted calyx, and 5 petals, generally covered with soft hairs on the inside. All the species yield a yellow viscid juice when wounded, which, when dried, becomes somewhat similar to gamboge. The species are natives of the tropical parts of America.

WAXWING (*Bombycilla*), a genus of birds of the family *Ampelidæ*, or Chatterers (q. v.), having a short, straight, elevated bill, with a very wide gape, as in the Fly-catchers, but without bristles; both mandibles notched at the tip; the wings rather long, broad, and pointed; the legs short; the toes long, with sharp and curved claws. The name W. is derived from a very peculiar character, which the wings exhibit; some of the secondaries and tertiaries terminating in horny expansions of the shaft, resembling small



Bohemian Chatterer (*Bombycilla garrula*).

pieces of red sealing-wax. The species are few, but widely diffused over the colder parts of the northern hemisphere. The only European species is the EUROPEAN W., or BOHEMIAN CHATTERER (*B. garrula*), which is found in summer in the arctic regions of Europe, Asia, and America, migrating southwards in winter, sometimes as far as the shores of the Mediterranean; most abundant in America, during winter, about the great lakes and the northern part of the Valley of the Mississippi. It is found also in Japan. It is only an occasional winter-visitant of Britain. In some winters, numerous flocks are seen; in other winters, and more generally, none at all. It is in severe winters that this bird is most frequently seen in Britain, and in the more southern parts of Europe. It is gregarious in winter, and the flocks are often large. It feeds on insects and worms, seeds, berries, and other fruits. It is a handsome bird, nearly as large as the Song Thrush; reddish gray, with a black patch on the throat, and a black band on the forehead; the tail coverts brownish orange; the primaries, secondaries, and tail-feathers tipped with yellow, two white bands on the wings; the lower parts silvery gray. The head is surmounted by an erectile crest of brownish orange feathers. The song of the W. is a weak whistling, bearing a little resemblance to that of the thrush. It is easily tamed. The flesh is said to be delicate food.

The AMERICAN W., or Cedar Bird (*B. cedrorum*, or *Carolinensis*), is a very similar, but smaller species, found only in North America, from Canada to Central America, less migratory, and never visiting arctic regions. The general color is reddish olive, passing into purplish cinnamon in front, and into ash-color behind; the chin black; no white on the wings; the lower parts yellow. It is erested like the European Waxwing. Great flocks of cedar birds collect in the end of summer. They feed on berries, and are particularly fond of those of the Red Cedar. The Cedar Bird is extremely voracious, and when food abounds, sometimes gorges itself so much, that it may be taken by the hand. It is in much esteem for the table.—Another species is found in Japan, having no waxy drops on the wings.

WAXY DEGENERATION is a morbid process in which the healthy tissue of various organs is transformed into a peculiar substance, allied in some respects to amyloid compounds, and in others to albuminous substances. Organs affected by this degeneration have a certain resemblance in consistency and physical character to wax. They may be cut into portions of the most regular shape, with sharp angles and smooth surfaces; and the thinnest possible slices may be removed by a sharp knife for microscopical examination. Such organs are abnormally translucent, increased in volume, solidity, and weight. Usually, the first parts affected by this degeneration are the small blood-vessels, the middle or muscular coat being first changed. Subsequently, the secreting cells become similarly affected. When a solution of iodine is brought in contact with such tissues, a very deep violet red color is produced; and this deep red color is alone a sufficiently characteristic test. Although amyloid degeneration is common to many tissues and organs, the parts most frequently affected are the spleen, liver, and kidneys. This morbid condition in one or more organs is the expression of a general pathological state, the conditions and relations of which are as yet but little known.

WAYLAND, the Smith (Ang.-Sax. VELAND; old Norse, VOLUNDR; Ger. WIELAND), was, according to the old German Sage (the principal traits of which are already contained in the older Edda, but which is related in the most detailed form in the Viltinasaga), a son of the sea-giant Wate, a nephew of King Wilkinus, and of the sea-nymph Wac-hilt. His father had bound him, at first, apprentice to the celebrated smith Mimi, then took him across the sea to the most skillful dwarfs, from whom he not only soon learned all their science, but far surpassed them.* He afterwards dwelt a long time in Ulfdaler (the Wolf's Valley, which, by comparison with other Sagas, appears to correspond to the Greek Labyrinth) along with his two brothers—Eigil, the best archer, to whom the oldest form of the Tell legend attaches; and Slagfidr, whom the saga has not further characterized. The brothers here met three swan-nymphs, and lived with them for seven years, when they flew away to follow battles as Walkyries (q. v.). Afterwards, W. came to King Nidung, who made him lame by cutting the sinews of his feet, and put him in prison, for which W. revenged himself by putting the king's two sons to death, and violating his daughter Beadohild, who afterwards gave birth to Wittich, a powerful champion of the German hero-legends. W. then flew away in a feather-robe, which he himself manufactured, and which his brother Eigil had tried first, but was precipitated to the ground. Skillfully putting together and supplementing the various old legends, Simrock has produced the Saga of W., as a whole, in his poem *Wieland der Schmied* (Bonn. 1835), and in the 4th part of his *Heldenbuch* (Stuttg. 1843). The legend was a favorite one among all the Germanic nations, as is shown by the frequent allusions to it in Scandinavian, Anglo-Saxon, English and German poems, as well as by the numerous fragments yet extant in oral tradition throughout all Teutonic countries.

The German poems to which the Viltinasaga appeals, which were in existence up to the 13th c., have been utterly lost. Even beyond the bounds of Germany, old French poems and traditions tell of Gallans the smith. See Depping and Michel, *Veland le Forgeron* (Par. 1833). The legend of W. is in fact one of those myths common to the Indo-Germanic family. Besides the German tradition, it is found most distinctly among the Greeks, in the different stories of Dædalus, Hephæstus, Erichthonius, and so forth. Next to Jacob Grimm's profound discussion in the *German Mythology*, Kuhn has pointed out in the best manner the signification and ramifications of the myth in his treatise, *Die Sprachvergleichung und die Urgeschichte der Germ. Völker*, in the *Zeitschrift für vergleichende Sprachforschung* (vol. iv., Berl. 1854).

WAYNE, ANTHONY, an American general of the war of the Revolution, was born at Waynesborough, Pennsylvania, January 1, 1745. His grandfather, a native of Yorkshire, commanded a squadron of dragoons at the battle of the Boyne, and emigrated to Pennsylvania. Anthony was educated at Philadelphia; at the age of 18, he was employed as a land-surveyor, and was selected by Benjamin Franklin to form a projected settlement in Nova Scotia. At the beginning of the American revolution (1775), he was married and settled on a farm in Pennsylvania, taking an active interest in politics, and became a member of a Committee of Safety, and studied military drill and tactics. At the outbreak of hostilities, he raised a regiment of volunteers, of which he was appointed colonel, and sent to Canada, where he covered the retreat of the provincial forces at Three Rivers. He commanded at Ticonderoga until 1777, when he was made Brigadier-general, and joined Washington in New Jersey; commanded the rear-guard in the retreat at Brandywine; led the attack at Germantown; captured supplies for the distressed army at Valley Forge; distinguished himself at Monmouth; was defeated at Paoli; but achieved the most brilliant victory of the war in the storming of Stony Point (q. v.), July 15, 1779. His courage and skill saved Lafayette in Virginia in 1780; and he aided in the siege of Yorktown, and commanded in Georgia.

At the close of the war, rewarded by popular enthusiasm, and having, by his dash and audacity, acquired the sobriquet of 'Mad Anthony,' he retired to his farm at Waynesborough, and engaged in promoting the construction of roads and canals. In 1792, he commanded a successful expedition against the Indians of the north-western territories; where he remained, until 1796, as United States' Commissioner. He died at the garrison at Presque Isle (now Erie), December 14, 1796.

WAYS AND MEANS, COMMITTEE OF, a committee of the House of Commons appointed to determine the modes of raising the money which the House—after resolutions reported from the Committee of Supply, and agreed to—has granted to the crown. Like the Committee of Supply, it is always a committee of the whole House. A chairman, elected by the Committee of Supply, but known as the Chairman of the Committee of Ways and Means, presides over both committees. One of the most important occasions for which the Committee sits is to receive the Budget, or annual financial statement of the year from the Chancellor of the Exchequer. The propositions of the government regarding loans, duties, taxes, tolls, and any other means for raising revenue, are submitted to the consideration of the Committee of Ways and Means in the shape of resolutions. The amount proposed to be raised must not exceed the sum granted in the Committee of Supply; and the Chancellor of the Exchequer is bound to satisfy the House, by a detail of the sums granted for the several services, that the amount of these sums will be a sufficient justification, in point of quantity, to the Committee of Ways and Means to adopt such measures and impose such taxes as shall then be recommended. Such resolutions as are agreed to are adopted and embodied in bills, and in due time become law. See SUPPLY, COMMITTEE OF; PARLIAMENT.

WEA'LDEN FORMATION, a series of fresh-water strata belonging to the lower Cretaceous epoch. Having been originally studied in the parts of Kent, Surrey, and Sussex called the Weald, this local name was given to the formation. It has been divided into two series, which do not differ very materially from each other, viz., Weald Clay, 560 feet; Hastings Sand, 740: total, 1300. The Weald Clay consists of blue and brown clay and shale with thin beds of sandstone and shelly limestone. These strata were probably lake or estuary deposits, and contain the remains of the land flora and fauna, often in great abundance. The beds of limestone, called Sussex Marble, are almost entirely composed of a species of *Paludina*, not very different from the common *P. vivipara* of English rivers. The clays are often laminated by thin layers, consisting of immense numbers of the shells of minute *Cyprides*. But the most remarkable animal remains are those of the huge reptiles which lived on the land, tenanted the air, or abounded in the sea, such as the Iguanodon (q. v.), Hylæosaurus (q. v.), Pterodactyl (q. v.), and the numerous species of turtles which have been described from these strata. The vegetable fossils belong chiefly to ferns, and to the gymnospermatous orders of Conifers and Cycads; the fruits of several species of both orders have been found; and in some places, the rolled trunks of *Endogenites* and *Clathraria*, belonging to Cycads, and of different species of coniferous wood, occur in enormous quantities, as at Brook Point, in the Isle of Wight, where the shore at low-water is strewn with them.

The Hastings beds contain more sandstone and less clay than those of the upper Weald Clays. The picturesque scenery of the High Rocks and other places in the neighborhood of Tunbridge, is weathered out of the beds of white sandstone belonging to this period. The remains of the huge Wealden reptiles abound in the sandstones of this division. The Tilgate forest-beds, where Dr. Mantell first found the Iguanodon, and the rocks in the neighborhood of Hastings, are the best known repositories of those remarkable fossils.

The deposition of the Wealden beds was followed by a gradual depression of the land, when these fresh-water deposits were covered by the estuary beds of the newer *Greensand*. The depression continued until the fresh-water and estuary strata formed the bottom of a deep sea, on which were deposited the immense beds of chalk and allied strata which form the bulk of the Cretaceous series. In the process of elevation, these beds have suffered denudation, so that districts which were covered with Cretaceous beds have been cleared of them, and immense valleys have been furrowed through the Chalk, Greensand, and Wealden.

WEALTH. See CAPITAL.

WEA'NING, AND FEEDING IN INFANCY. The propriety of mothers nursing their own children is now so universally acknowledged, that it is the duty of the physician less frequently to urge maternal nursing than to indicate those cases in which it becomes necessary to substitute another mode of rearing the infant. 'Women,' says Dr. Maunsell, 'who labor under any mortal or weakening disease—as phthisis, hæmorrhages, epilepsy—are obviously disqualified from the office of nurse. Some who are in other respects healthy, have breasts incapable of secreting a sufficient supply of milk. In other instances, the breast may perform its functions well, but the nipple may be naturally so small, or may be so completely obliterated by the pressure of tight stays, as not to admit of its being laid hold of by the child. These are actual physical hindrances to nursing. Again, women may, and, in the higher classes, frequently do, possess such extremely sensitive and excitable temperaments, as will render it imprudent for them to suckle their own children. Frightened and excited by every accidental change in the infant's countenance, and inordinately moved by the common agitations of life, such persons are kept in a state of continual fever, which materially interferes with the formation of milk both as to quantity and quality. Women, also, who become mothers for the first time at a late period of life, have seldom the flexibility of disposition or the physical aptitude for the secretion of milk, required to constitute a good nurse.'—*A Treatise on the Management and Diseases of Children*, 4th ed., 1842, pp. 39, 40.

In ordinary cases, the child should be put to the breast as soon

* The name Wayland is from a root signifying art, cunning; from which come Eng. *wile* and (through old Fr.) *guile*. Ang.-Sax. *velan* means to fabricate.

as the latter begins to contain anything; and when the secretion of milk has fairly commenced, it will require no other food until the seventh or eighth month, provided the mother be a good nurse. During the first five or six months, the infant should be put to the breast at regular intervals of about four hours; afterwards, when the teeth are beginning to appear, the child need not suck more than four times in the twenty-four hours, some artificial food being given to it twice during the same period. This at first may consist of soft bread steeped in hot water, with the addition of sugar and cow's milk; and subsequently a little broth, free from salt and vegetables, may be given once a day. The spoon is now the best medium of feeding, as the food should be more solid than could be drawn through the sucking-bottle. The time of weaning should be that indicated by nature, when, by providing the child with teeth, she furnishes it with the means of obtaining its nourishment from substances more solid than milk. If the infant has been gradually accustomed to a diminished supply of maternal and an increase of artificial food, weaning will be a comparatively easy process; and much of that suffering both to parent and child will be spared, which commonly ensues when a sudden change is made. In ordinary cases, the period of weaning varies from the seventh to the twelfth month; sometimes the child is kept at the breast for a much longer period, from the popular idea that lactation prevents pregnancy, but such unnaturally prolonged lactation is usually injurious to both mother and child.

In those cases in which it is inexpedient or impossible for a mother to suckle her own child, the choice of a wet-nurse becomes a subject of much importance. Upon this subject, Dr. Maunsell lays down the following important practical rules: 'The great thing we have to look to is to ascertain that both the woman and her child are in good health; and of this we must endeavor to judge by the following signs: The woman's general appearance and form should be observed, and they ought to be such as betoken a sound constitution. Her skin should be free from eruptions; her tongue clean, and indicating a healthy digestion; her gums and teeth sound and perfect; the breasts should be firm and well formed—not too large or flabby—and with perfect, well-developed nipples. We should see that the milk flows freely, upon slight pressure; and we should allow a little of it to remain in a glass in order that we may judge of its quality. It should be thin, and of a bluish-white color; sweet to the taste; and when allowed to stand, should throw up a considerable quantity of cream. A nurse should not be old, but it is better that she should have had one or two children before, as she will then be likely to have more milk, and may be supposed to have acquired experience in the management of infants. Having examined the mother, we must next turn to the child, which should be well nourished, clean and free from eruptions, especially on the head and buttocks. We should also carefully examine its mouth, to ascertain that it is free from sores or aphthæ. If both woman and child bear such an examination, we may with tolerable security pronounce the former to be likely to prove a good nurse.'—*Op. cit.*, pp. 44, 45. In one respect, we differ from this eminent physician. He holds that 'the more recently the nurse's own confinement has taken place, provided she has recovered from its effects, the better.' Supposing a nurse is required for a new born infant, this rule holds good; but provided a nurse is required for an infant of three or four months old (for example), it is preferable to obtain a nurse whose milk is of that age. We believe it to be a general physiological law that the age of the milk should correspond to the age of the infant; that is to say, that an infant taken at any given age from its mother, before the normal period of weaning, should be provided with a nurse who was confined about the same time as its own mother.

A wet-nurse should be very much preferred to any kind of *artificial feeding;* but peculiar cases may occur in which it is impossible to procure a nurse; or an infant whose mother is incapable of nourishing it may be the subject of a disease that may be transmitted through the infant to the nurse. In these cases, a food must be provided as nearly as possible resembling the natural food; and this is naturally sought for among the food of animals. The milk of the cow is most commonly used, in consequence of its being the most easily obtained; but ass's milk more nearly resembles human milk, as is shown from the following comparative analyses by Professor Playfair:

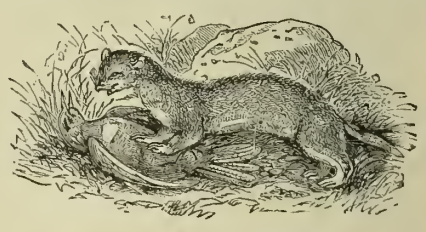
	Woman.	Cow.	Ass.
Casein	1·5	4·0	1·9
Butter	4·4	4·6	1·3
Sugar	5·7	3·8	6·3
Ashes	0·5	0·6	...
Water	88·0	89·0	90·5

The most important difference between cow's milk and woman's milk is the great excess of casein in the former. The former fluid may, however, be made to resemble the latter in composition in either of the following ways: (1) On gently heating cow's milk, a membrane of casein forms on the surface; by removing two or three of these membranes as they form, we can reduce the quantity of casein to the desired extent; or (2) we may dilute cow's milk with twice its bulk of pure water, and add a little sugar. This food should be administered at a natural temperature (of about 98°) through a sucking-bottle; and as the child grows older, it will soon be able to take natural cow's milk without inconvenience. The nature and importance of the mixture of milk and farinaceous food known as Liebig's Soup for Children, are described under SOUP.

The rules regarding the times, &c. of feeding are similar to those laid down for suckling. Assuming that the infant, whether brought up at the breast or artificially reared, has been safely weaned, we have to consider what rules should be laid down regarding its food subsequently. For some months after weaning, the food should consist principally of semi-fluid substances, such as milk thickened with baked flour, or pap, to which a little sugar should be added. Light broths may also be administered, especially in the occasional cases in which milk seems to disagree; and bread and butter may be tried in small quantity. We shall conclude this article with the following 'model of a suitable diet for children,' which cannot be too strongly impressed upon the minds of all young mothers. 'A healthy child, of two or three years old, commonly awakes hungry and thirsty at five or six o'clock in the morning, sometimes even earlier. Immediately after awaking, a little bread and sweet milk should be given to it, or (when the child is too young to eat bread) a little bread-pap. The latter should be warm; but in the former case, the bread may be eaten from the hand, and the milk allowed to be drunk cold, as it is well at this meal to furnish no inducement for eating beyond that of hunger. After eating, the child will generally sleep again for an hour or two; and about nine o'clock it should get its second meal, of bread softened in hot water, which latter is to be drained off, and fresh milk and a little sugar added to the bread. Between one and two, the child may have dinner, consisting, at the younger ages, of beef, mutton, or chicken broth (deprived of all fat), and bread. When a sufficient number of teeth are developed to admit of chewing being performed, a little animal food, as chicken, roast, or broiled mutton, or beef, not too much dressed, should be allowed, with a potato or bread, and some fresh, well-dressed vegetable, as turnips or cauliflower. After dinner, some drink will be requisite; and a healthy child requires, and indeed wishes for nothing but water.

Light, fresh table-beer would not be injurious to a child of four or five years old, but it is unnecessary. Between six and seven o'clock, the child may have its last meal of bread steeped in water, &c., as at nine o'clock in the morning. A healthy child which has been in the open air during the greater part of the day, will be ready for bed shortly after this last supply, and will require nothing more till next morning. Similar regimen and hours may be adopted throughout the whole period of childhood; only as the fourth or fifth year approaches, giving, for breakfast and supper, bread and milk without water, and either warm or cold, according to the weather or the child's inclination. The supply of food upon first awakening in the morning may also be gradually discontinued, and breakfast be given somewhat earlier.' —*Op. cit.*, pp. 80, 81.

WEA'SEL (*Mustela*), a genus of quadrupeds of the family *Mustelidæ* (q. v.), having a very elongated body; short feet, with toes quite separate, and sharp claws; four molar teeth on each side above, and five below. The COMMON W. (*M. vulgaris*) is a native of almost all the temperate and cold parts of the northern hemisphere, except the most arctic regions. Its range does not extend quite so far north as that of the ermine. It is the smallest



Weasel (*Mustela vulgaris*).

of the *Mustelidæ* of the Old World, not exceeding two inches and a half in height, and seven inches and a half in length, from nose to tail; the tail about two inches and a half long, and terminating in a point, not so bushy as that of the stoat or ermine. The female is smaller than the male. The head is large; the ears short, broad, and rounded, the whiskers long.

The color is reddish brown on the upper parts, sides, legs, and tail; the throat and belly white. The eyes are small, round, and black, with a very keen expression, to which the whole habits of the animal correspond. It is nimble and active, bold, and yet wary. It may often be seen peeping curiously from a hole in a

wall, but vainly does the schoolboy attempt to strike it with a stone. Catching it is out of the question for him, and so far well, for it is ready to bite severely. It is a most persevering hunter, its scent as keen as its sight, quarters the ground like a dog, and wearies out animals larger and apparently much stronger than itself. It preys on mice, rats, voles, small birds, and other small animals, sometimes even on hares and rabbits, robs birds' nests, devouring the young birds or sucking the eggs, and is occasionally troublesome in poultry-yards, killing young chickens. It climbs walls and trees with great agility, and does not hesitate to plunge into water in pursuit of the water-rat. It sometimes begins by abstracting the blood of the animal which it has killed, and generally devours the brain; but when food is abundant, it carries the body to its retreat, where a considerable quantity of prey is often found, the W. preferring to eat it in a half-putrefied state. The W. generally sleeps during the day, and is most active at night. It has a disagreeable smell, which is strongest in hot weather, or when it has been pursued or irritated. It is capable of being tamed when taken young, and becomes docile and gentle. The female W. makes a nest of straw-leaves and moss for her young, which are produced in spring, four or five in a litter; often in a crevice of a bank, or in a hollow tree. The fur of the W. is an article of commerce in some northern countries, and W.-skins are exported in considerable quantity from Siberia to China. The W. sometimes, but rarely, becomes white in winter, like the ermine. —The Ermine (q. v.), or Stoat, is another species of weasel.— America has several species of W., of which one (*M. pusilla*) is rather smaller than the Common W. of Europe, and has a shorter tail. It is abundant in the northern parts of the United States, and its range extends far to the north. In the United States, it remains brown all winter; but in the fur-countries it becomes white.

WEA'THER is the condition of the atmosphere at any time in respect of heat, moisture, wind, rain, cloud, and electricity; and a change of weather implies a change in one or more of these elements. From the direct bearing weather-changes have on human interests, they have from the earliest times been closely watched, so that the causes by which they are brought about may be discovered, and their approach predicted with some confidence. The craving in the public mind for this knowledge is strongly attested by the weather prognostics of every language, which, with much that is shrewd and of considerable value, embrace more that is vague, and not a little positively absurd.

It is not necessary here to refer to Moore, Zadkiel, and other almanac-makers of that class, except as proving by their mere existence a wide-spread ignorance of even the most palpable elements of physical law. Prognosticators of higher pretensions repeatedly appear before the public, and it is curious to note how their predictions are laid hold of by the newspapers, and scattered broadcast over the country. Among this class was Mathieu de la Drome, whose predictions of storms and rains made so much noise that the Emperor Napoleon requested the celebrated Leverrier to examine the grounds on which his predictions were founded. The exposure was complete. One of his principal predictions was based entirely on a high *average* of the rainfall at a particular season. On examining the rainfall of the particular years from which the average had been taken, it was found that the excess was entirely due to an unprecedentedly heavy rain which occurred in one of the years at that season. One of the most remarkable predictions of recent times was made by an Irish nobleman in reference to September 1865, which turned out to be in accordance with the prediction—dry, warm, and fine, beyond precedent for that month. The celebrity of this prediction has, however, been greatly reduced by other predictions made since, which the event did not verify.

The changes of the moon were long, and in many minds still are regarded as supplying the elements of prediction. In order to test the real value of the moon's changes on the weather, the Greenwich observations of 50 years were carefully examined, and it was found that the number of instances in which the weather was in accordance with the prognostication was one instance less than those in which the weather was different. When brought to the test of accurate examination and figures, the theory of the moon's changes on the coming weather is by this, as well as by similar investigations of old records of the weather, proved to be a delusion; but since most people have a bias towards forgetting the unsuccessful and remembering the successful prognostications, the theory may continue to be accepted, until a sounder knowledge of the natural laws are more generally diffused.

For some years, Mr. Thomas du Boulay predicted the general character of the weather of each summer from the weather-conditions which prevailed during the week of the spring equinox preceding, supposing that the general character of the weather of the next six months is already settled, and that it only requires the necessary skill to read its features, since these will remain generally constant till autumn. For a few years, he speculated in grain on the faith of the predictions, which turned out pretty correct. Latterly, however, his predictions were not verified.

The truth is, that no prediction of the weather can be made, in the British Islands at least, for more than about two days beforehand. Any attempt at a longer prediction is illusory. We would here refer to the article STORMS, as showing the possibility and mode of making real predictions of the weather. Almost all the weather-changes of Europe begin from westward, and pass over Great Britain, following a generally easterly course. Unsettled or bad weather is accompanied with a low barometer; elsewhere, the barometer is higher. Suppose that, from weather-telegrams received, it is seen that everywhere in Europe barometers are high, no storm is imminent and generally none is likely to happen for about two days at least. But if, on the following morning, barometers begin to fall a little in the west of Ireland, and an easterly wind begins to blow over Great Britain and Norway, and a south-east wind over France; then, seeing the winds blow towards the lowest barometer, or rather a little towards the right of it, the presumption is that a storm of greater or less severity is coming up, the center of which is likely to pass over England. This ought, therefore, to be closely watched; and if the winds keep in nearly the same direction, or veering slowly towards the south and west, increase in force, and barometers in the west of Ireland fall rapidly, a great storm is portended, of the approach of which warning should be at once issued. But if, on the contrary, the winds do not increase in force, and the barometer fall only slightly, or cease to fall, the storm has either passed considerably to the north of the British Islands, or its approach will be delayed for some time; and hence no immediate warning may be necessary.

It is our proximity to the Atlantic that makes it impossible to predict the weather beyond two days at the utmost. In Norway and the Baltic, and places toward the east of Europe, the weather may be predicted for a longer time owing to the more easterly situation of these places. In America also, where storms advance chiefly from west to east, gales and unsettled weather are predicted to places on the seaboard in the east some days before.

The collecting of this information by the telegraph is a work which, owing to the expense, governments only can accomplish; and from its public importance, it is an incumbent duty which they should discharge for the benefit of the seafaring and agricultural population. A good deal may, however, be done by each one for himself, by observing his barometer, the winds, and the face of the sky—especially the cirrus cloud—the most elevated and delicate of the clouds. But ere these simple observations can be turned to account, and made the basis of an intelligent prediction, some knowledge of the general features of Storms (q. v.) is indispensable. These specially—(1) Storms have a circular area; and (2) advance in an easterly direction, bearing a low barometric pressure with them. (3) Winds blow from a high to a low barometer, the observer, standing with his back to the wind, having always the low barometer to his left in the northern hemisphere, and (4) with a force proportioned to the difference of the pressure, or to the steepness of the barometric gradient. (5) Storms are first noticed in the upper regions of the atmosphere, or in the region of the cirrus cloud. (6) In front of the storm the air is warm and humid; in the rear of it, cold, or cool and dry. With such observations, requiring only a barometer intelligently interpreted, particularly if hills form part of the landscape, the character of the weather may be foreseen for one day, or even on occasions longer.

To the agriculturist and horticulturist, not high winds but hails, heavy rains, frosts, and fine weather are what are required to be known. Such forecasts have been issued for some time by General Myer in the United States, were also begun in France by Leverrier shortly before his lamented death, and are gradually being introduced over the continent of Europe, with great advantage to those national interests. But though no prediction of the weather for weeks or months beforehand can be made with any pretensions to trustworthiness, yet guesses or surmises may be formed not without some value. All observation goes to prove that predictions based on solar or other astronomical causes are without foundation, and that averages based on terrestrial observations are the only guides in the matter. Of this class are the interruptions which occur in the regular march of temperature in the course of the year. Thus, cold weather generally prevails from the 11th to the 14th of April —that is, the period of the 'borrowing days' (O. S.), and in the second week of May; and these, with some other cold and warm periods,* are almost co-extensive with the northern hemisphere of

* I have examined the temperature of Scotland for a number of years, and have shown (*Jour. of Scot. Meteorolog. Soc.*, Nos. xiii. xiv. xvi.) that the following interruptions occur from year to year, with very rare exceptions, in the annual march of the Scottish temperature:

Six cold periods	1. 7th to 10th February. 2. 11th to 14th April. 3. 9th to 14th May. 4. 29th June to 4th July. 5. 6th to 11th August. 6. 6th to 12th November.
Three warm periods	1. 12th to 15th July. 2. 12th to 15th August. 3. 3d to 9th December.

Buchan's Handy Book of Meteorology.

the globe. Hence, then, at these times, when the weather becomes cold or warm, it may be predicted that such weather will last for several days.

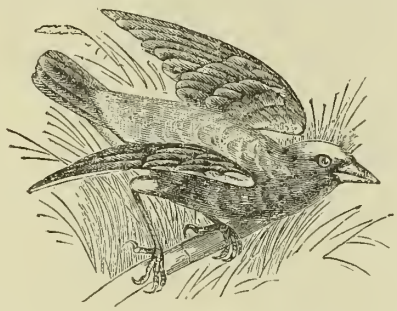
Again, if, after a long-continued prevalence of south-west winds, the north-east wind should set in, it is highly probable that easterly winds will prevail for some time; so that, if the season be winter, a continuance of frost, and perhaps snow, may be looked for; but if midsummer, the weather will become dry, warm, and bracing. But suppose easterly winds have been unusually predominant in autumn, and south-westerly winds begin to prevail in the end of November or the beginning of December, it is most probable that the weather will continue exceptionally mild, with frequent heavy storms of wind and rain, till about Christmas.

A good beginning has been made in India by Mr. Blanford in predicting the character of the monsoon season, it having been shown by him that abnormal distributions of atmospheric pressure which happen to prevail about its commencement, tend to perpetuate themselves during the season. Since the distribution of the rains depends on the distribution of atmospheric pressure, forecasts of the coming monsoon have been issued, which thus proceed from a scientific basis, and the event has shown them to have been remarkably successful. It may be predicted that as systematic observation advances, the power to predict the character of the coming season will be extended to higher latitudes.

WEA'THERING, a slight inclination given to the top of a cornice or moulding, to prevent water from lodging on it.

WEAVER-BIRD (*Ploceus*), a genus of birds of the Finch family (*Fringillidæ*), of a group or sub-family (*Ploceinæ*), to most of which the name Weaver-bird is extended. The name has reference to the remarkable structure of the nests of these birds, which are woven in a very wonderful manner of various vegetable substances, and are objects of great interest.

The *Ploceinæ* are natives of the warmer parts of Asia, of Africa, and of Australia; none being found in Europe nor in America.



Taha Weaver-bird (*Ploceus Taha*).

The species are numerous. They are small birds, with a strong conical bill, the ridge of which is slightly curved, the tip entire. The claws are large and very long. The wings are pointed, the first quill remarkably short. There is great diversity in the form and appearance of the nests constructed by different species. One of the best-known species is the PHILIPPINE WEAVER (*P. Philippinus*), the BAYA (q. v.) of India.—Many of the other weaver-birds construct nests pretty much on the same plan with



Nest of Pensile Weaver-bird.

this—ponches elongated into tubes, entering from below; those of some are kidney-shaped, and the entrance is in the side. They very generally suspend their nests in the same way from the extremities of branches, and often prefer branches which hang over water, probably as affording further security against monkeys, squirrels, snakes, and other enemies. Social habits are very prevalent among them, and many nests of the same species are often found close together. Some of them attach the nest of one year to that of the year preceding, as the *Ploceus pensilis* of Madagascar, which sometimes thus makes five nests in succession, one hanging to another.

Some of the African species build their nests in company, the whole forming one structure. Thus, the SOCIAL or REPUBLICAN W. of South Africa (*Ploceus socius* or *Philotærus lepidus*) constructs a kind of umbrella-like roof, under which 800 or 1000 nests have been found, the nests like the cells of a honeycomb, and arranged with wonderful regularity. An acacia with straight smooth stem such as predaceous animals cannot easily climb, is often selected by the bird-community. When the situation is chosen, the birds begin by constructing the roof, which is made of coarse grass; each pair afterwards building their own nest, which is attached to the roof. As new nests are built every year, the weight of the structure often becomes so great as to break down its support.—*Textor erythrorhynchus* is a bird of the W. group, which is common monly seen in South Africa accompanying herds of buffaloes, and feeding on the bots and other insects which infest them, alighting on their backs to pick them out of the hide. The bird is often of great use to the buffalo in another way, by giving warning of the approach of an enemy.—The Whydaw Birds (q. v.), or Widow Birds, likewise belong to the group of *Ploceinæ*.

WEAVING, the art by which threads or yarns of any substance are interlaced so as to form a continuous web. It is perhaps the most ancient of the manufacturing arts, for clothing was always a first necessity of mankind. The methods by which weaving is now accomplished have been explained and illustrated under LOOM (q. v.); it therefore only remains to describe the variations which may be effected by ingenious applications of the powers of the loom; and as these are almost endless, some of the more common and easily understood will be chosen.

The simplest form of weaving is that employed in making the mats of uncivilized nations. These consist of single untwisted fibres, usually vegetable, arranged side by side to the width required, and of the length of the fibres themselves, which are tied at each end to a stick, which is so fixed as to keep the fibres straight, and on the same plane, as in fig. 1. Then the weaver

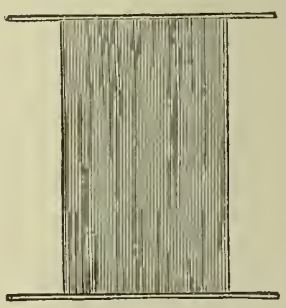


Fig. 1.

lifts up every other of these longitudinal threads, and passes under it a transverse one, which he first attaches by tying or twisting to the outermost fibre of the side he commences with, and afterwards in the same way to that on the other side, when it has passed through the whole series. The acquisition of the art of spinning threads of any length enables more advanced nations to give great length to the warp, or series of threads which are first arranged, and to pass the weft or transverse thread backwards and forwards by means of a shuttle, without the necessity of fixing at the sides. The mechanical appliances already described under LOOM aid these operations to an amazing extent. That kind of weaving which consists of passing the weft alternately over and under each thread of the warp is called *plain* weaving, and a transverse section of the web would be represented by fig. 2; but if the



Fig. 2.

weaver takes up first one and then two threads alternately of the warp series, and passes the weft under them for the first shoot of his shuttle, and raises those which were left down before for



Fig. 3.

the second shoot, he produces a cloth with a very different appearance, called TWILL (q. v.), many varieties of which may be produced by varying the numbers missed or taken up—as, for example, one and three, instead of one and two. The simple form of twill, viewed transversely, would be represented by fig.

There are few arts which require more patience or skill than weaving. As many as from one to two thousand threads often constitute the warp; and these threads may be so varied in quality (see YARN) as to produce many varieties of fabric. From that cause alone, there are almost infinite variations. Many may be produced by the order in which the threads are lifted for the passage of the weft—that of itself can also vary as much or more in its quality and other circumstances, so that the inventive genius of the weaver finds incessant opportunities for its display, and nice arithmetical calculations are required in estimating and allotting the numerous threads to the endless variety of patterns which are constantly passing through the looms. A really practical knowledge of weaving can only be obtained by working with looms, and studying such technical treatises as Watson's *Theory and Practice of the Art of Weaving*, and some of the elaborate treatises by the French weavers. There is no branch of manufacture in which inventions and improvements are more rapidly succeeding each other than in weaving; but, as a rule, they are of minor importance, and rarely affect the general principles of the process. In 1867, however, the novelty of *Convex* weaving by machinery was introduced, and although only at present applied to ladies' stays, seems to promise a wide application to clothing generally, and many other purposes.

Out of the numerous attempts that have been made during the last ten years to weave by machinery a convex surface, such as is required in several articles of clothing, hardly one, up to the present time, has succeeded. This failure has been owing partly to deficiencies in the various inventions of this kind, and partly to the costliness of carrying them out. At last, after long and patient trials, a patent convex weaving-loom has been invented that not only answers all the purposes of the hand-loom, hitherto exclusively used, but also possesses the advantage, which is absolutely necessary in a country where labor is scarce, of doing ten times the amount of work in the same space of time. With the hand-loom, one man can make, at the very utmost, only four pair of stays in a day, whereas the new-invented convex weaving-machine turns out 40 pair daily. The superior lightness and flexibility of woven stays, and their perfect freedom from hard seams, have increased to a very large extent the demand for this class of goods. Up to the present moment, hand-labor alone has been employed in France and Würtemberg, two countries where they have been most extensively manufactured. In the United States, however, where the high wages for hand-labor have necessitated the most extensive use of machinery, this system could not be adopted with any possibility of pecuniary success; and, in consequence of this fact, a loom for weaving of stays and other convex goods had to be invented. This loom, which was constructed under the superintendence of M. Opper, for the Convex Weaving Company in New York, does the work automatically and to perfection.

The principle of a constant length of travel for the shuttle was adopted for the sake of simplicity; but, as it is necessary, in weaving the gores, that the weft-thread should pass through only a part of the breadth of the warp, the Jacquard has been employed for the purpose of taking up the portion of the warp required to be woven in that part. It is impossible by mere verbal description to give any adequate notion of this ingenious machine without seeing it in operation.

WEBER, CARL MARIA VON, a musical composer of high eminence, was born at Eutin in Holstein, 18th December 1786. Musical and dramatic talent had been hereditary in his family for some generations: his father, by turns officer in the army of the Palatinate, finance minister of the Elector of Cologne, music-director to the Prince Bishop of Eutin, and head of a company of strolling players, led a somewhat irregular and checkered life. Young W. showed early a genius for music, but his instructors were often changed, in consequence of his father's change of residence. The teachers to whom he owed most were Hauschkel at Hildburghausen, Michael Haydn at Salzburg, and Valesi and Kalcher at Munich. His father's impatience and want of judgment were injurious to him in many ways, particularly in the efforts made to bring him before the public prematurely as a musical prodigy. At the age of 13, he composed an opera called *Die Macht der Liebe und des Weins*. When but 14, his second opera, *Das Waldmähchen*, was brought out, without much success at first; but was afterwards far better received than he himself thought it deserved. The next effort of the young opera-composer was *Peter Schmoll und seine Nachbarn*, composed at Salzburg in 1801, and performed at Vienna with but indifferent success. At Vienna, he became acquainted, in 1803, with Joseph Haydn and the Abbé Vogler, and studied for some time under the latter. In 1804, he left Vienna to be conductor of the Opera at Breslau, and while resident there, composed the greater part of his opera of *Rübezahl*.

We next find him, in 1806, with Prince Eugene of Würtemberg at his court of Carlsruhe in Silesia, where he composed two symphonies and three concertos. In 1807, he went to Stuttgart, as private secretary to Duke Ludwig, becoming also musical instructor to his children; and while there, he composed the opera of *Silvana*, and a cantata called *Der erste Ton*, besides overtures, choral pieces, and pianoforte works. Getting into disfavor and pecuniary embarrassments, the result of his father's recklessness, he was dismissed the court of Würtemberg, and took up his residence successively in Mannheim, Heidelberg, and Darmstadt, at which last place he composed his operetta of *Abu Hassan*. He then made a musical tour through Germany, during which his concerts were everywhere well attended. From 1813 to 1816, he was director of the Opera at Prague, which he entirely remodeled; and during his residence in the Bohemian capital composed *Kampf und Sieg*, and numerous other songs, including that noble national series from Körner's *Leier und Schwert*, which had no little influence in rousing patriotic sentiment during the war of liberation.

In 1817, he was invited to form a German Opera at Dresden; and there, during the remainder of his life, he held the post of *Kapellmeister* to the king of Saxony. To this period belong his most important compositions, including *Preciosa*, *Der Freischütz*. *Euryanthe*, and *Oberon*. None of these works, however, were first brought out in Dresden. The music to Wolff's *Preciosa*, the subject of which is taken from a novel by Cervantes, was first produced on the Berlin stage, where it made a powerful impression. The author's *chef-d'œuvre*, the opera of *Freischütz*, the libretto of which was written by the composer's friend, Friedrich Kind, also first saw the light in the Prussian capital in 1822. It was a great success: its novelty and beauty, as well as the deep thought contained in it, excited an extraordinary sensation throughout Germany, which soon extended to France and England. *Euryanthe*, produced in Vienna in 1823, was not quite so warmly received. Bearing more the impress of labor and cultivation, and less that of the composer's natural vein of romance, it has never been in such general favor as its predecessor. *Oberon* was written in prospect of a visit to London to a libretto supplied by Mr. Planché. When W. set out for England, he was already struggling against mortal disease. On the 8th March 1826, he appeared at Covent Garden Theater as conductor of a selection from *Freischütz;* and on the 12th of April following, he also conducted, on the first appearance of *Oberon*, with applause on both occasions, incessant and uproarious. At his benefit concert on the 26th of May, he was hardly able to go through the duty of conductor; and on the 5th of June he was found dead in bed in the house of Sir George Smart, whose guest he was. He was interred in the Roman Catholic Church, Moorfields; but in 1844, his body was removed to Dresden; and a statue of him by Reichel was erected in 1860 in front of the Dresden theater. W. was married in 1818 to Carolina Brandt, an operatic singer of some note, daughter of Brandt the violinist, by whom he left a family.

The verdict of posterity, as well as of his contemporaries, has placed W. in the first rank of musical composers. He was the first to use those bold effects of harmony and modulation whose introduction forms an era in the history of music. In his operas, the spirit of the romantic school appears in its brightest and most captivating form; and the overtures are masterpieces of imagination, each presenting an outline of the work to which it belongs. Besides the above operas and songs, his musical works are numerous, comprising concertos for the pianoforte, clarionet, oboe, bassoon, and violoncello—symphonies and overtures, one of the most beautiful and characteristic of them being the overture to the *Beherrscher der Geister*. Among his posthumous writings is an Autobiography. His Life has been written by his son, Baron Max Maria von Weber, 1864 (transl. by Simson). See also Jähn's *W.* (1873); and *Weber*, by Sir Julius Benedict (London, 1880).

WEBSTER, DANIEL, American statesman and jurist, was born at Salisbury, New Hamphire, January 18, 1782, the second son of Ebenezer Webster, a small farmer, and justice of the county court. He entered Dartmouth College in 1797, and taught school in winter to pay his expenses, and aid his brother, Ezekiel, who became a distinguished lawyer, in fitting for college. On graduating in 1801, he commenced to study law, but was induced, by the offer of a salary of 350 dollars a year, to become preceptor of an academy at Fryburg, Maine, paying his board by copying deeds. In 1804, he went to Boston, and entered the law office of Mr. Gore, refusing an appointment of clerk of the court of which his father was a judge, at 1500 dollars a year.

In 1805, having been admitted to the Boston bar, he established himself at Portsmouth, New Hampshire; married in 1808; and having engaged in politics as a member of the Federalist party, was elected to Congress, where he immediately took rank with the foremost men of the country. His speech on the Berlin and Milan Decrees, and his mastery of the questions of currency and finance, gave him a high position; but he determined, in 1816, to remove to Boston, where, leaving politics, he engaged for several years in legal practice of the most extensive and varied character. In 1822, he was a member of the Massachusetts Constitutional Convention; and December 22, 1822, he pronounced at Plymouth,

on the anniversary of the landing of the Pilgrims, the first of that remarkable series of discourses, or orations, which gave him the first rank among American orators. In 1825, he gave an oration at the laying of the corner-stone of the Bunker Hill Monument; in 1843, one on its completion. In 1826, he pronounced the eulogy of John Adams and Thomas Jefferson, two fathers and Presidents of the American republic, who died on the same semi-centenary anniversary of the Declaration of Independence; and in 1851, a patriotic discourse on the laying of the corner-stone for the extension of the Capitol at Washington. In 1822, he was elected to Congress from Boston, and was distinguished by his speeches on the Holy Alliance and the Greek revolution, and his labors in the revision of the criminal laws of the United States. In 1826, he was chosen senator; and in 1830, rose to the height of his forensic renown in a speech of two days, in the debate with Mr. Hayne, of South Carolina, on the right of 'nullification.'

W. and Clay were the leaders of the opposition during the administrations of Jackson and Van Buren. In 1839, he visited England, Scotland, and France; and in 1841, accepted the post of Secretary of State in the cabinet of General Harrison, and remained in that of Mr. Tyler, who, as Vice-president, succeeded on the death of the President, until 1843. In 1844, he aspired to the presidency, but the choice of his party fell upon Mr. Clay, whom he supported, but unsuccessfully. He was chosen senator for Massachusetts, and again, in 1848, was disappointed of the presidential nomination by the popular enthusiasm for the victor of Buena Vista, General Taylor. His senatorial efforts at this period were directed to the preservation of the Union by the advocacy of compromises on the slavery question, and he gave offence to the Abolitionists by defending the Fugitive Slave Law. In 1850, he became again Secretary of State in the cabinet of Mr. Fillmore; and in 1852 was once more, and no doubt grievously, disappointed at not receiving the nomination to the presidency, which was given to General Scott. He did not live to see the defeat of his rival; but, after a brief illness, died at his country residence at Marshfield, Massachusetts, October 24, 1852. Mr. W. was a man of very striking appearance, large, swarthy, with deep-set eyes, a deep powerful voice, and a solemn and earnest manner. His collected writings and speeches have been published (6 vols. 8vo, 1851), and his Correspondence (2 vols. 8vo, 1855).

WEBSTER, NOAH, American author and philologist, was born at Hartford, Connecticut, October 16, 1758, and entered Yale College in 1774. In his third college year, he served under his father, a militia captain, in the war of the Revolution. He was admitted to the bar in 1781, but engaged in scholastic and literary occupations. Employed in teaching a school at Goshen, New York, he prepared his *Grammatical Institutes of the English Language*, published in three parts; and edited *Governor Winthrop's Journal*. In 1785, he wrote *Sketches of American Policy*, advocating the formation of a new constitution, and gave public lectures on the English language, which were published in 1789. He taught an academy in Philadelphia, and wrote on the Constitution; and in 1788, published the *American Magazine* in New York. After a few years' law practice at Hartford, he engaged, in 1793, in the editorship of the *Minerva*, a Federalist daily paper in New York. In 1799, he published *A Brief History of Epidemic and Pestilential Diseases*, the yellow fever having broken out in New York; and pamphlets on International Law, Banking, and Finance. In 1807, he published *A Philosophical and Practical Grammar of the English Language*, and commenced his *American Dictionary of the English Language;* but finding difficulties in etymology, he devoted ten years to its study, and prepared a *Synopsis of Words in Twenty Languages;* then began his Dictionary anew, and in seven years completed it. In 1824, he came to Europe, to consult books and learned men, spending some months at Paris and at Cambridge. In 1828, an edition of 2500 copies of his Dictionary, in 2 vols. 4to, was issued; followed by one of 3000 copies in England. Numerous abridgments have been made, which found a large sale. His *Elementary Spelling-book*, founded on his *Institutes*, up to 1862, had been sold to the extent of 41,000,000 copies.

A new and thoroughly revised and enlarged edition of his dictionary was finished in 1866, and it is now perhaps the most complete dictionary of the English language yet published. Mr. W. also published a popular *History of the United States*, and a *Manual of Useful Studies*. He was a judge, a member of the state legislature, and one of the founders of Amherst College. He died May 28, 1843. See Life by Scudder (1882).

WEDGE, one of the mechanical powers, and in principle a modification of the inclined plane. Its normal form is here represented. The power is applied by pressure, or more generally by percussion, to the back B, thus forcing the edge A forwards. The wedge is employed for such purposes as the splitting of wood, the fastening firmly of the handle of an axe, the raising of a ship in a dry dock, &c. The investigation on statical principles of the mechanical advantage of the wedge is extremely unsatisfactory, the power, which is scarcely ever a 'pressure,' being always assumed to be one, and the enormous friction on the sides of the wedge being generally neglected; the theoretical result thus arrived at is that the pressure applied at the back: the resistance or weight : : ½ width of back of wedge: length of side. In the application of the wedge to the splitting of wood in the direction of the fibres, the split generally extends some distance in advance of the edge of the wedge, and the action of the latter is then a combination of the action of the wedge with that of the lever; in fact, this compound action is found more or less in all applications of the wedge as a cutting or splitting weapon, and tends further to complicate the statical investigation of its mechanical properties. The best and simplest illustrations of the single wedge are axes, nails, plugs, planes, chisels, needles, and all sharp-pointed instruments.



WEDGWOOD, JOSIAH, the creator of British pottery as an art, was born at Burslem, in Staffordshire, in the year 1730. His father was a potter, and very early he was set to work at the same business. His education seems to have been of the scantiest. After an abortive attempt to settle himself at Stoke with a partner named Harrison, he returned to his native place, and there commenced business as a potter. From the first, his ardor for the improvement of the manufacture was conspicuous. His first efforts were directed to the refining of the material, and soon he succeeded in producing a beautiful cream-colored porcelain, which became popularly known as Queen's Ware, Queen Charlotte having much admired it, and extended her patronage to the manufacturer. Subsequently, other improved materials were produced. The attention of W. was not less assiduously directed to considerations of form and decoration; he busied himself in emulating the grace of the antique models; and the celebrated sculptor, Flaxman, was employed to furnish designs to him. In this way, what he found a rude and barbarous manufacture, he raised to the level of a fine art; and he found his reward in the speedy amassing of an immense fortune. In 1771, he removed his works some little way from Burslem; and to the new site he gave the fanciful name Etruria, as that of the country of old most celebrated for the beauty of its ceramic products. Here he built himself a splendid mansion; and here, in 1795, he died.

Apart from his eminence in the art to which he mainly devoted himself, W. was a man of considerable culture. Natural Philosophy, in particular, he studied with much success. He was a fellow of the Royal Society, as also of the Society of Antiquaries; and to the *Philosophical Transactions* he from time to time contributed papers. He likewise interested himself deeply in all matters of public concernment; and mainly through his influence it was that the Grand Trunk Canal, uniting the waters of the Mersey, the Trent, and the Severn, was carried out. He was a man of much benevolence of character, and the prosperity which flowed upon him through life, he distinguished by the exercise of an almost princely liberality.

Full particulars as regards this remarkable man may be found in two lives of him published in 1865, one by Eliza Meteyard, the other by Llewellyn Jewett. See also Eliza Meteyard's *Memorials of Wedgwood* (1875), and *Wedgwood Handbook* (1875).

WE'DGWOOD WARE, a beautiful kind of pottery invented by Josiah Wedgwood in 1775. It consists of flint, Potter's clay, carbonate and sulphate of barytes, and zaffre, or some other coloring material. It is also called Jasper Ware. The beautiful classical designs on the earliest productions of this manufacture were many of them executed by Flaxman, and are very highly valued.

WE'DNESBURY, a market-town in the south of Staffordshire, in a district abounding in canals, coal mines, and iron-works, 7½ miles north-west of Birmingham by railway. It was called Weadesbury by the Saxons, and for a long time took precedence, in point of population and historical importance, of Birmingham and Wolverhampton. It was here that the great coal-field of Staffordshire was first worked. W. contains large works for the manufacture of railway plant; it produces also edge-tools, coach ironmongery, locks, screws, gun-locks and barrels, gas and water pipes. The town has been greatly improved by a Local Board of Health, appointed in 1865. By the Reform Act of 1867, W.—comprising also Bromwich and Tipton—was erected into a parliamentary borough, returning one member. Pop. (1871) of town, 25,030; (1881) 24,564; (1871) of parliamentary borough, 116,809; (1881) 124,438.

WE'DNESDAY, the fourth day of the week, the *Dies Mercurii* of the Romans, the *Mittwoch* (mid-week) of the modern Germans. The name Wednesday is derived from the northern mythology, and signifies Woden's or Odin's day. The Anglo-Saxon form was *Wôdanes dag*, the old German *Wuotanes tac*. The Swedish and Danish is *Onsdag*.

WEE'BO, or IBO, a small island off the coast of Mozambique, belonging to the Portuguese, about 150 miles south of Cape Delgado. The town is clean, with neatly-built houses; there are three forts, one of which serves as barracks for the garrison, and, though contemptible as a defensive work against a well-organized enemy, it is well adapted for resisting the natives, between whom and the Portuguese all along the Mozambique coast, there seems to be perpetual hostility. The pop. consists of nearly 3000 natives and a few Europeans; and though an important trade in ivory, copal, &c., is said to be carried on, there are few signs of activity in the harbor, and the natives for the most part seem miserable, fever-stricken wretches.

WEED, THURLOW, American journalist, was born at Cairo, New York, November 15, 1797, and at the age of 10 years was cabin-boy on a sloop on the Hudson River; at 12 he was an apprentice in the printing-office of Mr. Croswell, at Cattskill; then lived for a short time in a backwoods settlement, but at 14 returned to printing. He was a volunteer in the war of 1812, and at the age of 21 established a newspaper in Western New York, and during the anti-Masonic excitement, was elected to the state legislature, 1826—1827, where his peculiar and almost unrivaled abilities as a political manager or 'wire-puller' were early recognized. In 1830 he settled at Albany, the state capital, and commenced the publication of the *Evening Journal*, an anti-Jackson, whig, or republican paper, which became the organ of the party, and of the state government when its party was in power. Declining all offices for himself, except the profitable one of state printer, he is supposed to have exercised almost supreme influence in nominations and appointments, and to have secured the choice of Presidents Harrison and Taylor; was through his whole career, the friend and adviser of Mr. Seward. In 1861, he was sent in a semi-diplomatic capacity to Europe, and on his return was presented with the freedom of the city of New York, where he became part proprietor and one of the editors of the *New York Times*, and subsequently editor of the *Commercial Advertiser*. In 1866, he published *Letters from Europe and the West Indies*.

WEED (*Lymphangeitis*), or a Shot of Grease, consists in inflammation of the large absorbent glands and vessels situated between the horse's thighs. Rarely, it attacks the corresponding structures between the fore-limbs. It occurs in round-limbed, indifferently bred, hard-wrought horses; appears particularly after a day or two of rest, after exposure to cold, or during imperfect action of the bowels; and is said to depend upon more blood being produced than is required to replace the natural waste of the body. It is identified by lameness, tenderness in the groin, and fever. The horse must be bled, have a full dose of aloes, and when the pain and tenderness are great, ten drops of Fleming's Tincture of Aconite in water every two hours; the limb should be bathed for at least six or eight hours continuously in hot water, and then rubbed dry and kept warm. The subsequent swelling will be reduced by saline draughts, diuretics, rubbing of the limb, and exercise.

WEEDS, the name given to all those plants which grow wild in cultivated grounds, and injure the crops; which they do both by choking them, and by exhausting the soil. Those weeds which are annuals or biennials, as charlock, yellow rattle, and melilot, may gradually be got quit of by merely cultivating, for a succession of years, such plants as are to be cut before the seeds of the weeds are fully ripe. Perennial weeds, such as couch grass, can only be removed from the ground by repeated and careful tilling; and for this purpose, crops which require much hoeing are advantageously planted, and recourse is had to summer fallowing in fields, and frequent weeding in gardens.

Thistles and other large weeds are frequently pulled in cornfields before the corn comes into ear, and to prevent their seeding, they are cut in pastures. Sedges and rushes, which spring up in great abundance in damp grounds, disappear on thorough draining. Leafy crops which thickly cover the soil, prevent the growth of many weeds by the exclusion of air and light. Weeds which have been rooted up form excellent compost for manure. Those which make their appearance in fallow grounds, serve for green manuring when they are ploughed down.

WEEK (Goth. *Vico;* Old High-German, *Wehha* = order, cycle (?); Latin, *Vicis;* Gr. *Hebdomas, Sabbaton;* Heb. *Shabna*, from *Sheba*, seven) designates generally a period of seven days. It was probably first instituted as a kind of broad subdivision of the periodical month, corresponding to the four quarters of the moon, or about 7¾ days. Although found as a civil institution among some nations at the earliest time—e. g., with the Hindus, Assyrians, Persians, &c., it is only with the Jews that we see a religious signification given to the concluding or seventh day of that period itself. Both their cosmogony and legislation are connected with it. The Sabbath (q. v.) is emphatically the day of rest, while seven weeks after the Passover, the Pentecost or Feast of Weeks takes place, &c. (see SEVEN). It is doubtful whether it was through the Jews that this computation of weeks was introduced to the Egyptians, but it is certain that the latter at an early period counted seven periodical days, naming them according to the seven planets then assumed. The application of the names of the planets to the days of the week in the order they now stand, originated in this way: It was an astrological notion that each planet in order presided over an hour of the day, the order, according to their distances from the earth, being, on the geocentric system, Saturn, Jupiter, Mars, the sun, Venus, Mercury, the moon.

Assuming Saturn to preside over the first hour of Saturday, and assigning to each succeeding hour a planet in order, the 22d hour will fall again to Saturn, the 23d to Jupiter, the 24th to Mars, and the first hour of the next day to the sun; in the same way, the first hour of the following day falls to the moon, and so on. From Alexandria, this seven days' week was imported, together with the names of the individual days, to the Greeks—who previously divided their months into three decades—and to the Romans, about the time of Christ. Rome had previously counted her periods by eight days, the eighth day itself being originally called *Nundinæ*—a term later applied to the whole cycle—as returning *nono quoque die*, when the country-people were in the habit of coming to town for the purposes of business, and chiefly to inquire after public news, the changes in government and legislation, vacant places, and the rest. But the seven days' cycle soon found great favor among the Romans, owing partly, perhaps, to the spread of Egyptian astrology, although the change was not officially introduced before Constantine. It is certain that the Jewish name Sabbath came into use in Rome, and from Rome it spread to all the Romanic languages, even into the German. It survives in the Italian *Sabbato*, the Spanish *Sabado*, the French *Samedi* (*Sabbati dies*), and the German *Sambaztac*, which afterwards became *Samstag*. In the same manner, the Latin *Septimana* (the Greek *hebdomas*) has become the modern designation for week in the Italian *Settimana*, Span. *Semana*, French *Semaine*, and even in the Irish *Sechtmaine*. The *Codex Theodosianus* is the first document which adopts the term *Septimana* in the meaning of weeks.

The Jews, as well as the early Christians, had no special names for the single days, but counted their number from the previous Sabbath, beginning with Sunday, as the first after the Sabbath, and ending with Friday, as the sixth after the previous, or eve (*Ereb*) of the next Sabbath. After a very short time, however, young Christianity, which in the same manner had endeavored to count from the *feria secunda*, or second day after Sunday, to the *Septima* (or Saturday), had to fall back again upon the old heathen names, previously introduced in Gaul, Germany, &c. by the heathen Romans. The Sunday, or *dies Solis*, alone was changed in many of the Romanic languages in accordance with the new creed. It was called *Kyriake*, *dies Dominicus* or *Dominica*, the Day of the Lord, a term which in Italian became *Domenica*, in Spanish *Domingo*, and *Dimanche* in French. The Germanic *Frôntac* (from *frôn* = *dominicus*) occurs but once. It is very curious to notice how the names of the five days of the week which followed those named after the sun and moon, became Germanized, as it were, or the names of the originally imported gods translated into those of the Germanic divinities. Thus, the day of Mars became that of Ziu (see TYR). Mercury became Wodan; and the fourth day was called after the latter, in Dutch, English, and Scandinavian; while in Germany it was simply called the middle of the week = *Mittwoch*. The day of Jupiter became the day of Thor = Thursday, *Donnerstag;* while the *Dies Veneris* was transformed into the day of Freya, the wife of Odin (Wodan). The day of Saturnus, retained under this name in some northern tongues, became a *langardage*, or bathing-day, in others; while in Upper Germany it remained a Sunday-eve (*feria ante dominicam*) or *samstag* (see above).

From recent discoveries of Assyriologists, it seems certain that the Assyrians, and through them probably the other Semitic nations, derived their week of seven days from the Accadians or early Turanian inhabitants of Babylonia, who also observed the seventh day as a day of rest. To this remarkable people are also to be traced the planetary names which we still give to the days of the week. The Arabs, like the Jews, count their days (beginning and ending with sunset) by sevens, without giving them planetary names. Greeks, Slavs, and Finns also count their days from Sunday, instead of naming them. The French Revolution altered the seven days' week into a decade of ten days; but the new computation introduced in 1793 was abrogated again in 1805. The 'weeks of years,' in Hebrew prophetical poetry (like the Roman *annorum hebdomadæ*), indicate cycles of seven years.—See Ideler's *Chronologie* (1831); Grimm's *Deutsche Mythologie* (1835); and Lenormant's *La Magie chez les Chaldéens* (1874).

WEEKS, FEAST OF (Gr. *Pentecoste* = fiftieth, Heb. *Shabuoth*, also called Feast of Harvest, Day of the First-fruits, &c.), the second of the three great *Regalim* or Pilgrim Feasts of the Old Testament, was celebrated seven weeks, or forty-nine days, after the Passover. As the latter was the feast of the barley harvest, so the former was that of the wheat-harvest. The first two loaves of the new crop were offered up on the day of the festival—leav-

ened, and containing about 3½ quarts each (the Mishnah speaks of their being 7 inches by 3), together with a peace-offering of two lambs.

Besides this, a great burnt and sin offering—the former consisting of seven lambs, a bullock, two rams, together with the appropriate meat and drink offerings; the latter of one kid—were added, according to Leviticus (xxiii. 18); while Numbers (xxviii. 27) increases the number of the bullocks to two, and only mentions one ram—a number more in accordance with the regulations for the other festive sacrifices. The Jewish tradition, however, considers the animals mentioned in the later passage as an additional sacrifice; and Josephus has indeed added both up, except in as far as the rams are concerned, of which he only gives two. Tradition has given to this feast, which originally was only intended to represent the solemn closing of the harvest, a new significance by making it the anniversary of the Sinaitic Legislation, which indeed must have taken place in the first days of the third month. But the Pentecost, which is always fixed in the Jewish calendar on the 6th of Sivan, could not, before the establishment of astronomical computation, fall always on the same day, but must needs have fallen between the 5th and 7th of that month. Moses himself nowhere fixes the date of this festival as he does with the others. The Karaites, instead of referring the 'morning of [after] the Sabbath' of Lev. (xxiii. 15) to the 16th of Nisan, take it literally, and celebrate the festival always on a Sabbath. The uncertainty of the lunar calculation and observation among the Jews of the Dispersion, caused them also to add one day to this festival—a usage still retained at present. There seems to have been more of the character of a harvest-home inherent in this festival than in the Passover, which partook particularly of the character of a large and solemn family-gathering. For the Christian adoption of this festival, see PENTECOST.

WEEPING TREES are trees with remarkably elongated and pendulous branchlets, generally mere varieties of species which ordinarily have a different habit, as the Weeping Birch, Weeping Ash, and Weeping Willow, which are varieties of the Common Birch, Common Ash, and White or Huntingdon Willow. The Weeping Birch occurs in a wild state in some places in the Highlands of Scotland, and is a characteristic ornament of the landscape. Trees intermediate in their habit between the Weeping



Weeping Birch.

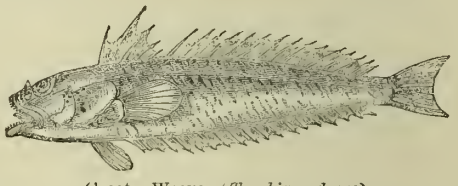
Birch and the common variety are of very frequent occurrence. Weeping trees are much esteemed for ornamental purposes, and are not only very beautiful in themselves, but as a contrast to other trees in lawns and pleasure-grounds. They are therefore carefully propagated in nurseries. The Weeping Ash is often grafted on the Common Ash, but the result is seldom very satisfactory, the art of the gardener forcing itself too much upon attention. A tendency to the weeping habit of elongated and pendulous branchlets is manifested in some kinds of trees, as the tendency to vary into a very opposite habit, with the branchlets drawn up close together (var. *stricta* of botanists), appears in others, of which the Swedish Juniper and the Irish Yew are familiar examples.



Weeping Willow.

WEERT, an unwalled town in the Netherlands, province of Limburg, 12 miles west-north-west of Roermond, on the ship-canal from Maastricht to 's Hertogenbosch. Pop. (1879) 7477. There are several good schools, a collegiate institution, town-house, two churches, and three market-places. In the Church of St. Martin is the grave of the Count of Hoorn, who was beheaded at Brussels, in 1568, for adhering to the Prince of Orange in the struggle for religious and political freedom. A beautiful promenade leads to the other church, outside the town, north of which are the ruins of the old castle. Besides the markets for farm produce, horses, and pigs, W. has factories for making cloth, stockings, and hats, corn and oil mills. Here was born, 1594, Jan van Weert, who, in boyhood a shoemaker's apprentice, became commander of the Austrian army and viceroy of Bohemia.

WEEVER, or STING-FISH (*Trachinus*), a genus of acanthopterous fishes of the family *Uranoscopidæ*, also called *Trachinidæ*. In this family the ventrals are composed of a spine and five jointed rays, and are generally situated before the pectorals. The scales



Greater Weever (*Trachinus draco*).

are cycloid, or wanting. The eyeballs are capable of being raised in a remarkable manner out of their sockets, and of being retracted again to the level of the orbits. The species frequent the bottom of the sea. They are often furnished with barbels, and have also a peculiar membranous filament under the tongue, which they can protrude at pleasure. In the genus *Trachinus* the head is compressed, the eyes are placed high and close together; there is a long sharp spine on the hinder part of the gill-cover. There are two dorsal fins; the second dorsal and the anal are long; the ventrals are close to the throat. Two species are found on the British coasts, the GREATER W. or STING-BULL (*T. draco*), and the LITTLE W. or VIPER W. (*T. vipera*). The former attains a length of nearly one foot; the latter, seldom of more than four or five inches. The general form is long, narrow, and compressed; the Little W. is proportionally deeper in body than the Greater Weever.

The head of both is short, compressed, flat between the eyes, and rough on the summit; both dorsals and the anal fins are spiny; and in both the gill-cover is furnished with a strong and sharp spine, which is directed backward, and can be appressed to the body, but which is also capable of being made to stand out so as to present its point to an adversary. Both species are of a yellowish brown color. They inhabit parts of the sea having a sandy bottom, and often partially bury themselves in the sand, but are ready to move off with great celerity if disturbed. They can

live long out of the water; and if left by the retiring tide, suffer no inconvenience. If assailed, they can, by a sudden bending of the body, make use of one of the strong spines of the gill-covers against the assailant; and the wound thus inflicted is so severe as to lead to the opinion that the spine is coated with a venomous exudation. Naturalists, however, generally supposed the popular opinion to be erroneous, and the severity of the wound to be merely owing to the laceration effected by the spine, until it was discovered by Dr. Günther, in 1864, that poison-glands existed in connection with spines of some South American fishes of the family *Siluridæ*. A peculiar stinging sensation attends a wound by a spine of a W., which extends far up the arm, if the wound has merely been in a finger, and is much more severe than the pain of a wasp-sting. There is also a groove in the spine, which has perhaps something to do with the conveyance of the poison; but no poison-gland has yet been proved to exist. In France, the fishermen are required, under a penalty, to cut off the spines of weevers before selling them. Weevers are esteemed for the table.

WEE'VIL (*Curculio*), a Linnæan genus of insects, now forming the tribe *Rhynchophora*, of the order *Coleoptera*, and section *Tetramera*. They are remarkably characterized by the prolongation of the head into a beak or snout, at the extremity of which the mouth is placed, and from which the club-shaped antennæ spring. Some of them have straight antennæ; but the greater number have the antennæ *geniculated*, or bent forwards at the second joint. The species are very numerous, and are distributed over all parts of the world. They all feed on vegetable food, both in their larvæ and in their perfect state; and some of them are notable for the mischief which they do in the former state, to the young shoots, leaves, fruits, and seeds of plants. They are diurnal insects, many of them very small, but others of considerable size. They are slow, timid, and defenceless; although the long hard beak suggests to those ignorant of its real nature and of their habits an idea of danger in handling the larger species. Many of them are of very dull and uniform color; but some are amongst the most beautiful of the Coleoptera—resplendent with the finest hues, and brilliant as gems. Such is the well-known Diamond Beetle (q. v.) of South America. The larvæ of weevils are soft, white, and footless, with very convex rings, hard heads, and horney jaws. The perfect insects are often found on leaves and in flowers of the particular kinds of plants on which they and their larvæ feed. *Rhynchites betuleti*, a W. often very injurious to vineyards, constructs a nest for its larvæ by rolling up the leaf of the vine, piercing the roll as it proceeds, and depositing eggs between the folds in the inner part of the roll.

The larvæ feed upon the leaf, which the parents further adapt for their use by cutting the leaf-stalk half through, so that the leaf hangs down, and by the time they are ready to change into the chrysalis state, it drops off, or is blown off by the wind, when they bury themselves in the ground to wait for the return of spring. Other trees, as the pear-tree, are infested by weevils which destroy their leaves in a similar manner; the leaves of some, as of the peach, often suffer injury from weevils which devour them, like caterpillars, without rolling them up; and turnips are subject to the ravages of certain small species of W., which proceed in the same manner. Some species of W. gnaw young shoots. The shoots of fruit trees, and young grafts are sometimes destroyed by weevils, which bore into them by means of their beak, and make a small chamber in the center, in which an egg is deposited, being pushed into its proper place by the beak. The shoot is then cut through a little lower down, and the parent W. may be seen climbing upon it, when the operation is nearly completed, to make it fall by her weight, and returning again to her work, if it is not yet ready to fall. She lays about two eggs a day, but continues her operations for many weeks, so that much destruction is effected. The larva feeds on the pith of the fallen shoot, and deserts it when ready to become a chrysalis, to bury itself in the ground.—The larva of a large species of W. (*Calandra palmarum*) inhabits palm-trees in South America, feeding on their central part, and is eaten and esteemed as a delicacy. When roasted, it almost melts into grease; but its flavor is said to be remarkably fine. This W. is black; about an inch and a half long; its larva is between two and three inches long.

Another species (*Calandra sacchari*) is very destructive to the sugar-cane. Its larva is also eaten in the West Indies and Guiana.—The wood of pines and firs is the food of certain kinds of W., so that plantations suffer severely from their ravages. Thousands of acres of pines in the Southern States of America have been destroyed by a W. (*Hylobius pales*), not much more than a quarter of an inch in length; and some of its congeners in other countries are scarcely less destructive, as *Hylobius abietis* in Europe.—There are many species of W. which attack leaf-buds and flower-buds. Thus *Anthonomus pomorum* infests the apple-tree, depositing its eggs in the flower-buds, and cutting off the prospect of fruit. *Anthonomus pyri* is equally injurious to the buds of pear-trees. Some species of *Rhynchites* lay their eggs in fruits—as apples and plums—at an early stage of their growth, cutting the fruit-stalk, that the fruit may fall to the ground. The European Nut-W. (*Balaninus nucum*) lays its eggs in young hazel-nuts, upon which the larvæ feed as the nuts grow; a nearly allied species attacks, in like manner, the hazel-nuts of America, and another infests acorns. The Pea-W. (q. v.) feeds upon peas; and other leguminous plants have their peculiar species, which devour their seeds. The Corn-W. (q. v.) is very destructive to wheat, and other similar species to maize, rice, and other kinds of grain.

WEFT, or WOOF, the thread which, in weaving, is passed by the shuttle backwards and forwards through the warp. See WEAVING.

WEIGHING-MACHINES are of various forms, according to the quantity and species of the goods whose weight is to be determined. The great majority of weighing-machines are founded upon the principle of the Lever (q. v.), the chief exceptions being the various forms of the Spring-balance (q. v.), to which might be added (though in such cases the term 'machine' is quite inapplicable) some of the methods employed to determine specific gravity, time of oscillation, &c. The simplest and primitive form of weighing-machine is the Balance (q. v.) with equal arms, which can be adapted either to the maximum of accurate weighing or to the most rapid equiponderance. But as this machine necessitates the *placing* in one scale of weights equal to the weight of the goods, it was soon found to be more convenient to employ a lever with unequal arms—the goods to be placed in the scale attached to the short arm, and therefore equipoised by less weights, the ratio of the weights in the two scales being in proportion to the ratio of length of the arms. On this principle the *steelyard* (see BALANCE), the *bent lever balance* (see BALANCE), and the *cart-steelyard* are constructed. But the convenience of equipoising a greater weight by one much less is counterbalanced by a considerable diminution in accuracy—one of the causes of error being the greater liability to flexure of the longer arm of the lever; and another, the necessity, for convenience' sake, of having the arm which is affected by the goods to be weighed as short as possible—the latter of itself reducing the accuracy of the steelyard to that of a symmetrical balance whose arms are each equal to the short arm of the steelyard. However, on behalf of the steelyard, there is again the advantage of rapid equipoise.

Each of these machines is variously constructed, the modifications having reference either to convenience of use, or to the species or weight of the goods to be weighed: an example of the former is the equal-armed balance (fig. 1), made in an inverted

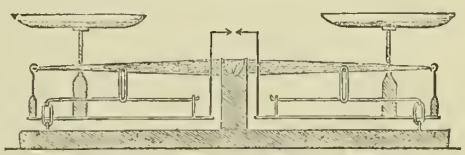


Fig. 1.

manner, with the scales above, and the rods which connect the scales with the beam so united as to preserve their perpendicularity during oscillation; and the latter is appropriately illustrated by the form of cart-steelyard given in fig. 2. The dotted lines, DD,

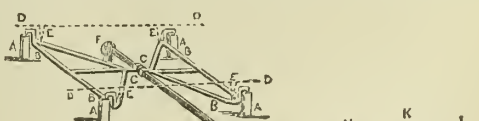


Fig. 2.

DD, indicate the grooved plates on which the wheels rest; E, E, E, E are the four points supporting the wheel-plates on the two triangular levers, CBB, CBB; the triangular levers are supported by the hooked extremities of their bases, B. B. B, B, upon fixed supports, A, A, A, A; while their vertices, C, C, are attached to a lever, FG, whose fulcrum is at F; G is attached by a chain to H, the extremity of a lever of the first kind, whose fixed support is at K, and on whose other arm (graduated) the weights for equipoising the cart and its load are placed. The machine is thus seen to be compound, consisting of the two triangular lever pieces, of a simple lever of the second, and of one of the first kind; the weight L, if sufficient, raising H, and with it G, and thence raising C, and so balancing the downward pressure of the cart and its load at E, E, E, E. Various other forms of the cart-steelyard are in

use. Mr. Duckham's weighing-machine is an ingenious adaptation of hydrostatics.

WEIGHTS AND MEASURES. For the proper carrying on of mercantile transactions, and for many other purposes, it is necessary that there be fixed and readily-accessible standards of magnitude, of weight, and of value. The lengths implied by the names *a foot*, *a hand*, *a cubit*, *a fathom*, are far too indefinite to have long continued to satisfy the wants of civilized nations; and in every country, by common consent, or by the action of government, determinate measures have been agreed upon. These measures, left almost to chance, have been different from one nation to another, even from county to county, sometimes from town to town, and still more awkwardly, often from one trade or guild to another.

Any one can appreciate the inconvenience of such a want of uniformity, for, in every transaction extending beyond his own sphere, he has to take account of the change of measure, the change of weight, the change of money, perhaps of all three at once. We all see and allow that there ought to be only one system of weights and measures in one country; that one bushel in Winchester, another in York—one acre in England, another in Scotland, and a third in Ireland; that Troy weights, avoirdupois weights, and all the other local, conventional, and trade variations which abound in the British dominions, form an aggregate of unbearable confusion, leading to endless mistakes and ceaseless quarrels. It is not more difficult to extend our observation, and perceive that if one system be advisable for one country, a universal cosmopolitan system would be no less advantageous for the whole world.

The only practical method of establishing a system of measures is to construct standards of reference, and to preserve these carefully in some public place. In order that these standards may not be worn and injured by too frequent use, it is convenient to have authenticated copies deposited in the various towns, so that all dealers and artificers may have ready access to them, and so that all makers of weights and measures may be without excuse for errors in their workmanship.

To set up a standard of measure seems to be a very simple matter—the authorities have only to fix upon the proper length of a yard, to have a piece of wood or of metal made to that length, and to cause it to be properly marked and preserved. For common purposes, this seems to be quite enough: however, experience soon shows the inconvenience of this simple plan, for, by repeated contacts, the ends of the yard-measure get worn. Instead, therefore, of making a rod just a yard long, they make it a little longer, and upon it form two fine marks a yard distant from each other, and hold this distance to be the true standard. By this expedient, the effects of wearing are got rid of; copy after copy can be compared with the original, without deterioration of the standard.

But use is not the only cause of deterioration: wood decays or is worm-eaten, and metals are liable to oxidation, so that the material has to be carefully chosen. This is not all. Every substance which has been examined is found to change its size with a change of temperature; the standard bar is shorter in winter than in summer; and the change, though it be so small as to be of no moment to the haberdasher, the wright, or the mason, is enough to cause great trouble to those engaged in very accurate work. Hence, in the selection of the substance to be used for the standard bar, we must have an eye to smallness of expansion as well as to durability. The substances available, taken in the order of their expansibility, are—*deal*, *glass*, *platinum*, *gold*, *silver*, *iron*, *brass*, *copper*. Deal may be put aside as wanting in durability, and the choice may be said to lie between glass and platinum, neither of which is much acted on by the air, or by the vapors which are found in the atmospheres of large towns. The fragility of glass and the costliness of platinum are objections; but the latter is a mere trifle when a national standard is concerned. Platinum, then, seems to be the best substance.

The standard measure for the British Empire is a brass rod, into which two pins of gold are inserted; the upper surfaces of these are sunk to the half thickness of the bar, and a small dot is made in the middle of each. The distance between the centres of these dots, taken when the temperature is at 62° F., is declared to be the true yard.

In the same way as the standard of measure, so must the standard of weight be established. A piece of heavy metal is made of the desired weight, and is duly authenticated. The preservation of the standard of weight is a matter of very considerable difficulty. Every occasion on which it is used, each removal of dust from its surface, the actions of the oxygen of the air and of the products of combustion which are always floating about, produce a sure though slow waste; and all that can be done is to retard this waste as much as possible. Perhaps a lump of platinum would make the best standard; but its softness is a decided objection.

In the use of a standard of weight, another matter has to be taken into consideration. The apparent weight of any substance is less than its true weight by the weight of as much air as is displaced by it. Now, the density of the air is not constant—air, when warmed, expands very much more than any solid body; and therefore a piece of metal appears to weigh more in warm than in cold weather. Not only so, air is rendered more dense by an increase of pressure, and so, when the barometer is high, all heavy bodies become apparently lighter; when the barometer sinks, they appear to become heavier. Thus the apparent weight of the standard pound is continually changing. If we accurately adjust two weights of brass when the barometer is low and the air warm, and afterwards compare them when the barometer is high and the weather cold, we can perceive no change, for, though each has lost weight, they have lost alike. But if we had adjusted a weight of iron to a weight of platinum in light air, and again compared them in dense air, the change would have been at once seen. For, since a pound of iron is more bulky than a pound of platinum, it displaces more air, and its apparent weight undergoes a greater change than does that of the platinum. Fortunately, these changes are too small to have any perceptible influence on mercantile transactions, yet they are sufficient to create the necessity for it being enacted that the standard weight must be held as true when the air is in a specified state as to warmth and pressure. The standard brass pound, which serves for the British Empire, is to be used when Fahrenheit's thermometer is at 62°, and the barometer is at 30 inches. (See Note at the end.)

The thought naturally arises, what if, in the course of time, the original standards be lost or destroyed?

Time was when a seed of wheat gathered from a well-ripened ear served sufficiently well to define a grain weight; and even now the Eastern jewelers weigh their gems against the *carat* or carob-bean, the hardness and uniformity of which seem to justify the selection of it. But for the extended purposes of modern commerce, and particularly for the more delicate requirements of scientific research, it is indispensable that we find some unchanging object of comparison; and none can be preferred to the earth itself, as the most universally acceptable and as the best defined. For the purposes of geographers and navigators, the circumference of the earth is divided into degrees and minutes, the length of one minute being the geographical or nautical mile; and it certainly would have been convenient if the common or statute mile had agreed with this. The dimensions of the earth are now known with a precision far greater than is needed for ordinary purposes; the entire length of the circumference of a meridian circle being 131,236 000 of our standard feet, so that the length of a nautical mile is 6075 feet and about 9 inches; and it is highly probable that subsequent and more accurate measurements will not alter this determination more than an inch or two either way. It is usual to divide the minute into 60 seconds, so that a second of the earth's circumference is 101·25, and thus if our standard foot had happended to be one-eightieth part longer than it is, there would have been exactly 100 feet in a second, and 6000 feet in a nautical mile. When we reflect on the disparity of the foot used by different nations, and recollect that 100 Vienna feet make 103·6 English, as many Amsterdam feet 92·7, as many Berlin feet 99·2, we can hardly help regretting that our forefathers had not happened to hit upon the exact 100.

The ancient Greeks were fond of dividing into sixties; this division still continues in our scales for angles and for time; and it is worthy of remark, that if we divide the whole circumference of the earth into 60 parts, each of these into 60, and again each into 60, we arrive at a distance of 607·5 English feet. Now, the length of the ancient Greek stadium or furlong is stated to be 606¼ feet by some writers; and if deduced from measures of the Roman mile, is between 605 and 613 feet; so that if we desire a cosmopolitan standard, we can hardly do better than go back to the ancient Greek *stadium* or the Chinese *li*, corrected to suit the more accurate determination of modern times: this would bring us to the geographical foot, one-hundredth part of a second of the earth's meridian.

The standard of weight is readily connected with the standard of measure. Some substance which can be easily obtained pure is chosen, and a definite bulk of it is weighed. Distilled water is universally selected for this purpose; and in the British system, the weight of one cubic inch of pure water is declared to be 252·458 grains when it is at the temperature of 62° F.

It has long been known that water does not continue to contract as it is cooled; the contraction becomes less and less as the temperature approaches to 41° or 39° F.; and the water, when cooled more, begins to expand, and continues to grow more bulky until it be on the point of freezing. On this account it has been proposed, and without any doubt it would be the best plan, to take water when at its greatest density as the standard for comparison, because then an error of a degree in temperature will produce no perceptible error in the weight.

The operation of verifying the standard of measure by comparing it with the size of the earth is necessarily an expensive and a complicated one, only to be attempted under the auspices of a wealthy government, or with the concurrence of several nations; and it is desirable to find out something more local and more easily obtained wherewith to compare our measures. The length of the Pendulum (q. v.) has been proposed; and, on account of a very simple and beautiful property of pendulums, the comparison can be readily made. If we imagine an excessively minute heavy body to be suspended by a thread so fine that the weight of the thread may be neglected, the compound so formed is called a simple pendulum; and the question becomes, what must be the length of such a pendulum in order that it may vibrate from side to side in, say, one second of time. Now, it is clear that we cannot obtain this length by direct experiment, since we cannot construct such a pendulum. M. Biot tried to approximate to it by using a small ball of platinum hung by a very fine wire. However it is known that if a heavy rigid mass, AB, be suspended by a knife-edge C, and if its vibrations be made in the same time with those of a simple pendulum of which the length is CD, then if we place another knife-edge at D, and reverse the ends A, B, the compound pendulum will again vibrate in the same time as before. Hence, we have a very simple method of comparison. Having constructed a strong bar with two knife-edges at a known distance from each other, say at the distance of a yard; let us then by many trials, filings, and scrapings, so adjust it as that the times of vibration shall be alike for the two knife-edges, and, finally, let us count how many vibrations such a pendulum makes per day, and then we shall have a means of verifying our measure.



The act of parliament which fixes our present weights and measures, enacts that the length of a pendulum vibrating in one second of mean solar time is 39·13929 inches: now the lengths of pendulums are proportional, not to the times in which they vibrate, but to the squares of those times; and so, if we know the length of one pendulum, and the number of vibrations it makes per day, we can calculate what ought to be the length of another to vibrate a given number of times. A convertible pendulum having the distance between its knife-edges exactly 36 inches, ought to make 90088·42 vibrations per day.

When only a degree of accuracy sufficient for commercial and ordinary purposes is aimed at, the above process is by no means difficult; but when extreme precision is wanted, the operation is attended with many and very great difficulties; it involves considerations which would hardly have been expected. In the first place, our experiments are made in air, and the buoyancy of the air lessens the actual weight of the pendulum; that buoyancy has to be allowed for, and therefore it is declared that the above length is that of a pendulum vibrating in a vacuum. Next, since the earth has a diurnal motion on its axis, every substance placed on it has a centrifugal tendency which goes to modify what otherwise would have been its gravitation; this centrifugal tendency produces the earth's oblateness, and causes a variation in the intensity of gravitation from one latitude to another.

A stone is actually heavier in Edinburgh than it is in London. This change in gravitation cannot be measured by a balance, because the weights at each end of the balance are changed alike; but it is seen at once in the going of a clock; for a pendulum regulated to go truly in London is found to go too fast when taken to a higher latitude, and to lose time when carried nearer to the equator. Hence, the enactment that the pendulum must be swung in the latitude of London. And again, the attraction which the earth exerts upon bodies placed near it diminishes with their distances, being inversely as the squares of the distances; hence, a clock carried from the bottom to the top of a hill loses time perceptibly, and so it is necessary to have the additional enactment that the pendulum be swung at the level of the sea.

In addition to these niceties, there are others connected with the manipulation, such as the parallelism of the knife-edges, their bluntness, the extent of the area of oscillation, and the stability of the supports, so that altogether the exact measurement of the length of the seconds pendulum is a matter of very great complexity. All these difficulties and troubles notwithstanding, we may hold that, for all practical purposes, our system of weights and measures—and it may be added, the systems of all other civilized nations—is perfectly well established, whether it be regarded as derived from the dimensions of the earth, or from the intensity of gravitation.

No system of measures can ever claim to be of universal application from which geographical dimensions are excluded. It is essential that the unit of measure bear some simple relation to the earth's circumference, for otherwise the operations of the surveyor will not accord with those of the geographer. The only question, therefore, in regard to the establishment of a cosmopolitan system, is as to the number of parts into which the earth's circumference is to be divided. Now, the denary system of numeration has already asserted its supremacy; one by one the schemes followed by different nations have given way to it, and their very languages have been modified by its influence; sufficient traces remain to show how extensive these modifications must have been. The *three-score and ten* is not yet forgotten in English, nor the *quatre-vingt dix neuf* in French. In many trades the counting is still in dozens and grosses, yet our merchants count their interest, their discount, and their dividends in cents. The surveyor divides the foot on his leveling staff into tenths, hundredths, and thousandths; he makes his Gunter-chain of 100 links. The astronomer no longer divides the second into sixty thirds, but into hundredths; he gives his equinoctial time in decimal fractions of the day, and he makes the arguments for the planetary disturbances in thousandth parts of the whole revolution. There is no single instance in which the decimal system, once adopted, has been abandoned. See DECIMAL SYSTEM.

Note.—Since the above article was written, a new act, the Weights and Measures Act, 1878, has been passed, which, while making no material change so far as mercantile matters are concerned, places the system on another and most unsatisfactory foundation. The standard of length is still the distance between the same two gold pins, but the standard of weight is now declared to be a platinum pound avoirdupois to be weighed *in vacuó*. The act contains no instructions as to how this is to be compared with any weight in air, nor does it narrate any connection between the brass weight of 5760 grains in air, with the platinum one of 7000 grains *in vacuó*. Further, the whole of the old act is repealed, so that there is now no connection between the standards of measure and of weight, nor between these and any natural or recognizable quantity. We are thus carried back to the rudest of all foundations, an arbitrary weight and an arbitrary measure. The fruits of laborious scientific research are put aside.

WEIGHTS AND MEASURES have, since 1824, been in great measure regulated by statute. The statute 5 Geo. IV. c. 74 was passed to enforce uniformity in the weights and measures used in various parts of Great Britain and Ireland; and a standard yard was defined as being then in custody of the clerk of the House of Commons, and it was enacted that all superficial measures should be computed and ascertained by the said standard yard.

The act also described how, if the said standard yard were to be lost or destroyed, another was to be made. So the statute defined a standard brass weight of one pound troy, and a standard gallon. That statute was altered by a subsequent statute of 5 and 6 Will. IV. c. 63, and inspectors were authorized to be appointed by justices of the peace, who had power to examine and stamp weights and measures. It was enacted that any contract, bargain, or sale made by any weights or measures unauthorized by the act should be wholly void, and every such weight might be seized by the inspector, and forfeited. One or two exceptions were made by the act—such as weights above 56 lbs.; wooden or wicker measures used in the sale of lime; glass and earthenware jugs or drinking-cups, though represented as containing the quantity of any imperial measure, or any multiple thereof, and these are not illegal though incorrect. The act 41 and 42 Vict. c. 49, to consolidate the body of existing law on the subject, insists on uniformity in the use of imperial weights and measures, defines the standards of weight, length, and capacity as specified in the note to the preceding article, gives the penalties for unjust measures, regulates the stamping and verification of weights and measures, and prescribes how the law should be administered.

WEI'MAR, a small but interesting town of Germany, capital of the grand duchy of Saxe-Weimar-Eisenach, and residence of the grand duke, 60 miles south-west of Leipzig by railway. It stands in a pleasant valley on the left bank of the Ilm; but the environs are in no way remarkable, and the town itself is irregularly and rather poorly built. Though the residence of the court, and finding its subsistence in providing for the wants of distinguished visitors, W. carries on neither trade nor manufactures, and seems a dull, provincial-looking town. The lustre conferred upon W. by the residence here, at the close of the 18th and the earlier portion of the 19th centuries of Goethe (q. v.), Schiller (q. v.), Herder (q. v.), and Wieland (q. v.) at the court of Karl-August (see SAXE-WEIMAR-EISENACH), has faded since that group was broken up by death; and now the interest of the town is almost wholly derived from its monuments, traditions, and associations. The town church (*Stadtkirche*), dating from the year 1400, has an altar-piece by Cranach, and contains a number of memorable tombs, among which are those of the brilliant soldier, Bernhard of Weimar (q. v.) and of Herder, the philosopher and critic. The ducal palace is a handsome building, some of the apartments of which are decorated by frescoes illustrating the works of Goethe, Schiller, Herder, and Wieland. The public library contains busts of these men of genius; and a number of relics, as the gown worn

by Luther when a monk, and Gustavus Adolphus's leather belt, pierced by the bullet that caused his death at Lützen. The houses of Goethe, Schiller, and Herder are still pointed out. The two former of these poets lie interred in the grand-ducal burial-vault. The park and gardens of the palace, within which is the summer residence of Goethe, are much esteemed as a promenade. Pop. (1880) 19,944.

WEIR, or WEAR—called also a dam, and in the north of England and south of Scotland, a cauld—a structure placed across a river or stream, for the purpose either of diverting the water into a mill-lade, of raising the level of the surface of the river, and thereby increasing its depth for the purpose of navigation, or of providing the means of catching salmon and other fish. There is also the waste-weir, for the purpose of preventing a reservoir embankment being overtopped by floods; and the gauge-weir, for the purpose of computing the quantity of water flowing over it, from a measurement of the difference of level between the crest of the weir and the surface of the still water above it. The word is also sometimes used, though perhaps not quite correctly, to denote a training-wall or other structure parallel with the general line of a river, for the purpose of remedying or preventing loops or sinuosities. A weir may—according to the purpose for which it is intended, to the nature of the materials at command, or to other circumstances—be formed either of stone, timber, or brushwood, or a combination of any two. It is generally placed obliquely across the stream, in order to make the length of its crest considerably greater than the width of the channel (fig. 1),

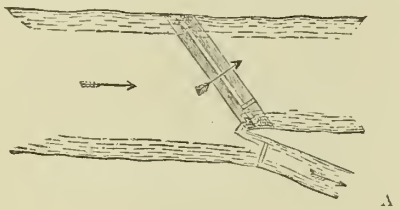


Fig. 1.
A, intake.

and thereby prevent the water in floods from raising to so great a height as it would do with a shorter crest, to the risk of damaging the adjoining low lands, and probably putting the mills above in backwater. In such cases, the mill intake, or the navigation lock, as the case may be, is generally placed at the down-stream end of the weir. Much obliquity, however, makes the current to impinge against and to cut into the side of the river opposite the lower face of the weir, and to prevent that effect, weirs are sometimes made of the shape of two sides of a triangle, or rather of that of a hyperbola, with its apex pointing up stream, which arrangement is peculiarly applicable to the case of there being an intake for a mill on each side of the river (fig. 2), and the apex is a

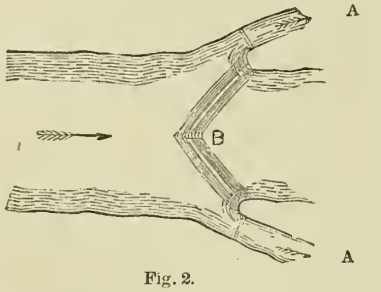


Fig. 2.
A, A, intakes; B, Fish-pass

very suitable place for a fish-pass or ladder. Not unfrequently, when at a wide part of the river, the weir is placed at right angles across, and with a slight curve upwards (fig. 3); and a natural

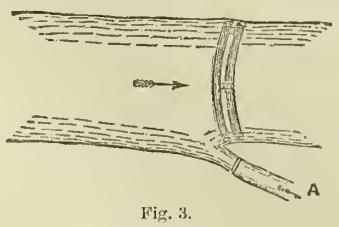


Fig. 3.
A, intake.

shelf of rock is often very advantageously made use of for either a mill or fishing weir, the low parts being made up where necessary with stone or timber.

The down-stream face of a weir is generally a pretty flat slope of stone 'pitched' or set on edge, and with its toe, or lower edge, either sunk into rock, or protected from being underwashed by a row of timber-sheeting piles, and frequently also by an apron of timber-planking. This slope is either straight, or made with a hollow curve (fig. 4), so as to check the tendency of the water to

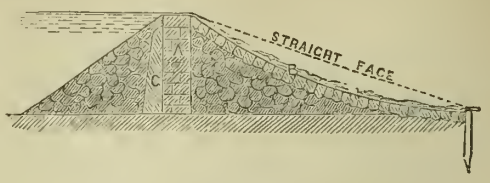


Fig. 4.
A, masonry; B, pitching; C, clay puddle.

acquire increasing velocity as it descends; and it is frequently divided into panels by timber-framing, so as, in the event of a portion of the pitching being washed out, to lessen the risk of the whole of it being carried away. The up-stream face is generally a slope dipping into the water, and protected by stone pitching, but it is sometimes a perpendicular wall. In order to render an ordinary sloping weir water-tight, sometimes there is under the crest or coping a row of well-jointed and close-driven timber sheeting-piles; but those being liable to decay, without their decay being visible, a better, though a more difficult and expensive arrangement, is to build a perpendicular wall of water-tight masonry under the crest. In either case, generally there is the additional precaution taken of having a wall of pounded clay on the up-stream side of the wooden or stone barrier; and sometimes a mere wall of pounded clay alone, in the center of the weir, is trusted to, as the sole means of making it water-tight; but the latter is not a satisfactory arrangement, unless the stone-work next to the clay be so closely compacted by an admixture of gravel and sand as to prevent any current of water from reaching the clay, and cutting into it. The down-stream face is sometimes made a nearly perpendicular wall, which, unless for the obstacle which it presents to the ascent of the salmon, is a very good arrangement, where the bottom of the channel is solid rock, so as not to be liable to be scooped out by the falling water; else it must have at its foot a level apron of heavy masonry for the water to fall on (fig. 5).

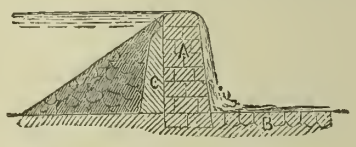


Fig. 5.
A, masonry: B, pitching; C, clay puddle.

The down-stream face is also sometimes made of a series of steps, so forming a succession of levels and light falls (fig. 6),



Fig. 6.
A, masonry; B, pitching; C, clay puddle.

which is a very good plan for breaking the force of the falling water; but it, like the perpendicular face, presents obstacles to the ascent of the salmon, unless a fish-pass or ladder be provided.

The weir for the purpose of navigation need not be in any way different from the mill-weir, otherwise than that, instead of an intake sluice, there must be a Lock (q. v.) with upper and lower gates, and a chamber between them as long and as wide as the largest vessels navigating the river. Fishing-weirs are generally provided with a sort of cage, called in Scotland a cruive, a word which has been made English by having been used in English fishing-acts. The cruive consists of a chamber (fig. 7), generally about four or five feet in width, and as much or a little more in length, having at the upper end a portcullis grating, called the heck, with the bars vertical, and three inches apart, so as to let small fish get through, and at the lower end two folding horizontally sparred doors called the inscales, pointing upwards, but set so as to leave a small opening between the points, through which the ascending salmon enter. Partly from

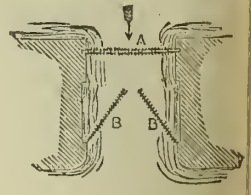


Fig. 7.
A, heck; B, B, inscales.

the inward pointing of the inscales, and partly from the instinct of the fish to ascend the river, they seldom get out again, and are easily caught. Frequently, weirs serve the purpose both of mill-dams and of fishing-weirs.

A weir sometimes made use of for catching salmon and other fish in tidal rivers, consists of a sort of horse-shoe shaped structure of loose stone-work, through which the water can percolate freely, with its heel or open end pointing up-stream. The fish ascend the river with the flood-tide, and falling back with the ebb, part get embayed within the walls at low water, and are either left dry, or are shut in so as to be easily caught.

Weirs, either of stone or of wicker work, are also sometimes made use of as an accessory to what in English fishing-rivers are called putts and putchers, being a sort of combination of wooden gratings acting something like those of the cruive and net-work; and in many cases, weirs, either natural, as formed by rocks or islands, or strictly artificial, are used for catching fish by means of an attached poke-net extended by the current.

By the English common law, no fishing mill-dam or fishing weir is legal except it be ancient, and even an ancient fishing-weir must have a free gap, and every fishing mill-dam must have a proper fish-pass.

The following are provisions as to weirs in the English Salmon Fishery Act, 1861: For the purpose of clearly indicating the rights of mill-owners, &c., in the first place, the expression 'dam' is defined to mean all weirs and other fixed obstructions used for damming up water; 'fishing weir,' a dam used for the exclusive purpose of facilitating the catching of fish; and 'fishing mill-dam,' a dam used partly for facilitating the catching of fish, and partly for supplying water for milling, &c. (24 and 25 Vict. c. 109, s. 4).

The following regulations are to be observed with respect to dams: No dam, except such fishing weirs and fishing mill-dams as were lawfully in use on the 6th August 1861, by grant, charter, or immemorial usage, must be used for facilitating the catching of salmon. Any proprietor of a fishery, with the consent of the Home Office, may attach to every dam which existed on the 6th of August 1861, such a fish-pass as the Home Office may approve, so that no injury be done to the milling power, or to the supply of water to or of any navigable river, canal, or other inland navigation. Every person who, in waters where salmon are found, constructs a new dam, or raises or alters, so as to create increased obstruction to fish, a dam already constructed, must attach and maintain in an efficient state such a fish-pass as may be determined by the Home Office. By the Tweed Act, mill-dams, weirs, caulds, and other permanent obstructions are to be so constructed as to permit the free run of salmon in the ordinary state of the river. In Ireland, as in England, weirs are legal, if they can be traced back to statute 25 Edward III. Special Fishery Commissioners have power to inquire into legality of all fishing weirs, and every fishing weir must have a free gap.

By the old Scotch law, a provision as to mill-dams is given in the Act 1696, as follows: 'In respect that the salmon-fishing within the kingdom is much prejudiced by the height of mill-dams that are carried through the rivers where salmon are taken, His Majesty, with consent of the Estates of parliament, orders a constant slope in the midstream of each mill-dam dyke; and if the dyke be settled in several grains of the river, that there be a slope in each grain (except in such rivers where cruives are settled), and that the said slope be as big as conveniently can be allowed, providing always the said slope prejudge not the going of the mills situate upon any such rivers.' Cruives are by various old acts declared to be illegal in *tidal* waters, except the cruives and yairs of the Solway, which is exempted as being a Border river.

By the Scotch Fishery Act of 1862, the commissioners are empowered 'to make general regulations with respect to the construction and alterations of mill-dams, or lades, or water-wheels, so as to allow a reasonable means for the passage of salmon;' and they made a by-law, which has been sanctioned by the Home Secretary, providing that every dam should have a salmon pass or ladder, and also making provision for hecks at the intakes and lower ends of mill-lades, and immediately above the wheels, and regulations whereby the water, when not used for the mills, should be sent down the natural channel of the river. The commissioners are also required to make, and have made, general regulations as to the construction and use of cruives, which implies their legality, but only where there is a prescriptive right.

WEI'SSENFELS, a town of Prussia, in the government of Merseburg, and 12 miles south of the town of that name, on the Saale. Pop. (1880) 19,654, employed in the porcelain-factory and in wool-spinning, shoemaking, the manufacture of pianofortes, tanning, and a trade in timber. The castle, once the residence of the dukes of W., is now a barrack.

WELCKER, FRIEDRICH GOTTLIEB, one of the most distinguished scholars of Germany, was born in the year 1784 at Grünberg, in Hessen-Darmstadt; studied at Giessen; was appointed one of the masters of the Gymnasium there in 1803; and in the year 1806, traveled to Rome, where he remained two years. Here he became acquainted with the celebrated Danish archæologist, Zoega, whose Life and Essays he afterwards published, and by whose example he was stimulated to that subtle appreciation of the works of ancient art which appears everywhere in his works. On his return from Italy, he was appointed to a professorship of Ancient Literature, first in Giessen, then in Göttingen, and finally (1819) in the newly erected Prussian university of Bonn, which continued to be the scene of his scholarly activity till his death in 1868.

W. belonged to that class of scholars who, since Heyne and Wolf, have given such a lofty inspiration, such a philosophical significance, and such a historical comprehensiveness to those studies which, for want of a better name, we are forced still to designate philology. But philology in this country generally means the history and philosophy of language; with the Germans, as it did originally with the Alexandrian Greeks, it means, the sympathetic understanding and the imaginative reconstruction of the life and thought of famous ancient peoples, based on the critical treatment of ancient documents, or the tasteful appreciation of the monuments of ancient art. It is needless to say that this 'philology' is a very different thing from the minute verbal and metrical preciseness which was long the leading characteristic of scholarship in this country. For however important these minutiæ may be in their place, they are manifestly valuable only as means to an end; and even when the end has been steadily kept in view, it cannot be denied that some of our greatest intellects have spent more of their strength on these subsidiary matters than their importance deserves.

In W., Otfried Müller, and other German scholars of the first class, we see a general reaction against this narrow school; and a reaction which was sure to prosper, as it was based on thorough academic training, and had learned to neglect no trifle and despise no minute point which could be made subservient to higher purposes. If it was the fault of German scholarship generally that it was too professional and too academic, it is the praise of Müller, W., and the school to which they belong that they have bridged over the gulf which separates learning from life, and inspired the dry bones of tradition with a spirit which makes them intelligible to the present, and significant of the future. The long academic career of W. was distinguished by an uninterrupted course of scholarly activity. Many of his works are tracts and essays on archæological subjects without external unity, but all exhibiting a remarkable combination of extensive and accurate learning, fine taste, delicate sensibility, and sound judgment. We can only note here his three most important works of a larger compass. The first is the *Æschylean Trilogy* (1824), in which the organic connection and sequence of the Greek dramas are set forth with a richness of constructive detail not altogether free from that fanciful and problematic element which is one of the most distinguishing characteristics of German scholarship. The second is the *Epic Cycle* (1835—1849), a work which has done great service to the right appreciation of early Greek literature, by taking Homer out of that region of mysterious isolation in which he had been previously allowed to remain. The third, and perhaps his greatest work is the *Götterlehre*, or Greek Mythology (1857—1862), which embraces all that is good, and rejects all that is bad in the wide German literature of this subject, with a delicate tact and a just discrimination as valuable as they are rare. Of all W.'s works, this is the one that would most probably bear with credit the ordeal of an English translation.

WELD, or WOOLD, also called DYER'S ROCKET, DYER'S WEED, and YELLOW WEED (*Reseda Luteola*), is a plant of the same genus with MIGNONETTE (q. v.), a native of waste places in England, very common in Germany and in many parts of Europe. It has an upright stem, 2—3 feet high; lanceolate, undivided leaves; and long racemes of small yellow flowers, with 4-partite calyx and prominent stamens. It is used for dyeing. In order that it may yield a good dye, it requires to be cultivated with care. The best is grown in France, England, and Holland; and that produced about Cette, in France, is preferred to all other. Good W. must have flowers of a beautiful yellow or greenish color, and abound in leaves; that which is small, thin-stemmed, and yellow, is better than that which is large, thick-stemmed, and green; that which grows on dry sandy soils is better than that produced on rich and moist soils. It was formerly cultivated to a much greater extent in Britain than it is at present, and was also more used by dyers than it now is.



Dyer's Rocket [*Reseda Luteola*].

W. is still, however,

a valuable dye-stuff. It serves equally for linen, woollen, and silk, dyeing not only a rich yellow, but, with proper management, all shades of yellow, and producing a bright and beautiful color. Stuffs previously dyed blue are, by means of W., changed to a very pleasing green. Large quantities of W. are imported from France.

WE'LDING, the process by which some substances are united together in a softened state. It is generally applied to such metals as malleable iron, two pieces of which, heated to redness, may be made to unite by applying them together and beating with a hammer. Other substances, such as horn and tortoise-shell, can be welded by first making separate pieces soft by heat, and pressing them together, which causes so intimate a union that no traces of the junction remain after cooling.

WELLESLEY, Richard Colley Wellesley, Marquis, K.G., English statesman, was born at the town residence of his family, Grafton Street, Dublin, June 20, 1760. The family of Wellesley was of Saxon origin, belonging to the county of Sussex, and was among the most ancient in Ireland, one of them having gone from England as standard-bearer to Henry II., who gave him large grants of land in Meath and Kildare. William de Wellesley was, in 1334, summoned to parliament as Baron Noragh, and was high in favor with Edwards II. and III. The name (originally *Welesley* or *Welseley*) was written Wellesley till the 16th c., when it became abbreviated into Wesley. Mr. Garrett Wesley of Dangan, County Meath, married Miss Colley, of Castle Carberry; and on the decease of his son without issue, the estates were bequeathed to his cousin, Richard Colley, who thereupon assumed the name of Wesley. The Colleys, originally Cowleys, were also of ancient descent, and came originally from Rutlandshire.

Richard Colley, who thus succeeded to the Wellesley estates, though in no way related by blood to the earlier Wellesley family, was created Baron Mornington. His eldest son received (1760) the dignities of Viscount Wellesley and Earl of Mornington, and enjoyed the still more enviable distinction of being the father of the Marquis Wellesley, the subject of this notice, and of Arthur, first Duke of Wellington, by his marriage with the eldest daughter of Arthur, first Viscount Dungannon. W.'s father, the first Earl of Mornington, although chiefly known for his talents as a musical composer, was a man of great abilities. W. received his education at Eton, and afterwards at Christchurch, Oxford, at both which seats of learning his fame stood high. An eloquent speech was made by him at Eton as early as 1778; and in 1780, he gained the University prize for the best composition in Latin verse, in which he excelled through life. His father having died in 1781, W., on attaining his majority, took his seat in the Irish House of Peers, took upon himself the pecuniary obligations of his father, and placed the estates under the management of his mother, who survived her husband for nearly half a century. The debts of the first earl were liquidated, but W. was unable to preserve the family possessions. He was one of the original Knights of St. Patrick when the order was founded by George III. in 1783.

It appears, from a correspondence between Pitt and the Duke of Rutland, that at the age of 24 he had convinced both statesmen that he was destined to distinguish himself, and to render the public essential service. Dissatisfied with the limited field of distinction which Ireland afforded him, he obtained, in 1784, a seat in the British House of Commons as member for Beeralston. In 1786, he became one of the Lords of the Treasury, when he was elected for Saltash. Being unseated on petition, he obtained a seat for Windsor, and became a favorite of George III. Accident directed his attention to India, and in 1795, he became one of the unpaid members of the Board of Control. In October 1797, he received a seat in the House of Lords as Baron W.; and, at a most eventful period, was selected to go to India as governor-general. Four powers then divided the sovereignty of India—the British; Tippoo Sahib; the Nizam; and the Mahrattas, comprehending Scindiah, Holkar, and the Rajah of Berar; and the west of India was the scene of invasion by Zemaun Shah. Tippoo hated the English, and meditated their expulsion from India; and the troops in the service of the Nizam and the Mahrattas were officered by Frenchmen. When W. arrived at Calcutta, in May 1798, Egypt had been conquered by Bonaparte; and the native powers of India, incited by the French, were unfriendly to British rule. His first operation was one of great boldness.

Disregarding the remonstrances of the Madras Council, he ordered the Nizam to disband 14,000 men, surrounded them with a British force, secured the 124 Frenchmen by whom they were officered, and sent them instantly to Europe. Having annihilated French influence, he began the reduction of the empire of Mysore. On the 3d February 1799, he ordered General (afterwards Lord) Harris to march with an army of 20,000 men direct from the coast upon the Mysore capital. He himself removed to Madras, to be near the scene of this eventful operation. In one short month, the fortress of Seringapatam was taken, Tippoo Sahib slain, and his dominions partitioned. Having thus, in fifteen months, destroyed French influence, struck terror into the native princes, and overthrown the most inveterate enemy of British rule in India, he returned to Bengal. Up to this period, he had been the Earl of Mornington; he was now (Dec. 1799) created by the king Marquis of W., and received the thanks of Parliament. The East India Company offered him £100,000 of the prize-money realized at Seringapatam, but he refused, disdaining to be enriched out of military spoil. He afterwards accepted an annuity of £5000 voted him by the Court of Proprietors. His next step was to place the territories of the Nabob of the Carnatic under the administration of the Company, in consequence of the treachery of that prince. He also concluded a treaty with Persia, to which he attributed 'the fall of Zemaun Shah, the confusion of the Afghan government, and the repression of the annual project of invading Hindustan from Cabul'—then, as since, the nightmare of Indian statesmen. In 1801, he sent a force of 7000 men up the Red Sea, to assist in wresting Egypt from the French.

The expedition, under General Baird, reached Egypt, and effected a junction with the army from England; but the French had already surrendered. In 1802, in consequence of differences with the Court of Directors, he tendered his resignation; but was induced to continue in office until January 1806. The Mahratta war broke out; the battles of Laswaree, Assaye, Argaum, and Delhi were fought; and Scindiah, the Berar Rajah, and Holkar were stripped of their dangerous influence, and reduced to submission. A large accession of territory rewarded the galantry of the army; and in 1805, W. returned to England, after the most brilliant administration ever known in India. He had outshone even the native princes in the pomp and splendor of his progresses. He built the palace of Calcutta; founded and patronized the college for Indian literature; stimulated every attempt of natives and Europeans to bring to light the vegetable, mineral, and physical treasures of the 'golden peninsula;' and inaugurated those important financial reforms which in a brief period raised the revenue of the Company from 7 to more than 15 millions sterling. On his return, he was received with every mark of respect and approval by the directors; but as matter of course, there were many complaints that his administration had been oppressive, especially towards the native powers; and articles of impeachment were even presented to the House of Commons, though they were rejected with contempt. He now prepared to enter anew upon a parliamentary career.

George III. wished him to be one of the secretaries of state in the Portland cabinet, but he declined the offer. He went to Spain as ambassador-extraordinary in 1809; landed at Cadiz on the day the battle of Talavera was fought, and on the 2d November met his brother, the Duke of Wellington, at Seville. In December 1809, he was appointed Secretary of State for Foreign Affairs; and in 1810, was elected a Knight of the Garter. He was favorable, both in and out of office, to the repeal of the penal laws affecting the Roman Catholics; and when, in January 1812, the Prince Regent refused to agree to a concession of Roman Catholic claims, W. resigned his seat in the cabinet. During the first ten years of the administration of Lord Liverpool, he remained in opposition. He protested against the insufficiency of the means placed at the disposal of the Duke of Wellington, and did not cease to demand that he should be assisted to the utmost extent of the national credit and resources, until the Duke had crossed the Pyrenees at the head of his victorious army, and brought the war to an end before Toulouse. When the settlement of the affairs of Europe was being arranged in 1815, W. protested against the neglect of commercial interests, but without effect. He now began to ally himself with the more liberal section of the Conservatives, who looked up to Mr. Canning as their leader, and accepted the office of Lord-lieutenant of Ireland. Conciliation was to be the principle of his government, but he held office for five years without effecting any material amelioration, owing to the difficulties arising out of the state of the penal laws. He was recalled from Ireland by his brother when he took office in 1828.

In 1830, W. accepted the post of Lord-steward of the Household from Earl Grey, and in 1833, in the 74th year of his age, he again proceeded to Ireland as viceroy, where he remained until Sir R. Peel's administration of 1834. In 1835, on the restoration of the Whig party, he accepted the post of Lord Chamberlain, which he only held for a few months. In 1837, it became known to the Directors of the East India Company that he was in straitened circumstances, and deriving little if any advantage from their annuity of £5000 per annum; they therefore resolved that a sum of £20,000 should be vested in trustees for his benefit. In 1841, it was further resolved that his statue should be erected in the court-room, as a mark of the admiration and gratitude of the East India Company. He died at Kingston House, Knightsbridge, on the 25th September 1842; and, in compliance with his will, was buried in the vault at Eton College Chapel. An authentic record of his Indian administration was undertaken by Mr. Montgomery

Martin, under the direction and at the expense of the East India Company, and published in 1836 in 5 vols. 8vo, entitled *Despatches, Minutes, and Correspondence of the Marquis Wellesley, during his Administration in India.* A thin 8vo vol. issued in 1838 contains *Despatches and Correspondence of the Marquis Wellesley, during his Mission to Spain.*

The marquis published several pamphlets on various occasions: *Substance of a Speech in the House of Commons on the Address in 1794; Notes relative to the Peace concluded with the Mahrattas; Letters to the Government of Fort George, relative to the new form of Government established there; Letters to the Directors of the East India Company on the India Trade;* &c. He was twice married, but left no issue, and the marquisate became extinct at his death; the earldom, &c., went to his next brother, but afterwards reverted to the second duke of Wellington, as son of the great duke, who was third brother.

WE'LLINGBOROUGH, so called from the medicinal springs in its vicinity, is a market-town in the county of Northampton, 10¼ miles east-north-east of the town of that name. It carries on a considerable trade in corn, boots, and shoes. Pop. (1881) 13,796.

WELLINGTON, Arthur Wellesley, Duke of, K.G., one of England's greatest generals, was the third son of Garrett, first Earl of Mornington, and brother of the Marquis Wellesley (q. v.). He was born May 1, 1769, at Dangan Castle, Ireland, and completed his military education, a few years before the French Revolution, in the military college of Angers, in France. He entered the army as ensign in the 41st Regiment in 1787, and became lieutenant-colonel of the 33d in 1793. In 1794, he embarked in command of the 33d Regiment, to join the Duke of York's army in the Netherlands. In this, his first term of actual service, he commanded three battalions on the retreat of the army through Holland, and distinguished himself in several repulses of the French.

In 1796, he accompanied his regiment to India, where his brother, the Marquis Wellesley, shortly afterwards arrived as governor-general. He commanded the subsidiary force of the Nizam, when the reduction of the Mysore was decided upon, and his division defeated Tippoo Sultan's right flank at Mallavelly. At the assault and capture of Seringapatam, he commanded the reserve in the trenches. He was appointed to the command in Mysore, and took the field (1800) against Dhoondiah Waugh, a Mahratta freebooter, who was defeated and slain. He was named second in command of the expedition which sailed from India to assist the English army in Egypt, but was prevented from embarking by illness. It was in the Mahratta war of 1803 that the young general won his first fame. After besieging and capturing Ahmednuggur, W., with only 4500 men, came upon the combined Mahratta forces, 40,000 or 50,000 strong, and not waiting for a larger British force that was on its way, won the brilliant victory of Assaye (q. v.). The victory of Argaum followed; and the great fort of Gawulghur, supposed to be impregnable, having been taken in December, the Mahratta chiefs sued for peace, after one of the most extraordinary campaigns on record. W. was made K.C.B., and received the thanks of the king and parliament. In 1805, he returned to England, and in November commanded a brigade in Lord Cathcart's expedition to Hanover.

In 1806, he obtained a seat in the House of Commons for Newport, Isle of Wight; and in April 1807, was appointed Chief-secretary to Ireland, the Duke of Richmond being Lord-lieutenant. He held a command in the army under Lord Cathcart, in the expedition against Copenhagen in 1807; and after the affair at Kioge, negotiated the capitulation of Copenhagen. He received the thanks of the House of Commons in his place, and returned to Ireland. In 1808, he commanded an expedition which sailed from Cork, being the first division of the British army sent out to assist in the expulsion of the French from Spain and Portugal. He landed at Corunna, and offered his aid to the army and people of Galicia; but the offer being declined, he finally landed (August 1808) with 10,000 troops at the mouth of the river Mondego, in Portugal. The whole of the north of Portugal was then in arms against the French. The affairs of Obidos and Roliça were quickly followed by the battle of Vimieira, in which he defeated Junot, who lost 3000 men and 13 pieces of cannon. After this event W. signed the armistice which led to the Convention of Cintra (q. v.). He subsequently gave evidence generally in favor of this convention at the Court of Inquiry (November 22). Being superseded in the command of the army by men who were only his superiors in military rank and seniority, he returned to England For the battle of Vimieira, he again, in his place, received the thanks of the House of Commons.

On the death of Sir John Moore, he returned to re-assume the command of the Peninsular army, previous to which he resigned the office of Chief-secretary of Ireland. He arrived at Lisbon, and assumed the command April 22, 1809. He had now to contend with Soult and Victor, who had entered Portugal at the head of a veteran army, and were in possession of its finest northern provinces. Oporto had been taken by Soult, and W. was anxious to bring him to action at once, in order that he might not make his retreat unharmed. The passage, at Villa Nova, of the Douro, a wide, deep, and rapid river, in the face of a formidable enemy, who had removed every boat and barge to the opposite side of the river, was one of the boldest and most successful operations of the war. W. entered Oporto the same day, and followed the French army. He was now, by a decree of the Prince Regent of Portugal, Marshal-general of the Portuguese army. The French had fallen back to a point where reinforcements were to meet them; and on the 27th and 28th July 1809, the enemy, commanded by Victor and Sebastiani, were defeated by the British under W. at Talavera. The slaughter on both sides was terrible, in this desperate, almost hand-to-hand conflict. W. was unable to follow up his victory owing to the non-co-operation of the Spanish army under Cuesta; and the want of supplies, and the junction of Soult, Ney, and Mortimer in his rear, compelled him to fall back upon Badajoz. The thanks of parliament were voted for the victory of Talavera, and Sir Arthur Wellesley was created (4th September 1809) a peer by the titles of Baron Douro of Wellesley and Viscount Wellington of Talavera, with a pension of £2000.

In May 1810, the French collected under Massena in such superior force in his front that he fell back upon Busaco, where he made a stand. Here the French (September 27) made two attacks upon his position, but were repulsed with great slaughter. After this, he retreated to Torres-Vedras (q. v.), to the occupation of which line of defence, and his judicious method of maintaining it, the ultimate success of the Peninsular war may be chiefly attributed. Massena, being unable to find subsistence for his army, began his retreat to Santarem, followed by W., who pursued the French in their retreat along the line of the Mondego. In April 1811, he received the thanks of parliament for the liberation of Portugal. Spain, however, was now subdued by the French. The Spanish armies were annihilated, and it was of the last importance that W. should be able to keep his rear open to the Tagus. W. having invested Almeida, Massena attempted to relieve it, but was skillfully repulsed at Fuentes de Onoro, May 3 and 5. The fall of Almeida followed, and W. ordered Badajoz to be invested. At this time, he had great reason to complain of the want of support and reinforcements from England. He had only the force which had followed Massena from Torres-Vedras, diminished by 9000 men *hors de combat* in so many sanguinary encounters. Writing to Marshal Beresford, he said: 'I enclose a despatch from Lord Liverpool [then at the head of the Home Government]; I believe they have all gone mad.'

The siege was carried on with vigor; but learning that Soult and Marmont designed to join their armies into one, in order to relieve Badajoz, and his own inadequate force not justifying him in risking a battle, he raised the siege, and retired to the frontiers of Portugal. He next laid siege to the strong fortress of Ciudad Rodrigo; and on the night of January 19, 1812, it was carried by storm, and the garrison made prisoners. For this achievement he was created by the Regency a Grandee of Spain, with the title of Duque de Ciudad Rodrigo. He again received the thanks of parliament, and a further pension of £2000 a year, and was advanced in the British peerage by the title Earl of Wellington. He next marched towards Badajoz, invested it in March, and carried it by storm, April 6, after a frightful carnage; the allies losing nearly 5000 men. In June, he advanced to Salamanca, captured the convents there, which had been fortified by the French, and drove Marmont to the Douro. On the 22d July, he gained at Salamanca one of his greatest military triumphs. Marmont extended his line, with the view of turning W.'s right: but the latter, perceiving that the enemy had thus weakened their left and center, vigorously assailed the weak points, and after an obstinate resistance, put the whole army to rout. Ammunition, stores, two eagles, eleven pieces of cannon, and 7000 prisoners, were the trophies of victory. The loss of the allies was only about 700 killed and 4000 wounded. Marmont lost an arm, and four French generals were killed.

W. received the order of the Golden Fleece, entered Madrid, was made generalissimo of the Spanish armies, and was advanced in the British peerage by the title of Marquis of Wellington. The thanks of parliament were again voted to him, together with the sum of £100,000, to be laid out in the purchase of lands to be settled on him, his heirs, and successors. In September, he marched to Burgos, but failing to capture it, he again retreated to the frontiers of Portugal. W. visited Cadiz and Lisbon, where he was received by the whole population. In May, he marched his army into Spain in two columns, and on the 21st June gained, at Vitoria, another signal victory over the French, commanded by King Joseph, assisted by Marshal Jourdan. The enemy lost 151 pieces of cannon and all their ammunition. The king's private carriage, letters, &c., fell into the hands of the victors. In exchange for the bâton of Jourdan, which was found on the field,

the Prince Regent forwarded to W. the bâton of a field-marshal of England. By this splendid and important series of victories, he had reached the summit of martial glory. The deliverance of Spain from the French was now certain. His infantry were soldiers who would, in his own words, 'go anywhere and do anything;' and even the invasion of France itself seemed to his countrymen to be no longer chimerical. He pursued the French army to France by Pamplona. He failed, July 25, to carry San Sebastian by assault, but gained another decisive battle over Soult at the Pyrenees, and the French army retreated into France.

A second attempt to carry San Sebastian by assault was successful, but it cost W. 2300 in killed and wounded. He now crossed the Bidassoa, and invaded France. Pamplona surrendered. After the passage and battle of the Nivelle, and the passage of the Nive, the victorious army of W. was attacked, December 10 to 18, on the left and right, by Soult who was defeated. Leaving two divisions to blockade Bayonne, W. followed Soult with the rest of the army. On 27th February 1814. he defeated Soult at Orthes, and crossed the Adour. The affairs of Aire and Tarbes were followed by the passage of the Garonne; and on the 10th April, W. consummated this series of brilliant victories by again defeating Soult under the walls of Toulouse. The allied Russian and German armies having entered Paris, and Napoleon having signed his abdication a few days before, this last battle would not have been fought, but for the non-arrival of news of the events of Paris. In a few weeks W. was in Paris, presenting the trophies of his brilliant campaign to the allied monarchs. He was created, May 3, Marquis of Douro, and Duke of W. in the British peerage, and received an additional grant of £400,000. He received for the twelfth time the thanks of parliament for his services, and on his arrival in England was greeted with the utmost enthusiasm. On the 28th June, he took his seat for the first time in the House of Lords. He next returned thanks at the bar of the House of Commons, and was addressed by the Speaker. He was appointed ambassador-extraordinary to the court of France in July 1814, whence he proceeded to the congress of Vienna.

Napoleon having escaped from Elba, the congress was abruptly broken up. W. was appointed commander of the British forces on the continent of Europe, and from Vienna joined the army at Brussels. It appeared probable that Napoleon would make a bold advance into Belgium, and its defence was assigned to an Anglo-allied army under W., and a Prussian army under Blücher. The battles of Ligny (q. v.) and Quatre Bras (q. v.) were succeeded on the 18th June 1815 by the great battle of Waterloo (q. v.). Here the grand and decisive blow was struck; here for the first and last time the Emperor and the great English general met and measured swords, and here the power of Napoleon was finally crushed. The allied armies, under W. and Blücher, marched upon Paris; the French army evacuated Paris under a convention; and Louis XVIII. entered Paris the very day after the English army. Marshal Ney was brought to trial. He relied upon the terms of the capitulation of Paris, and appealed in vain to W., who denied that the French king was bound by the convention—a reading which it is impossible to justify, as Sir A. Alison has shown in his *History of Europe*. At the request of the allied sovereigns, W. took the command of the army of occupation, and resided in Paris from 1815 to 1818.

Two attempts were, during this period, made upon his life: gunpowder was placed in his cellar for explosion; and one Cantillon discharged a pistol into his carriage; for which attempt at assassination, Napoleon I. left the miscreant a bequest in his will. When the allied armies evacuated France in 1818, the emperors of Russia and Austria, and the king of Prussia, created W. a field-marshal of their armies. He was created Prince of Waterloo by the king of the Netherlands. The gratitude of the British nation was, meanwhile, enthusiastically manifested. Statues were raised to his honor in the metropolis. Parliament voted £200,000, in addition to former grants; and the mansion and estate of Strathfieldsaye were purchased, to be held by W. and his heirs. The office of Master-general of the Ordnance, now abolished, but then comprehending the control of the artillery branch of the service, was conferred upon him. At the coronation of George IV., in 1821, he officiated as Lord High Constable of England. In October, he attended George IV. to the field of Waterloo. In 1822, he represented Great Britain at the Congress of Verona, where he ineffectually exerted his influence to prevent the invasion of Spain by a French army, in support of absolutist principles. In 1826, he went on a special embassy to St. Petersburg, when he induced the Emperor Nicholas to act in common with England and other powers, as mediators in the quarrel between Turkey and Greece. On his return, he was appointed Constable of the Tower. In 1827, he succeeded the Duke of York as commander-in-chief of the army, and was made colonel of the Grenadier Guards.

From this period, his political career may be said to begin. When Mr. Canning received the commands of George IV. to form an administration, W., with six other members of the Liverpool administration (including Lord Eldon and Peel), resigned office. In the explanations which he gave, he emphatically denied that he had entertained the ambition of himself filling the post of first-minister; and said he felt his incapacity for such an office so strongly that he should have been 'mad' if he had coveted it. In August 1827, after Mr. Canning's death, he again accepted the command of the army, which he resigned on being called upon by George IV. (January 8, 1828) to form an administration. Of strong Tory politics, he was, nevertheless, the first minister to cede to the growing popular power. The Test and Corporation Acts were repealed, and the removal of the Catholic disabilities was the first measure proposed by W. in the following session, upon the ground of the formidable attitude of the people of Ireland and the danger of civil war. This measure involved him in a bloodless duel with the Earl of Winchelsea. The French revolution of 1830 appears to have influenced him in making a firm stand against reform in parliament, in the same proportion that it raised the demands of the people; and when the struggle of Continental Europe to emancipate itself from arbitrary government, strengthened the popular cry for 'parliamentary reform,' he chose the earliest moment to declare the unalterable perfection of the representative system of the country, and the determination of his government to resist all measures of parliamentary reform. His unpopularity became excessive; and anticipating a defeat in the House of Commons, on Mr. Brougham's proposition for reform in parliament, W. resigned office, and was succeeded by Earl Grey. He had meanwhile become Lord Warden of the Cinque Ports.

Under the administration of Earl Grey, W. held no office. He strenuously opposed the Reform Bill, and a London mob broke the windows of Apsley House, and hooted and pelted him in the streets. In January 1834, he was elected Chancellor of the university of Oxford. Upon the enforced resignation of Lord Melbourne, in November 1834, he was sent for by William IV. He declined to take the premiership, and was intrusted by the king with the whole charge of the government, and the seals of the three Secretaries of State, until Sir R. Peel could arrive from Rome. Peel constructed a Conservative government, in which W. took the office of Foreign Secretary. In April, Peel resigned, and henceforward W. ceased to take a prominent share in the civil government of the country. He gave a generous welcome to Soult, who represented France at the coronation of Queen Victoria, and was received with great cordiality by the people on this occasion. In August 1839, a grand banquet was given to him at Dover, as Lord Warden of the Cinque Ports, on which occasion Lord Brougham proposed his health in a brilliant eulogium. In 1841, he accepted a seat in the cabinet of Sir R. Peel, without office. In 1842, the Queen visited him at Walmar Castle, and in the same year he was reappointed to the command of the forces. In 1845, he doubted the policy of repealing the Corn Laws; but in conformity with his usual practice, of considering 'how the Queen's government was to be carried on,' he determined to stand by Sir R. Peel in his attempt to abolish them.

W. not merely consented to remain in the cabinet, but accepted the higher office of President of the Council in lieu of the post of Lord Privy Seal. When the bill came up to the Lords, W., with great emotion and earnestness, warned the peers not to reject the bill, and never to separate themselves from both the crown and the House of Commons. His speech made a great impression, and the bill passed a second reading by a considerable majority. He retired with the Peel government in July 1846. After this event he may be said to have withdrawn from political strife, nor is it to be denied that his share in the repeal of the Corn Laws cast a halo of popularity around the remainder of his life. In 1848, he called attention to the unsatisfactory state of the national defences in a letter to Sir J. Burgoyne. As commander-in-chief, he directed great preparations to be made to prevent a Chartist outbreak on the 10th April. His last speech in the House of Lords was delivered in support of the Militia Bill, when he declared that England had been carrying on war in all parts of the world with an insufficient peace establishment. On September 14, 1852, he was seized at Walmer castle with an epileptic fit, became speechless, and died the same afternoon. His remains were honored by a public funeral. The body, after laying in state at Chelsea Hospital, was removed to the Horse Guards; and on the morning of November 18, was borne through the streets of London to St. Paul's Cathedral, where it rests by the side of that of Lord Nelson. The funeral pageant was witnessed by a countless multitude.

His *Despatches*, published by Colonel Gurwood, in 12 vols., are the proudest monument of his glory; they exhibit him as a commander who overcame countless difficulties by honesty, sagacity, singleness and constancy of purpose, and devotion to duty. Throughout his long career, he appears the same honorable and upright man, devoted to the service of his sovereign and country, and just and considerate to all those who served under him. As a general, he was cautious, prudent, and careful of the lives of his

men; but when safety lay in daring, as at the battle of Assaye q. v.), he could be daring in the extreme. He enjoyed an iron constitution, and was not more remarkable for his personal intrepidity than for his moral courage. The union of these qualities obtained for him the appellation of the 'Iron Duke,' by which he was affectionately known in his later years. His parliamentary oratory was plain and to the point. He spoke without fluency or art, yet his strong sense and practical sagacious judgment gave him great weight with his brother peers. His tastes were aristocratic; and his aides-de-camp and favorite generals were almost all men of family and high connections. Altogether, he was the very type and model of an Englishman; and in the general order issued by the Queen to the army, he was characterized as the 'greatest commander whom England ever saw.' He married, in 1806, the second daughter of the third Earl of Longford, and by her (who died in 1831) he left two sons—Arthur Richard, the second duke (who also inherited the earldom of Mornington), and Charles, deceased, whose son, Henry Wellesley, is heir-presumptive to the title.

Colonel Gurwood's *Despatches of the Duke of Wellington*, 12 vols.; Gurwood's *General Orders of Duke of Wellington*, 1809—1818; Napier's *History of the Peninsular War;* Alison's *History of Europe;* Thibaudeau, *Histoire de l'Empire;* Thiers, *Histoire de l'Empire;* Marquis of Londonderry's *Narrative of the Peninsular War*, 1808—1813; Gleig's *Life of Arthur, Duke of Wellington;* Bourrienne's *Mémoires sur Napoleon;* Las Casas, *Mémorial de Ste-Hélène; La Vie de Wellington*, Brialmont; *Speeches in Parliament of Duke of Wellington; Sir R. Peel's Memoirs*, by his Literary Trustees; *Supplementary Despatches and Memoranda of Field-marshal Arthur, Duke of Wellington*, edited by his son, the Duke of Wellington, in 14 volumes, 1858—1875; also in continuation of the above, *Despatches, Correspondence, and Memoranda of Field-marshal Arthur, Duke of Wellington*, in eight volumes, 1867—1880.

WE'LLINGTON, a small market-town in the county of Somerset, 7 miles south-west of Taunton, at the foot of the Blackdowns, which are crowned by a Waterloo monument. The town gives title to the Duke of Wellington. Blankets, serges, and other woollen goods and earthenware are manufactured. Pop. (1881) 6360.

WELLINGTON, a small market-town of Shropshire, 10 miles east of Shrewsbury, at the foot of the Wrekin. It is situated in a populous mining and agricultural district, with coal and iron mines, iron-works, limestone quarries, and wire-mills in the vicinity; in the town are smelting-furnaces, nail-works, and malt-kilns. Pop. (1881) 6202.

WE'LLINGTON, a town of New Zealand, the chief town of a 'provincial district,' and since 1865 also the capital of the whole colony, the residence of the governor, and place of meeting of the 'General Assembly,' or colonial parliament. W. was the first settlement of the New Zealand Company, and was planted under the direction of Colonel Wakefield, with a band of pioneer colonists, in 1840. The town is beautifully situated on a bay of Port Nicholson, itself an inlet of Cook's Strait, on the southern coast of the North Island. The surrounding country is richly wooded, but the dense forests have begun to yield to the axe of the settler. The harbor is a fine expanse of water, six miles long and five broad, and has an excellent wharf, affording accommodation to ships of any tonnage, and considered one of the best in the Australian colonies. Since the removal of the seat of government hither, the town has made very rapid progress; it possesses a number of good public buildings; a handsome pile has recently been erected for the use of the House of Representatives and Legislative Council. The streets are generally spacious, and have good dwelling-houses. W. possesses a cathedral, together with about 20 other places of worship, in connection with the Episcopalians, Presbyterians, Methodists, Roman Catholics, and Jews. There are also several banks and numerous insurance agencies. There is a railway to the interior, to connect ultimately with the lines already laid on the eastern and western shores. W. is also connected by steamers with the chief ports of New Zealand, and with Melbourne, Sydney, and Panama. Pop. (1881) 20,535.

WELLINGTON COLLEGE, near Wokingham, Berkshire, was founded in 1853, in memory of the Duke of Wellington, from funds raised by public subscription. It is a school intended for the education of the sons of deceased officers of the army. There are above 20 masters and about 400 pupils. The foundationers are boarded and educated free of charge; non-foundationers pay £110 per annum.

WELLINGTO'NIA, the name given by Lindley to a genus including only one species, the *W. gigantea*, the greatest of all pines. The Americans refer the W. to the genus *Sequoia*, which contains two species, *S. sempervirens* and *S. gigantea* (our W.). The foliage of the latter is very similar to that of an arbor vitæ, the leaves being very small, like scales, and closely appressed to small slender branchlets. The leaves of young plants are longer and somewhat needle-shaped. The branches divide into very numerous small branchlets. The flowers are generally solitary and terminal, the male and female flowers distinct, but on the same tree. The cones of the *W. gigantea* are ovate, from 1½ to 2 inches long, by 1½ inch broad, single, or in opposite pairs, rarely clustered, the scales wedge-shaped, with about four seeds under each. The *W. gigantea* has a columnar stem, with branches only on the upper half of it, the branches of comparatively small size, and not forming an umbrageous head. The stem attains a height of 300 feet, and sometimes more, perfectly straight and erect.

One tree is known, 321 feet in height; and near it lies a larger one, which has fallen, and which was broken against another



Wellingtonia gigantea: The Three Graces.
(Copied from Hutchin's *Scenes of Wonder in California.*)

large tree in its fall, its diameter where it was broken, 300 feet from its base, being 18 feet. Another tree is 102 feet in circumference at the base. The W. is found only in a limited district in California, on the Sierra Nevada, at an elevation of 4000 to 5000 feet above the sea. It was discovered in 1850, by Mr Dowd, who,



Cone and foliage of the *Wellingtonia gigantea,*

being engaged in deer-hunting, came with astonishment into the midst of a group of these trees, now known as the Mammoth Trees of Calaveras. In this locality, within an area of 50 acres, are 123 large trees, 20 of which exceed 25 feet in diameter at the base, and are therefore about 78 feet in circumference. A tree which was felled was 302 feet in height, and 96 feet in circumference at the ground. It was sound to the center. Its age may be guessed at something like 3000 years. It was calculated to contain about 500,000 cubic feet of timber. Five men were employed for 22 days in felling it, by boring great auger-holes and sawing between them. When it had been cut through, it remained steadfast on its base, and more than two days were spent in driving in great wedges, to cause it to fall. A round wooden house has been erected on the stump, where dancing-parties sometimes enjoy themselves. For several years, the Wellingtonias of Calaveras were supposed to be the only trees of their kind in existence, but groups have more recently been found in other parts of the same district, and scattered trees in a number of localities. The W. has been introduced into Britain, the climate of which is very suitable to it. The loftiest W. does not exceed 325 feet, and is greatly surpassed by the eucalyptus trees of Australia and Tasmania. Many eucalypti are 250 to 350 feet high; and as some measure 18

to 20 feet in diameter, it is probable they also contain more timber than any W., though these are proportionately thicker at the base.

WELLS, an ancient city and municipal and parliamentary borough, in the county of Somerset, pleasantly situated at the foot of the Mendip Hills, 15 miles south-west of Bath. It is a clean and cheerful town, with runlets of water flowing through each principal street. The cathedral, a remarkably beautiful edifice, begun in 704, and enlarged in 1138, is for the most part in Early English; but its west front, one of the noblest façades in the kingdom, and which is enriched with 300 statues, is in Gothic. The bishop's palace, originally founded in 1088, is surrounded by a moat supplied from the abundant source of St. Andrew's Well—from which the town is said to derive its name—and by lofty walls. There are no manufactures, and the trade is chiefly retail. Pop. (1871) 4518; (1881) 4633.

WELL-STAIRCASE, a winding staircase with an aperture left in the center, called the *well*, by which light and air are admitted.

WELSER, the name of a famous extinct patrician family in Augsburg. JULIUS W. was knighted by the Emperor Otto I. for his services in the war against the Hungarians. His son, OCTAVIAN W., settled in Augsburg, and from him descended the patrician family, which always held important posts in the council of that town. BARTHOLOMEW W., privy councilor of the Emperor Charles V., was so wealthy, that he could vie with the Fuggers (q. v.), in munificence. With the emperor's permission, in 1526, he fitted out three ships in Spain, which, under the command of Ambrose Dalfinger of Ulm, sailed for America, and took possession of the province of Caracas, which the emperor gave W. in pledge. Twenty years after this, the Welsers gave up their possession voluntarily, and it reverted to Spain.—The most famous of the family was the niece of Bartholomew W., PHILIPPINE W., a daughter of his brother, Franz W., born about 1530. She had received an excellent education from her clever mother, and was exceedingly beautiful.

On the occasion of a Diet of the empire at Augsburg in 1547, she was seen by the Arch-duke Ferdinand, the second son of the subsequent emperor, Ferdinand I., who fell in love with her. The young girl firmly rejected all the advances of this fiery youth of 19, and refused to have any relation with him excepting by marriage. They were therefore married in 1550, without the knowledge of his father, or of his uncle, Charles V. His father, on hearing the news, was exceedingly angry, and for a long time his son did not venture to appear before him. Even in other countries this misalliance made a great noise. In the meanwhile, the loving couple enjoyed the greatest domestic happiness, and Philippine enchanted every one that knew her by her intelligence and kindness of heart. It was only after eight years that his father was reconciled. Philippine, in disguise, herself handed him a petition, and by her deportment on the occasion, as well as her beauty, disarmed the angry father. He forgave his son, declared his children legitimate, and raised their mother to be Markgravin von Burgau. This happy marriage lasted 30 years. Philippine died at Innsbrück in 1580. In the palace at Schönbrunn, the portrait of the lovely Philippine is still pointed out.

WELSH LANGUAGE AND LITERATURE, The Celtic languages are divided into two groups, Gaelic and Cymric. To the latter of these the Welsh belongs, and has even given name, as forming the most important member of the group, which comprises besides, Armorican (spoken in Bretagne) and Cornish (now extinct). A controversy has been waged concerning the nature and closeness of the intimacy existing between the Gaelic and Cymric tongues, but the question may now be considered settled by the researches of the Rev. Richard Garnett (*Gentleman's Magazine*, May 1839), who found, on examining the monosyllabic words in the introductory part of Neilson's *Irish Grammar*, that out of 270, no fewer than 140 were identical in sense and origin with corresponding Welsh terms, that 40 were cognate, an equal number borrowed from Latin, Saxon, &c., and that only 50 were peculiar to the Gaelic. Nevertheless, it is not to be supposed that the affinity is as close as that which exists between English and so-called Scotch. It is rather (according to Mr. Garnett) such as exists between Icelandic and German. A Welshman cannot understand a Highlander or an Irishman; he cannot even understand a Breton (as used to be believed), though the language of the latter is undoubtedly Cymric. Most extraordinary hallucinations were formerly current in regard to the antiquity of the Cymric tongues. Pezron, the Breton investigator, gravely affirmed that Welsh and Armoric (which he considered the same) had been 'the language of the Titans, that is, the language of Saturn, Jupiter, and the other principal gods of heathen antiquity.'

The Rev. Joseph Harris, editor of the *Seren Gomer*, remarked in 1814, that 'it is supposed by some, and no one can disprove it, that Welsh was the language spoken by Adam and Eve in Paradise.' The *fact*, on the other hand, is, that of the two branches of Celtic, the Cymric is less ancient than the Gaelic, and that among the Cymric tongues the Cornish is probably older than the Welsh. (See Norris, *Ancient Cornish Drama*, Oxford, 1859). But preposterous as the views of most patriotic Welshmen are on this subject, it is undoubtedly true that the Welsh is one of the oldest living languages in Europe, and that it possesses a literature reaching back to remoter times than that of any modern tongue except Irish. The most striking peculiarities of the language are the abundance of its grammatical permutations, and its facility in forming derivatives and compounds. Of the former, two examples may be given by way of illustration. The Welsh word for 'father' is *tad;* for 'my,' *fy*. But you cannot say for 'my father,' *fy tad*. After *fy*, every word beginning with *t* must change the *t* to *nh;* and therefore the correct phrase is *fy nhad*. So after *ei*, *tad* becomes either *dad* or *thad*, according as *ei* means 'his' or 'her.' The rules of permutation are almost endless, and, in the opinion of such Welsh scholars as are not Welshmen, useless, nothing being gained in point of euphony or expressiveness.

The Welsh affirm that their language is exceedingly harmonious, and it would serve no good purpose to dispute the assertion; but foreigners ignorant of the tongue, and associating no definite ideas with the words that issue from a Welshman's lips, generally fail to realize the fact, and consider it in this respect—though not in others—distinctly inferior to Gaelic. The language, or rather the structure of sentences and the phraseology, exibits a certain stateliness, or even grandiloquence, characteristic, indeed, of uncivilized nations. One thing specially deserves notice. The Welsh people are profoundly attached to, and familiar with it. It is not dying out, like Irish or Scotch Gælic. It has a genuine literary, as well as oral existence even now, and though the changes it has undergone since the days of Taliesin are numerous and great—so great, indeed, that no modern unlettered Cambrian can understand a word of the early poetry of his country—yet it is essentially the same tongue as Cæsar and Agricola heard, and is consequently to be regarded with veneration as the solitary living link that unites those distant ages with our own.

There are extant, says Owen Pughe, some thirty old treatises on Welsh grammar and prosody. The most important of these is one composed by Geraint (880 A.D.), revised by Einion (1200 A.D.), and regularly privileged by the sovereigns who then exercised authority in Wales. It was first printed by the Welsh MS. Society in 1856, under the editorship of the Rev. J. Williams ab Ithel. Among English grammars of the Welsh language, the best is said to be that by the Rev. Thomas Rowland (2d ed. 1857); among dictionaries, that of Owen Pughe, entitled *Geiriddur Cymraeg a Saesoneg, a Welsh and English Dictionary* (2 vols. 1793; 3d ed. 1861, *et seq.*). It is, however, only a Welsh-English dictionary; the most satisfactory English-Welsh dictionary is that published by Daniel Silvan Evans (2 vols., Denbigh, 1852—1858).

The literature of Wales has been arranged into four periods: the *first* extending from the earliest times to the Norman Conquest (1066 A.D.); the *second*, from the Norman Conquest to the English Reformation (*circa* 1536 A.D.); the *third*, from the English Reformation to the beginning of the reign of George III. (1760 A.D.); and the *fourth*, from 1760 to the present day. To what date the oldest specimens of Welsh literature ought to be assigned, has been the subject of sharp dispute. These specimens are in verse, and are rhymed. The chief of their alleged authors, with their supposed periods, are Aneurin (510—560 A.D.), Taliesin (520—570 A.D.), Llywarch *Hen*, or 'the Old' (550—640 A.D.), and Myrddin or Merlin (530—600 A.D.).

According to Pinkerton (see his preface to *Barbour*) and Laing (*Dissertation on Ossian*), they are not authentic; but the vindication of their authenticity, first by Sharon Turner in 1803, and afterwards, and more critically, by Mr. Stephens of Merthyr-Tydvil, in his *Literature of the Kymry* (1849), and Mr. Nash, in his *Taliesin, or the Bards and Druids of Britain* (1858), is considered conclusive. The last two of these writers, however, may almost be said to meet their opponents half-way. Of the seventy-seven poems ascribed to Taliesin in the *Myvyrian Archaiology of Wales* (a collection of all the most celebrated works in Welsh literature, 500—1400 A.D.), which appeared in 1801—under the auspices of Mr. Jones, Mr. Edward Williams (better known as 'Edward of Glamorgan'), and Dr. Owen Pughe—Mr. Stephens considers fifty-seven to be demonstrably spurious, and only twelve to be probably genuine, that is, belonging to the age of Taliesin. Mr. Nash enables us to form an independent judgment on the point, for he translates some fifty of these poems, and we find that, instead of their exhibiting an antique Welsh character, they abound in allusions to medieval theology, and frequently employ medieval Latin terms. It is certainly unfortunate for the reputation of the 'Chief of the Bards,' that the specimens of his which *are* considered to be genuine possess exceedingly small poetic merit.

The life of this famous but apparently over-rated genius is, of course, enveloped in legend. He is said to have been the son of a certain St. Henwg, and to have been educated at the College of St. Cadog. His life was spent successively at the courts of Urien Rheged, Gwyddno, Prince of Cardigan, and King Arthur, and his sepulchre is shown near Aberystwith. It is still called *Bedd Tal-*

iesin (Taliesin's Grave). Of the poems whose authorship is ascribed to Aneurin, a prince of the Cumbrian Britons, the most notable is that entitled *Gododin*, in which he pathetically laments a defeat of his countrymen by the Saxons. It is reckoned authentic. (Several English translations of the *Gododin* have been published, and a translation of the whole works of Aneurin was published by Mr. Probert in 1820.) Llywarch Hen, also a Cumbrian warrior, is regarded as the finest and most poetical of all the semi-historical Welsh bards. Tradition reports that he lived to the age of 150. The burden of his verse is the miseries of old age, on which he descants with melancholy eloquence. (See *The Heroic Elegies and other Pieces of Llywarch Hen. Prince of the Cumbrian Britons*, with a literal translation by William Owen, 1792.) The pieces ascribed to Merddyn, in the *Myvyrian Archaiology*, are in all probability spurious. Besides the names already mentioned, other poets of the first period are Gwyddno, Gwilym ab Don, Golyddan, &c.

The earliest specimen of Welsh prose now extant is the collection of the laws of King Hywel Dda, or Howel the Good (died 748 A.D.)—a work of great value in illustrating the manners and morals of early Welsh times, but it is very uncertain when or by whom the collection was made. The oldest extant MS. belongs to the 12th century. The latest and most critical edition (Welsh and English) is that published in 1841 by the Record Commission, and edited by Aneurin Owen, son of Dr. Owen Pughe. Another work, entitled *The Wisdom of Cadog the Wise* (a collection of proverbs pretending to be by a St. Cadog, who flourished in the 6th c., and was a friend of Taliesin), is of such doubtful authenticity that its claim can only be noticed in our sketch.

Second Period, 1066—1536.—A few years after the date of the Norman Conquest, a new spirit was imported into Welsh poetry by the influence of Gruffydd ab Cynan, Prince of North Wales, and Rhys ab Tewdwr, Prince of South Wales, particularly of the former. Gruffydd had been born during his father's exile in Ireland, and was brought up in that country, where he appears to have acquired a familiarity with both the native Celtic literature and that of the Dano-Norse invaders. In the year 1100, he held a great Eisteddvod at Caerwys in North Wales, which was numerously attended by Irish bards and musicians. For the next three hundred years, Wales is rich in native bards, a fact that conclusively refutes the tragic story of Edward I. having caused them all to be slain, lest their patriotic songs should stir the Welsh to renew the struggle for independence.

Nearly sixty names occur in the *Myvyrian Archaiology* between 1120—1380. The first is that of Meilyr (1120—1160), whose best piece is entitled *The Deathbed of the Bard*. Meilyr's son, Gwalchmai ab Meilyr (1150—1190), who is said to have accompanied Richard Cœur de Lion to Palestine, is a superior poet to his father. Fourteen of his productions are extant. Gwalchmai's son, Einion (1170—1220), also figures as a poet. Forty pieces are ascribed to Cynddelw (1150—1206), a contemporary of Gwalchmai, of which probably the most interesting is *The Deathbed of Cynddelw*. He has also some verses addressed to Prince Madog or Madoc of Powys, whom enthusiastic Welshmen conceive to have discovered America before Columbus. Other bards of this second period are Llywarch ab Llewellyn (1160—1220); Hywel (1140—1170), a brother of Prince Madoc, and writer chiefly of erotic odes; Owain Cyveilioc (1150—1197), also of princely rank, whose *Hirlas* or the *Long Blue Horn* is a great favorite with more than Welshmen; and above all, *Davydd ab Gwilym* (*circa* 1340—1400), who has been compared to Ovid, to Petrarch, and to Burns. In his verses, Welsh poetry undergoes a change—the bardic or Scaldic spirit disappears, and a more humane, if less patriotic spirit takes its place. Davydd sings of love and of social amusements; he was likewise a fierce satirist, though at times very penitent and pious; while, to complete his resemblance to the Scottish poet, and also to justify the biblical name he bore, he showed an unmistakable predilection for illicit love.

Davydd's poems were first published in Welsh, with a biography of the author by Owen Jones and Owen Pughe (1789). An English translation of some of them by Mr. A. Johnes appeared in 1834. Besides the poets already mentioned, the following names are in high repute: Iolo Goch, the friend and bard of the famous Owen Glendower, who is said to have lived to the age of 120; Sion Cent ('John of Kent'), a name given him from Kentchurch, in Hereford, where he resided (1380—1410), and who, having adopted the opinions of the Lollards, ultimately attained the reputation of a wizard; and Lewis Glyn Cothi, who flourished during the Wars of the Roses, and was bard to Jasper, Earl of Pembroke, son of Owen Tudor, and the widow of Henry V.

Prose.—The oldest Welsh chronicler of the second period is Caradoc, a monk of Llancarvan, who flourished in the first half of the 12th century. His work narrates in Welsh the history of his native country from the death of Cadwallader, 689, to the times of Caradoc himself. It is a dry, illiterate affair, like the Anglo-Saxon Chronicle. Contemporary with Caradoc was the famous Geoffrey of Monmouth (q. v.), Bishop of St. Asaph, who died in 1154. He, however, though a Welshman, wrote in Latin, and belongs, therefore, rather to the general literature of England than to Welsh literature. His *Chronicle* commences with the fall of Troy, and ends with the death of Cadwallader, so that it forms an introduction to that of his friend Caradoc. In it the legend of Arthur first assumes that romantic and chivalrous form in which modern readers are familiar with it.

It is impossible here to enter into a discussion of the question where the materials of the Arthurian romance were first accumulated; suffice it to say, that evidence preponderates in favor of their Welsh origin. To this *second* period must also be assigned that charming collection, the *Mabinogion*, or Children's Tales, of which a MS. volume of more than 700 pages is preserved in the library of Jesus College, Oxford, and is known as the *Red Book of Hergest*, from the name of the place where it was discovered. A beautiful edition of this work in Welsh and English, with preface and notes, was published in 3 vols. (1838—1849) by Lady Charlotte Guest. The age of these tales, which relate principally to Arthur and the Round Table, is doubtful. The transcription in the *Red Book of Hergest* belongs probably to the 15th c.; but the date of their composition may be safely held to be much earlier, perhaps somewhere in the 13th century.

The *Triads* may also be here noticed. They are collections of historical facts, maxims ethical and legal, mythological doctrines and traditions, and rules for the structure of verse; all expressed with extreme brevity, and regularly disposed in groups of three. They were a very popular species of composition among the Welsh, and are of all ages. Examples occur in the poems of Llywarch Hen, but the greater part are found in transcripts and miscellanies of the 16th and 17th centuries.

The 'historical' triads are especially puzzling. They occur in a so-called collection made by one Thomas Jones of Tregaron, about the close of the 16th century. This Jones was originally, it seems, an eminent robber—a Welsh 'Rob Roy;' but in his later years he reformed, married an heiress, and became a justice-of-peace for the county of Brecon. The peculiarity of his 'Collection' is, that it gives a totally different account of the origin of the Britons from Geoffrey of Monmouth, bringing them from a 'Summer Land' (supposed to be Constantinople or the Crimea) over a sea called the 'Hazy Sea.' The question arises, and has not been settled: Whether are we to suppose Jones the fabricator of these 'triads,' or his account of the origin of the Britons the genuine record of an ancient tradition? In favor of the former hypothesis, unfortunately, is the circumstance that there is no trace of such an ancient tradition in the anterior literature of Wales.

Third Period (1536—1760).—This and the remaining period may be briefly sketched. The most notable fact in its commencement is the comparative ease with which the Reformation made its way among the Celts of Wales. The Celts of the Highlands remained for a time, and those of Ireland remain to this day, obdurate adherents of the old faith; but those of Wales, on the whole, swiftly accepted the new religion. The art of printing had been in operation in England for more than half a century before it was applied to the Welsh language.

The first book printed in the Welsh or any Celtic language was an almanac, with a translation of the Lord's Prayer and the Ten Commandments (Lond. 1546). The author, William Salesbury, was a scholar and a zealous Protestant. In 1547, he published the first dictionary of English and Welsh, and executed the greater part of the first translation of the New Testament into his native tongue (Lond. 1567). In 1588, appeared the earliest translation of the whole Bible into Welsh. The author was a Dr. William Morgan, afterwards Bishop of St. Asaph's. A revised edition of this, in 1620, by Dr. Parry, Morgan's successor in the bishopric of St. Asaph's, is the translation still in use among the natives of the Principality. Contemporary with Salesbury, but an adherent of the old faith, was Dr. Griffith Roberts, who lived on the continent, and published at Milan a Welsh Grammar in 1567. Another contemporary was Dr. John David Rhys, whose principal work, *Cambrobrytannicæ Cymræcæve Linguæ Institutiones et Rudimenta*, is a treatise on Welsh grammar. The suspicious Thomas Jones of Tregaron, possible *author*, rather than collector of the 'historical' triads, was a friend of Rhys, and died about 1620. In 1603, Captain Myddleton, one of the first three persons who smoked tobacco in England, published a metrical version of the Psalms in Welsh, partly executed while cruising about in the West Indies.

The most celebrated poets of the *third* period are the Rev. Rees Prichard, vicar of Llandovery (1579—1644), whose *Canwyll y Cymry* (Candle of the Cambrians) is a metrical version of his professional homilies or sermons, the eloquence of which had previously won for him a great reputation as a preacher; it is still popular, the 20th edition having appeared as late as 1858: Huw Morus, or Hugh Morris (1622—1709), author of a variety of pieces, which his countrymen consider unsurpassed in humor, pathos, and even sublimity—an edition in 2 vols. appeared at Wrexham (1823), under the title of *Eos Ceiriog* ('The Nightingale

of Ceiriog): and Goronwy Owen (1722—*circa* 1780), a gifted bard, but likewise an incurable drunkard, whose principal poems are contained in the first volume of a book entitled *Diddanwch Teuluaidd* (Domestic Amusement, Lond. 1763). Of the prose writers, the only noteworthy are Ellis Wynne (d. 1734), author of the *Bardd Cwsg* (Sleeping Bard, 1703), a series of visions of Hell and Hades, written with great beauty of style; and the Rev. Moses Williams (1685—1742) an antiquarian scholar of high merit, whose *Repertorium Poeticum*, or List of Welsh Poems and Catalogue of Welsh Books, is very valuable.

Fourth Period (1760 to present time).—Various causes co-operated to give a new impetus to Welsh literature after the accession of George III. Among these, the most powerful were the establishment of periodical publications, the institution of patriotic societies, and the spread of Methodism. The first important production of this period is entitled *Some Specimens of the Poetry of the Ancient Welsh Bards translated into English* (Lond. 1764), by Mr. Evans, curate of Llanvair Talyhaern, in Denbighshire. The next name deserving of mention is that of Owen Jones (1741—1814), who, though engaged in mercantile occupations all his life, managed, by his enthusiasm and liberality, to quicken and extend the public interest in Welsh literature. In 1771, he founded the *Gwyneddigion* (society of the 'Men of Gwynedd'), which gave prizes for the best performances on the Welsh harp, and the best Welsh poems. In 1801—1807, he caused to be published at his own expense, under the editorship of Owen Pughe and Edward Williams, three volumes of the *Myvyrian Archaiology*, so called in honor of himself, who had assumed the bardic name of Myvyr, from his native vale in Denbigh. Owen Jones was, however, rather a Welsh Mæcenas than a Welsh *littérateur*. The next names of importance are those of the editors just mentioned, Owen Pughe and Edward Williams.

The former (1759—1835), according to Southey, was a 'muddy-minded man;' nor is the fact that he was a follower of Joanna Southcott, and one of her twenty-four elders, adverse to this description of his intellect. Be this as it may, Owen Pughe is the great Welsh lexicographer; his Dictionary of Welsh (1793—1803) contains 100,000 words illustrated by 12,000 quotations. He also translated *Paradise Lost* into Welsh, in which work he threw off the chains of Welsh alliteration, an innovation generally acknowledged to be an improvement. Edward Williams (1745—1826), better known as Iolo Morganwg, is probably the finest Welsh genius of the fourth period. Southey knew him, and liked him greatly. His principal productions are *Salmau yr Eglwys yn yr Anialwch* (Psalms of the Church in the Desert); but an *Ode on the Mythology of the Ancient British Bards in the Manner of Talicsin* (1792), accompanied by notes and specimens of 'Triads,' containing the metaphysical and religious doctrines of the old Druidical bards, provoked a long-protracted controversy. Morganwg said that he had copied them from a MS. collection of a Welsh poet, *anno* 1560, which was in his possession, and affirmed that the collection was of very great antiquity. He was often asked to produce it, but always declined; and Welsh critics of the stricter sort have now ceased to believe in its existence.

The three associates in the publication of the *Myvyrian Archaiology* had each one son, and all of these have become eminent in connection with the literature of their native country. Taliesin Williams (1787—1847), son of Edward Williams, wrote poetry both in Welsh and English; Aneurin Owen (1792—1851), son of Owen Pughe, among other works, published an important collection of the *Laws of Wales;* while Owen Jones, son of Owen Jones, the Welsh Mæcenas (died 1874), had a high reputation as an architect, the Alhambra at Sydenham being a favorable specimen of his professional talents. The fourth period of Welsh literature is naturally richer in critical than in creative works. Among Welsh antiquaries may be mentioned the Rev. Edward Davies (1756—1831), author of *Celtic Researches* (1804) and *Mythology of the Druids* (1809): the Rev. Thomas Price (1787—1848), author of the *Hanes Cymru a Chenedl y Cymry* (1836—1842), a History of Wales and of the Welsh nation from the earliest times to the death of Llewellyn; an admirable work, comprehensive, critical, and literary (Price was an ardent and voluminous writer, contributing to no fewer than 15 periodicals at the same time): and the Rev. John Williams ab Ithel, rector of Llanymowddwy in Merioneth, and editor of the *Cambrian Journal*.

In 1856, he edited, for the Welsh MS. Society, the *Grammar of Edeyrn, the Golden-tongue*, said to be composed about 1270; in 1860, the *Brut y Tywysogion*, or Chronicle of the Princes; and in 1861 (*et seq.*), *The Traditionary Annals of the Cymry*, reprinted from the *Cambrian Journal*. Williams is a rather credulous and uncritical writer, but a scholar of undoubted merit. Probably the ablest recent Welsh scholar was the late Mr. Thomas Stephens of Merthyr-Tydvil, a man at once patriotic and honest, enthusiastic and critical. To him, above all others, Englishmen desirous of obtaining some clear and credible knowledge of Welsh literature, ought to apply. His principal works are *Studies on British Biography*, and *Literature of the Cymry in the Twelfth and following Centuries*. The enlightened views of Stephens have met with great acceptance among such English scholars as have paid attention to the subject of Welsh history and literature.

The poetry of the fourth period is not remarkable. The principal names are—David Richards of Dolgelly (1751—1827), author of a sort of epic on the Trinity—a very unsuitable subject for an epic—and a paraphrase of the history of Joseph: David Thomas of Caernarvon (1769—1822), who was very successful at the Eisteddfods: David Owen of Givion (1784—1841), whose poems were collected and published under the title of *Blodau Arfon* (Flowers of Arvon): the Rev. Daniel Evans, a collection of whose pieces was published at Llandovery in 1831, under the title of *Gwinllan y Bardd* (The Poet's Vineyard): the Rev. Walter Davies (1761—1849), also great at Eisteddfods: the Rev. James Hughes (1779—1846): the Rev. William Rees of Liverpool, author of a spirited paraphrase of the Book of Job, &c.: and the Rev. William Williams of Caernarvon, author of *Grawn Awen* (The Treasure of the Muse), &c.

A good deal of indifferent Welsh prose has been written during this period on religious subjects, owing to the spread of Methodism among the Welsh, but it may profitably be overlooked by a foreigner; and with a glance at the history of Welsh periodicals and societies, we close our brief survey of the subject. The first Welsh periodical, edited by the Rev. P. Williams and Evan Thomas, appeared about 1770, and was entitled *Yr Eurgrawn Cymraeg* (The Welsh Treasure), but the first that attained any measure of success was the *Seren Gomer* (Star of Gomer), which was published at Swansea (1814). In 1831, *Y Drysorfa* (The Treasury) was commenced, under Calvinistic auspices; in 1836, *Y Diwygiwr* (The Reformer), and *Y Dysgedydd* (The Teacher); 1833—1841, *Y Gwladgarwr* (The Patriot), more a literary than a theological magazine, and tolerably clever; *Yr Haul* (The Sun), a journal advocating the interests of the Established Church; and *Y Traethodydd* (The Essayist), commenced at Denbigh (1845), distinctly the best literary organ in Wales. In 1879, above 60 daily or weekly newspapers appeared in the principality; of these about a dozen were published in Welsh. There are also about the same number of monthly or weekly magazines or periodicals, helping to keep alive the ancient speech; and two quarterlies in the Welsh language, but on general subjects. There are besides Welsh Magazines conducted in English.

The *Cambrian Register*, the *Cambro-Briton*, the *Cambrian Quarterly Magazine*, and the *Cambrian Journal*, each of which appeared for a series of years, dealt almost exclusively with Welsh subjects. A Welsh Encyclopædia (*Encyclopædia Cambrensis—Y Gwyddoniadur Cymreig*) was begun under the editorship of the Rev. John Parry of Bala, in 1856. The *Archæologia Cambrensis*, the journal of the Cambrian Archæological Association, began to appear in 1846. The *Enwogion Cymru* (1862) of the Rev. Robert Williams is a useful biographical dictionary of eminent Welshmen.

The leading Welsh societies, literary and antiquarian, that have existed, or still exist, are the Cymmrodorion, established in London in 1751, which lived for thirty years; the Gwyneddigion, also established in London in 1771, but extinct some 20 years ago; a second Cymmrodorion (1820—1843); The Society for the Publication of Ancient Welsh MSS. (founded at Abergavenny, 1837); and the Cambrian Institute, founded in 1853. The Eisteddfod, the annual national 'sitting' for the encouragement of bardism, music, and general literature, dates from the end of the fourth century. The meeting lasts three or four days, a president and conductor are appointed for each day, and it is attended by thousands of persons of all classes. Prizes and medals are given for the best poetical, musical, and prose compositions, for the best choral and solo singing, and singing with the harp. On the last day, the great event of 'chairing' the fortunate bard takes place.

WELSH ONION, or CIBOL (*Allium fistulosum;* see ALLIUM) a perennial plant, a native of Siberia. It has fistular leaves and no bulb. Its leaves appear very early in spring, and are then used in soups and salads. Its flavor more resembles that of garlic than of the onion. It has been long cultivated in kitchen-gardens in Britain, and perhaps deserves more attention than it receives, because it is ready for use before any similar plant in spring. The seed is sown in spring or summer; leaves fit for use are produced in the following spring, and the bed continues to be productive for a number of years. The name Welsh Onion is from the German *Wälsch*, and merely indicates a foreign origin.

WE'LSHPOOL (often vulgarly called POOL), a municipal and parliamentary borough of North Wales, in the county of Montgomery (of which it is considered the capital), 18¼ miles west-south-west of Shrewsbury. Powis Castle is an ancient edifice, the oldest parts dating from the 12th c.; and the park is much admired. Woollen mills, tanneries, and malt-houses are in operation. Pop. of municipal borough (1881) 7090. As one of the five Montgomery boroughs, W. helps to send one member to parliament.

WENDS (from the same root as to *wend*, to *wander*, and signifying the wandering or roving border tribes), the name given by the Germans to a branch of the Slaves (q. v.) which, as early as the 6th c., occupied the north and east of Germany from the Elbe along the coast of the Baltic to the Vistula, and as far south as Bohemia. They were divided into several tribes, which were successively subdued by the Germans, and either extirpated or gradually Germanized and absorbed, although remnants of them are still here and there to be found.—In a narrower sense, the name of Wends is given to those remnants of the Slavic population of Lusatia who still speak the Wendic tongue, and preserve their peculiar manners and customs. They number about 150,000. A collection of Wendic songs was published by Haupt and Smaler (2 vols. Grimma, 1843—1844). The Wends, like the other subject Slavic tribes, were, in early times, cruelly oppressed by their German masters; in recent times, their lot has been more tolerable.

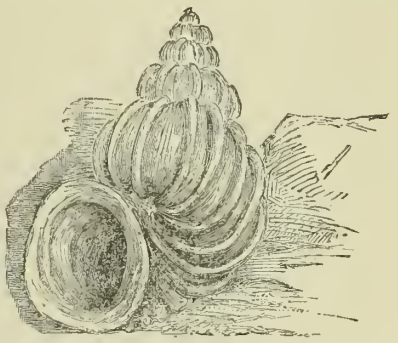
WE'NER, LAKE, the largest lake in the Scandinavian peninsula, and after the lakes Ladoga and Onega in Russia, the largest in Europe, is situated 150 miles west-south-west of Stockholm, and about 30 miles inland from the Cattegat. It is over 90 miles in length, and varies from 15 to 48 miles in breadth, is 309 feet in greatest depth, and lies 150 feet above sea-level. Area, 2005 sq. miles. From the north shore a peninsula extends southward into the middle of the lake; and from the southern shore a peninsula extends northward to within about fifteen miles of the point of the northern peninsula; the portion of the lake lying to the west of these peninsulas receives the name of Dalbo Lake. Of the numerous rivers that feed the lake, the chief is the Klar, from the north, and its surplus waters are discharged into the Cattegat by the river Göta. It is connected by a canal with Lake Wetter, by means of which, the Göta Canal, Lake Roxen, &c., inland communication is established between the Cattegat and the Baltic Sea. The lake is rich in fish; it is often visited by sudden gusts of wind, and is in many places too shallow for navigation.

WE'NLOCK, a parliamentary and municipal borough in the county of Salop, 12 miles south-east of Shrewsbury. Pop. of parl. borough (1871) 21,208; (1881) 20,143. The principal buildings in Much Wenlock are the church, a building of considerable antiquity, bearing traces of Saxon and Norman architecture; and the town-hall, a venerable and interesting structure, decorated internally with elaborate oak carvings of the time of Charles II. There are also a savings-bank, and a public library and reading-room. The extensive ruins of Wenlock Abbey afford a rich treat to antiquaries. The abbey was founded in the year 680, and was the parent church of Paisley Abbey, Scotland. The remains have been carefully preserved from further dilapidation by the owner, J. Milnes Gaskell, Esq., formerly M.P. for the borough, who converted a portion of them into an occasional residence for himself. W. is an ancient municipality, with separate quarter sessions, and is the first borough that acquired the right by charter of representation in parliament. The town of Wenlock proper, or Much Wenlock, is but small; but the parliamentary borough comprises 12 parishes spreading over a large area, and includes the market-towns of Madeley, Broseley, and Ironbridge, and the populous district of Coalbrookdale, where important iron and brick and tile works are carried on. There are also extensive limestone quarries in the neighborhood. There is a railway connecting W. with the Severn Valley Railway at Buildwas, and another connected with the Shrewsbury and Hereford line.

WENLOCK GROUP, an important series of rocks of Upper Silurian age, which are largely developed in the neighborhood of Wenlock. The group is divided into an Upper and Lower series. The Upper, known as the Wenlock Limestone, consists of a considerable thickness, sometimes reaching 300 feet, of a gray subcrystalline limestone, so hard that it has withstood the weathering which has removed the softer shales above and below it. It forms a ridge parallel to that of the Aymestry limestone, running for 20 miles north-east to south-west through the south-eastern portion of Shropshire. Sometimes it contains huge concretionary masses of crystalline carbonate of lime, locally named 'ball-stones;' in other places, it becomes thin and flaggy. It abounds in fossils, especially in corals, crinoids, mollusca, and trilobites. The Lower Wenlock series consists of 1400 feet of Wenlock shale, and 150 feet of Woolhope limestone and grit. The Wenlock shale is generally a dark gray, almost black argillaceous rock, often containing elliptical concretions of impure earthy limestone. It is worked in some places for flagstones and slates. The Woolhope limestone and grit consists of gray argillaceous nodular limestones resting on fine shales. In Denbigshire, it appears as a coarse grit, often of great thickness, and producing a very barren soil. The fossils of the Lower Wenlock beds are of a similar character to those of the Upper series.

WENS are encysted tumors, much more common on the scalp than in any other situation, though occasionally observed on the face, shoulders, &c., and consisting of obstructed sebaceous glands, which enlarge by the internal pressure of their accumulated secretions. The closed orifice may be often noticed in the form of a small dark point, and in that case the duct may sometimes be gradually enlarged by the gentle introduction of a probe or director, and its contents pressed out. By this treatment, they may, at all events, be kept from being unsightly, and will sometimes shrivel up and disappear. If this treatment fail, and the patient finds the tumor so annoying that he insists upon its removal, it must be exterminated with caustic or the knife. In consequence of the well-known dangers (especially erysipelas) that frequently follow cutting operations of the scalp, the caustic treatment is generally preferable. The most prominent part of the wen must be thoroughly cauterized with nitric acid or potash, which will lead to the formation and separation of a slough, which will lay open the tumor, which may then be left to empty itself and wither, or may be emptied by pressure, and cauterized within. As a general rule, wens are better left alone, unless they can be emptied by simple pressure, as severe operations on them are frequently attended with danger.

WE'NTLETRAP (*Scalaria*), a genus of gasteropodous mollusces, of the family *Turritellidæ*. The shell is spiral, with many whorls, the whorls deeply divided, and not always close together, crossed by remarkably elevated ribs, the aperture round and rather small. The animal is furnished with a proboscis, and has the eyes placed on an external convexity, the foot short and oval. About one hundred species of this genus are known. Those which have the whorls close together are called False Wentletraps by shell-collectors, those in which they are not contiguous are known as True Wentletraps. Of the former, some are found in northern seas, as *Scalaria communis* on the coasts of Britain and of continental Europe, and *S. Grœnlandica* on those of North America. *S. Grœnlandica* is particularly abundant on the banks of Newfoundland, and forms part of the food of the cod. The *true* Wentletraps are all natives of the seas of warm climates. Some of them are very beautiful. A species found in the south-east of Asia, and known as the PRECIOUS W. (*S. pretiosa*), was once in such esteem amongst shell-collectors, that an extremely fine specimen is said to have been sold for 200 guineas; and an ordinary price was from three to five pounds. This shell may now be purchased for a few



Wentletrap (*Scalaria pretiosa*).

shillings. It is from an inch and a half to two inches long, snow-white, or pale flesh-colored, with eight separated—but not widely separated—whorls.

WE'RDAU, a town of Saxony, on the river Pleisse, 40 miles directly south of Leipzig, and 49 by railway. Pop. (1880) 13,654, mostly engaged in manufacturing cloth and in yarn-spinning.

WE'RDEN, a town of Rhenish Prussia, on the Ruhr, 17 miles north-east of Düsseldorf. Pop. (1880) 7590, employed in the manufacture of cloth, linen, and silk, and alum, and coal-mining.

WE'REGILD (Ang.-Sax. *wer*, man; and *geld*, satisfaction), a composition by which, according to the custom of the Anglo-Saxons, Franks, and other teutonic people, homicide and other heinous crimes against the person were expiated. There was an established progressive rate of weregild for homicide, varying at different times and among different Teutonic tribes, from the weregild of the *ceorl*, or peasant, to that of the king. In the time of Tacitus, the weregild for homicide among the Germans was due to the relatives of the deceased; that for other crimes one-half to the injured party, and one-half to the state. The sum paid to the relatives in case of homicide, also known as the *manwyrth*, seems to have been looked on as the equivalent of the dead man's value. As the power of the community or king increased, the exaction of retribution for the death of its members was considered to be the duty of the state as well as of the relatives, and the principle of division was applied to homicide as well as minor crimes; each payment being a separate full equivalent for the value of the deceased, the one to appease the feud, the other to make atonement to the state. This double weregild is recognized

in the compensation for the death of a king, by the laws of the Mercians and Northumbrians.

In the days of Edward the Elder the weregild had become a much more complicated penalty, the composition for homicide consisting of four different payments, two of which, the *fight-wite*, or penalty for a breach of the peace, and the *weregild*, went to the king as head of the state; while a sum called the *halsfang* was paid to the kindred to loosen the hand of the avenger of blood, and the *manbote* was given to the overlord to compensate him for the loss of a vassal. The graduated scales of weregild in use among the different Teutonic nations throw much light on the gradations of society at the period. It does not appear that among the nations who recognized the principle of weregild, the relatives were bound to accept a compensation for their kinsman's slaughter, in place of appeasing the death-feud by blood; the latter practice was often resorted to instead. It was only through the exertions of Archbishop Theodore that Egfred, the Christian king of the Angles of Northumbria, adopted the alternative of accepting a weregild for his brother slain in battle by the Mercians, in place of demanding the blood of the slayer. A similar principle to that of weregild for homicide seems to have been recognized by the Celtic nations, and there are traces of it in the Mosaic code.

WE'RE-WOLF (Ang.-Sax. *wer*, a man), a man-wolf, a man who, either periodically or for a time, is transformed, or transforms himself into a wolf, becoming possessed of all the powers and appetites of a wolf in addition to his own, and being especially remarkable for his appetite for human flesh. The belief in the transformation of men into wolves or other beasts of prey has been very widely diffused; there is perhaps no people among whom some evidence of its former prevalence does not exist. It is not yet extinct, even in Europe. In many of the rural districts of France, the *loup-garou* (the latter part of the word is a corruption of the Teutonic *wer-wolf*), is still an object of dread. This superstition lingers too among the country-people of Northern Europe, and a particular form of it flourishes vigorously among the Bulgarians, Slavonians, and Serbs, and even among the more intelligent inhabitants of Greece. See VAMPIRE. Its details vary in different countries and districts. The definition given above includes only the commonest and the best marked of its incidents. Probably, it has not yet entirely disappeared in any country whose rural districts are infested with wolves or other wild animals; and manifestations fitted to suggest it may be occasionally observed in the mad-houses of most countries. See LYCANTHROPIA. The animal whose shape is taken, as already stated, is not always, though usually, a wolf; it was probably always the animal most formidable, or considered most inimical to man. In Abyssinia, it is the hyæna.

Occasional notices of lycanthropy, as it is called, are found in classical writers; and lycanthropy, as there described, was the change of a man or woman into a wolf, so as to enable the man or woman to gratify an appetite for human flesh, either by magical means, or through the judgment of the gods, as a punishment for some dire offence. Sometimes the transformation was into the shape of a dog or a bull. Ovid, in his *Metamorphoses*, tells the story of Lycaon, king of Arcadia, who, when entertaining Jupiter at a banquet, resolved to test his omniscience by serving up to him a hash of human flesh. The god, to punish him for this, transformed him into a wolf. Herodotus describes the Neuri as sorcerers who had the power of taking once a year, for several days, the shape of wolves; and the same account of them is given by Pomponius Mela. Pliny relates that, in Arcadia, every year, at the festival of Jupiter Lycæus, one of the family of Antæus was chosen by lot, and conducted to the brink of the Arcadian Lake, into which, after having hung his garments upon a tree, he plunged, and was transformed into a wolf. Nine years after, if alive, he returned to his friends, looking nine years older than when he disappeared. Some notices of lycanthropy are to be found in Petronius; and allusion to it is also made by Virgil in the 8th *Eclogue*. Marcellus Sidetes tells us of men who, every winter, were seized with the notion that they were dogs or wolves, and lived precisely like these animals, spending the night in lone cemeteries. This disorder attacked men chiefly in the beginning of the year, and was usually at its height in February. It is worth while observing that the classical instances of lycanthropy mostly refer to Arcadia, a pastoral country whose inhabitants suffered greatly from the ravages of wolves.

In Norway and Iceland, it used to be believed that there were men who were 'not of one skin.' Such men could take upon themselves other shapes than that of man, and the natures corresponding to the shapes which they assumed; they had the strength and other powers of the animal whose shape they bore, as well as their own. It was believed that the change of shape might be effected in one of three ways: simply by putting on a skin of the animal; by the soul of the man deserting the human body—leaving it for a time in a cataleptic state—and entering into a body borrowed or created for the purpose; or, without any actual change of form, by means of a charm, which made all beholders see the man under the shape of the animal whose part he was sustaining. The two former were the common modes of transformation; at any rate, the Sagas are full of illustrations of them; while illustrations of the third mode are comparatively rare. Nothing of the man remained unchanged except his eyes; by these only could he be recognized. Odin had, and freely exercised, the power of varying his shape. When men changed their shape to prey upon their kind, they always took the form of a wolf. It was believed that many had the power of thus transforming themselves; and great was the popular dread of were-wolves. Perhaps the best stories of were-wolves which are to be found are contained in the Northern Sagas. Scarcely anywhere did the belief in them go so deep into the minds of the people as among the northern races. In connection with it, notice may be taken of what is called the 'Berserkr rage,' which appears to have been a peculiar form of mania. The Berserkr yelped like dogs, or wolves rushing into conflict, bit their shields with their teeth, and committed terrible atrocities while the paroxysms of their disease were upon them. Berserkr has been rendered 'bare-skinned;' others make it mean 'wolf-skin-coated' (why not 'bear-skin-coated?').

Olaus Magnus states that in Prussia, Lithuania, and Livonia, though wolves were very numerous and troublesome, the ravages of the were-wolves were regarded as much more serious. Every year at the feast of the Nativity at night, the were-wolves assembled in great numbers at appointed places, and proceeded to look out for human beings or tame animals, upon which they could glut their appetites. If they found an isolated house, they entered it, and devoured every human being and tame animal it contained; after which—showing that they were not common wolves—they drank up all the beer or mead. Similar testimony with regard to Livonia is given by Bishop Majolus, who adds, that the transformation into the wolf-form continued for twelve days.

Instances of persons being changed into wolves by way of punishment, were freely believed in the middle ages; for example, St. Patrick was believed to have changed Vereticus, king of Wales, into a wolf; and there was an illustrious Irish family which had incurred the curse of St. Natalis, every member of which, male and female, according to the popular belief, had to take the shape of a wolf, and live the life of a wolf for seven years.

In the 15th and 16th centuries, the belief in were-wolves was, throughout the continent of Europe, as general as the belief in witches, which it had then come to resemble in many respects. It gave rise to prosecutions almost as frequent as those for Witchcraft (q. v.), and these usually ended in the confession of the accused, and his death by hanging and burning. It was calculated to inspire even greater terror than witchcraft, since it was believed that the were-wolves delighted in human flesh, and were constantly lying in wait for solitary travelers, and carrying off and eating little children. The were-wolves, like the witches, were now regarded as servants of the devil, from whom they got the power—often exercised by anointing with a salve—of assuming the wolf's form; and it was believed that great numbers of them trooped together to the devil's Sabbath. The stories of mutilations and other mishaps befalling them in the wolf-state, by which, when they resumed the human form, they were identified as were-wolves, exactly resemble the stories told of witches.

In September 1573, we find a court of parliament sitting at Dole, in Franche-Comté, authorizing the country-people to take their weapons, and beat the woods for a were-wolf, who had already—thus went the recital—'carried off several little children, so that they had not since been heard of, and done injury to some horsemen, who kept him off only with great difficulty and danger to their persons.' Throughout Europe, the judicial cognizance of witchcraft and of lycanthropy ceased at the same time. In Great Britain, where wolves had early been exterminated, the were-wolf was only known by rumors coming from abroad; but the belief that witches could transform themselves into cats and hares, which did prevail, was precisely analogous to the belief in were-wolves, especially in its later forms.

The later forms of this strange belief were obviously sophisticated. In its earlier shape, three things are to be noticed—the power ascribed to the were-wolf of transforming himself, either by changing the shape of his own body, or projecting his spirit into another body; his appetite for human flesh; his taking the shape and nature of the animal held to be most malicious against man—the wolf. As to the first of these, all that can here be done is to point to its connection with the doctrine of Transmigration (q. v.), and to add that it has been one of the commonest of human beliefs. As to the second, is it unlikely that in the early times in which the superstition had its origin, the appetite for human flesh may have been common enough to spread terror through whole districts?

It is, at least, not improbable that every race of men has had an experience of cannibalism; and it may well have been that, in occasional cases, especially under conditions of disease, the taste

for human flesh survived the general practice of using it. Modern Europe affords many unquestionable examples of this taste existing and being indulged in the midst of comparative civilization. There can be no doubt that some of the unhappy multitude put to death as were-wolves had really murdered and eaten the flesh of human beings. But secret murders, unaccompanied by cannibalism, would tend to support a popular belief in cannibalism. We have not to go out of our own age for proofs of the existence of men afflicted with a homicidal tendency; and in times when the means of detecting crimes were very imperfect, it is conceivable that the murders committed by one or two such persons would spread terror, and give support to a superstitious theory throughout a large district. The Maréchal de Retz, who lived in the time of our Henry VI., had caused to be stolen and put to death by torture, under the most inhuman circumstances, many hundred children—he confessed on his trial that he murdered 120 in a single year. (A memoir of Gilles de Laval, Maréchal de Retz, has been compiled from authentic documents by P. J. Lacroix, the eminent French antiquary.)

Perhaps no society has ever been free from men similarly constituted, and acting similarly according to their opportunities. As to the third point, if it be granted that a certain practice of, or general suspicion of cannibalism existed among a people, who believed in the power of transformation, it is easy to understand how the cannibal, getting his victims by stealth, was supposed to indulge his inhuman appetite under the guise of the animal most unfriendly to man. And the existence of a form of mania in which the madman had the hallucination that he was changed into a wolf, yelled like a wolf, lived in many respects like a wolf, was calculated strongly to confirm the belief in men-wolves. In conjunction with the mischief done by real wolves, this itself may be thought almost enough to have given origin to the superstition. The hallucination of having undergone transformation into a wolf from time to time, seems to have been one of the commonest by which weak and crazed brains were possessed during the period when the hunt for were-wolves was kept up. The literature of this subject, though abundant, is for the most part fragmentary, and mixed up with other matters. A good account of the subject will be found in *The Book of Were-wolves*, by Sabine Baring-Gould (Lond. 1865).

WERNER, Abraham Gottlieb, a celebrated mineralogist and geologist, born at Wehrau, on the Queiss, in Upper Lusatia, September 25, 1750. His father was director of a smelting-work, and he was thus led almost in childhood to the study of minerals. After some time spent at the Mineralogical Academy of Freyberg, he went to Leipzig, where he studied natural history and jurisprudence. Here, at the age of 24, he published his first work on mineralogy, a mere pamphlet on the external characters of minerals. In 1775, he was appointed Professor of Mineralogy, and curator of the Mineralogical Cabinet at Freyberg. In 1780, he published the first part of a translation of Cronstedt's *Mineralogy*, in his notes to which he gave the first outlines of the system which bears his name. In 1791, he published a *Theory of the Formation of Metallic Veins*, which was translated into English and French, and greatly extended his reputation. He was not, however, a voluminous author, but his views were diffused by his pupils, among whom were the most eminent German mineralogists of the time. In 1792, he was appointed Councilor of Mines in Saxony. He died at Dresden in 1817.

W.'s influence was very great in the promotion both of mineralogy and of geology. In his mineralogical system, minerals were distinguished and arranged chiefly according to their external characters; and mineralogists have now learned to depend much more than he did on their chemical constitution. In geology, he did great service by arranging the facts already known, and guiding to proper methods of observation. His theory was extensively received for a time. It may be described as the opposite of the Huttonian theory, accounting for the present state of mineral substances in general by supposing them to have been dissolved or suspended in water; whilst the Huttonian theory ascribed almost everything to the action of fire. W.'s is sometimes called the Neptunian theory, whilst that of Hutton is styled the Plutonic. Modern geology recognizes a certain measure of truth in both, but rejects them alike in that character of completeness or universality in which they were once advocated. W. classified rocks into Primary, Transition, and secondary; and the terms are still sometimes used, although merely as convenient names, not as indicative of opinions concerning the rocks designated by them.

WERNIGERO'DE, a small walled town of Prussia, in the government of Magdeburg, and 43 miles south-west of the city of that name, stands at the northern base of the Brocken Mountain. Its castle, the residence of the Counts Stolzberg-Wernigerode, comprises a library of 40,000 volumes, and a zoological garden. It manufactures linen, cloth, and tobacco; and carries on copper-smelting and paper-making. Pop. (1880) 8274.

WE'SEL, a strongly fortified town of Prussia, on the Rhine, 32 miles north-north-west of Düsseldorf. The Rhine, which here is joined by the Lippe, is divided by a fortified island, and crossed by a bridge of boats, protected on the left bank by a fort. Of its churches, the Willibrod Kirche was first opened in 1181. Cloth, hosiery, serge, leather, hats, tobacco, and linen are manufactured, and book-printing is carried on. The citadel is defended by about 4500 men. Pop. (1880), inclusive of garrison, 20,593.

WE'SER (Lat. *Visurgis*), a river of Germany, formed out of the Werra, which rises in the Thuringer-wald, and the Fulda, rising in the Rhöngebirge, on the frontiers of Prussia and Bavaria. These streams, after a northern course, unite at Münden, in Hanover; and the united stream, the W., flows north through Prussia, till, passing Bremen, it forms for about 40 miles the boundary between Oldenburg and Prussia, and enters the North Sea by a wide but shallow estuary, much interrupted by sand. Entire length, 260 miles. It communicates with the Elbe by a navigable canal; but though considerably improved in this respect, the W. is not of much use as a navigable stream. The principal trading-town on its banks is Bremen.

WESLEY, John, the founder of the Methodists (q. v.), was born at Epworth, in Lincolnshire, England, 17th June 1703. The family name was variously spelled Wesley and Westley, and is supposed to be the same with Wellesley, and to be derived from a place of that name near Wells. An Irish gentleman, Garrett Wellesley, Esq., of Dungannon, offered to make Charles Wesley, younger brother of John, his heir, on condition of his settling in Ireland, believing him to be of his own family. The offer was not accepted; and the estate of Mr. Wellesley went to another branch of the family, which was soon raised to the Irish peerage, with the title of Earl of Mornington, and from which the Duke of Wellington and the Marquis of Wellesley sprung. The more immediate progenitors of John W. were ministers of the church of England, of Puritan principles. Some of them suffered for nonconformity. Bartholomew Wesley, the great-grandfather of John, was ejected from his living by the Act of Uniformity in 1662. John Wesley, the son of Bartholomew, was also deprived of his living, and was often fined, and several times imprisoned for preaching contrary to the law. Samuel Wesley, a son of this John Wesley, conformed to the Church of England, but opposed the schemes of James II., refusing to be bribed by offers of preferment, which, on account of his erudition and talents, it was thought worth while to make to him. He supported the cause of the Revolution, in circumstances of personal danger, and in the beginning of the reign of William and Mary, was rewarded with the living of Epworth. He wrote an epic poem entitled *The Life of Christ*, and other similar works. He had a family of nineteen children.

His wife, Susannah Annesley, the daughter of an ejected minister, was a woman of remarkable intelligence and fervent piety, who devoted herself very much to the education, and particularly the religious education, of her children. His eldest son, Samuel, head-master of Tiverton school in Devonshire, was a Tory and High-Churchman, who strongly disapproved of the 'new faith' and peculiar course of his brothers John and Charles. John W. was the second son of Samuel, or the second who grew up to manhood. In his infancy, he had a narrow escape from being burned to death, when the parsonage of Epworth was burned by some of the parishioners in their rage against their pastor for his faithful reproving of their vices. Another remarkable story is connected with the parsonage of Epworth, and with the early years of John W.'s life—the continued disturbance of the family, throughout a considerable time, by loud knockings and other noises, which could not be accounted for, and which therefore were regarded as preternatural, although Mr. Wesley and his household were less affected by the strange visitation than perhaps its authors expected them to be, and persisted in residing in the parsonage, even making sport of 'Old Jeffery,' their unseen visitant, who 'was plainly a Jacobite goblin, and seldom suffered Mr. Wesley to pray for the king and the Prince of Wales without disturbing the family prayers.'

John W. was a very diligent and successful student. The religious history of his college life belongs to the history of Methodism (q. v.). After much conscientious hesitation as to his motives and fitness for entering into the clerical profession, he was ordained deacon in 1725, and in 1726 he graduated as M.A., and was elected fellow of Lincoln College, Oxford. In the same year he was appointed Greek lecturer and moderator of the classes. He became curate to his father at Wroote, a small living which Samuel W. held along with that of Epworth, and whilst serving here, he was advanced to priest's orders in 1728. He returned to Oxford, and along with his younger brother, Charles, entered into those religious associations from which Methodism sprang. The intercourse of the brothers Wesley at this time with William Law, the

author of the *Serious Call*, had a great influence on their opinions and conduct. They walked two or three times a year from Oxford to visit Law at his house near London. In 1735, John W. was induced to go out to Georgia with General Oglethorpe, to preach to the Indians and colonists. His religious views at this time were strongly tinctured with asceticism. His intercourse with Moravians, who were his fellow-passengers to America, and afterwards his fellow-laborers in the colony, tended to stimulate his religious zeal. He attempted to establish a discipline in the colony, very different from that of the Church of England at home, and failed in the attempt.

The difficulties of his position were increased by an affair in which he became involved with the daughter of the chief magistrate of Savannah, whom he wished to marry; but on the advice of the Moravian bishop and elders, to whom he submitted the matter, he withdrew from her, and she very soon marrying another, W. refused her admission to the communion; upon which her husband raised an action at law, and W., finding Savannah no suitable place for him, and, as he said, 'shaking the dust off his feet,' returned to England, having resided in America not quite two years. With religious zeal undiminished, he maintained an intimate connection with the Moravians in London. On 24th May 1738, some months after his return to England, he attended a meeting of a society in Aldersgate Street, where, whilst one was reading Luther's preface to the Epistle to the Romans, he experienced such a change of religious feeling that, notwithstanding all his previous zeal, he ever afterwards regarded this as the time of his conversion. 'I felt my heart strangely warmed,' he says; 'I felt I did trust in Christ, Christ alone, for salvation; and an assurance was given me, that He had taken away *my* sins, even *mine*, and saved me from the law of sin and death.' Many who accept generally Wesley's views of conversion, doubt his opinion as to the date of his own. After this, he visited the Moravian brethren at Herrnhut in Germany, made the acquaintance of Zinzendorf, and was introduced to the Prince Royal of Prussia, afterwards Frederick the Great.

Returning to England, he became associated with his old college companion, Whitefield, and after his example began, in 1739, the practice of open-air preaching. From this time, the history of Wesley's life becomes very much the history of Methodism. In 1740, he solemnly separated himself from the Moravians, finding that he differed from them on important points of doctrine; and in the same year the breach took place between Whitefield and him, which divided the Methodists into two sections, Calvinistic and Arminian. In the evangelistic work which he carried on in England, and in organizing the Methodist body, W. was indefatigable. He seldom traveled less than forty miles a day, usually on horseback, till near the close of his life, when he used a chaise. In 1752, he married a widow with four children, but the marriage proved an unhappy one, and a separation ensued. His health gradually declined during the last three years of his life, and after a short illness, he died in London, 2d March 1791, in the 88th year of his age. His remains lay in state for several days in his chapel in the City Road, dressed in the sacerdotal robes which he usually wore, with a Bible in his hand. W. was a voluminous writer. His writings are chiefly polemical and religious. His style in the pulpit was fluent, clear, and argumentative, not impassioned like Whitefield's; his countenance was mild and grave; and his manners agreeable, although he exercised a very imperial domination over the preachers of the Methodist body. He was a man of great benevolence, and gave away all his living to the poor.

Probably no man ever exerted so great an influence on the religious condition of the people of England as John W., and his influence has extended to the most remote parts of the world.—CHARLES WESLEY, his younger brother, born at Epworth, 18th December 1708, was associated with him in the whole Methodist movement. Having studied at Christ Church, Oxford, and visited Georgia at the same time with his brother, he took an active part in the subsequent work in England. He was a clear and simple preacher, and a man of fervent piety, but of a disposition very far removed from asceticism. He is the author of a great number of hymns in use among the Methodists; some of which, however, are among the best and most admired hymns in the English language, replete with pious feeling, and of lyrical power and sweetness almost unsurpassed.—See *The Works of the Rev. John Wesley* (16 vols., Lond. 1809); *Life of the Rev. John Wesley, A.M.*, by Dr. Coke and Mr. Moore (Lond. 1792); *The Life of Wesley*, by Southey (2 vols., 1820; new ed. 1864); *The Life and Times of W.*, by Tyerman (1870); and *John W. and the Evangelical Reaction*, by Miss Wedgwood (1870).

WESSEL, JOHANN, called also *Gansfort*, a predecessor of Luther, was born at Gröningen, 1419, taught philosophy at Cologne, Louvain, Heidelberg, and Paris, and died (1489) in his native town. On account of his learning, he was called *Lux Mundi* (Light of the World); while his enemies, on account of his opposition to the scholastic philosophy, termed him *Magister Contradictionum* (Master of Contradictions). In his doctrine of justification by faith, he forestalled Luther, who esteemed him very highly. After his death, a large portion of his writings were burned as heretical. Another portion appeared under the title of *Farrago Rerum Theologicarum*, of which Luther published an edition with a preface (Wittenb. 1522), but the most complete edition is that by Joh. Lydius (Amst. 1617). See Ullmann's *Joh. Wessel, ein Vorgänger Luther's* (Hamb. 1834), and Bähring's *Das Leben Joh. Wessel's* (Bielef. 1846).

WE'SSEX. See HEPTARCHY.

WEST, BENJAMIN, Anglo-American painter, was born at Springfield, Pennsylvania, October 10, 1738, of Quaker parentage, and with lack of opportunity or encouragement, surprised his friends by his skill in drawing at the age of seven years, and at nine painted a picture in water-colors, which, in some points, he declared in after-life, he had never surpassed. His first colors were made from leaves, berries, &c., and his brushes stolen from a cat's tail. Thus, self-taught, at the age of 16 he practised portrait-painting in the villages near Philadelphia, and painted for a gunsmith his first historical picture, 'The Death of Socrates.' While the Society of Friends were discussing the propriety of his becoming a painter, he shocked their principles still more by volunteering in a military expedition to search for the remains of Braddock's army. At 18, he was painting portraits in Philadelphia, and later at New York, where, in 1760, he was aided by some generous merchants to go and pursue his studies in Italy. At Rome, he was patronized by Lord Grantham, whose portrait he painted, became the friend of Mengs, and, as the first American artist ever seen in Italy, attracted much attention. He painted his 'Cimon and Iphigenia,' and 'Angelica and Medora,' and was elected member of the Academies of Florence, Bologna, and Parma. In 1763, visiting England on his way to America, he was induced to remain in London, and in 1765 married Eliza Shewell, to whom he had been engaged before leaving America.

His 'Agrippina landing with the ashes of Germanicus,' attracted the attention of George III., who was his steady friend and patron for forty years, during which time he sketched or painted 400 pictures. His 'Death of General Wolf,' painted in the costume of the period, against the advice of all the most distinguished painters, effected a revolution in historic art. For the king he painted a series of 28 religious pictures for Windsor Castle. His best-known works are 'Christ healing the Sick,' 'Death on the Pale Horse,' and the 'Battle of La Hague.' In 1792 he succeeded Sir Joshua Reynolds as the President of the Royal Academy, but declined the honor of knighthood. Through his whole career, he was the generous friend, adviser, and patron of young artists. *The Life and Studies of Benjamin West* were compiled from materials furnished by himself, by John Galt, in two parts (Lond. 1816—1820); and a biography of him is also given in Cunningham's *Lives of Eminent British Painters*. He died in London, March 11, 1820, and was buried with great pomp at St. Paul's Cathedral. His wife died 1817. Two sons survived him.

WEST BRO'MWICH, a large and rapidly increasing town of South Staffordshire, one of the most important towns in the great manufacturing and mining district known as 'The Black Country,' five miles north-west of Birmingham. A few years ago, W. B. was a mere village on a barren heath, and it owes the rapidity of its growth mainly to the rich mines of coal and iron in the vicinity, and to the industries to which these give rise. Very many canals, and three railways, run through the parish. There are numerous churches, schools, and other important establishments. There are very large glass-works and also gas-works in the town: much of the gas used in Birmingham, as well as all that supplied to W. B., Wednesbury, and many other towns in the vicinity, being made here. The manufactures of iron-wares of all kinds, as gun and pistol barrels, locks, swords, fire-irons, fenders, &c., and of all kinds of hollow-wares, as kettles, saucepans, &c., are among the great branches of industry. Pop. (1871) 47,981; (1881) 56,299.

WE'STBURY, a small and ancient parliamentary borough of Wiltshire, 20 miles north-west of Salisbury, and on the western declivity of the Salisbury Plain. Its church, a tasteful edifice, was erected—the older parts at least—in the 13th century. For the most part uninteresting in itself, W. stands in the midst of a locality interesting from its many antiquities. W. is a station on the Wiltshire and Somerset Railway. Pop. (1881) 6014, chiefly employed in agriculture, the manufacture of woollen cloth of a superior quality, and the smelting of iron ore, some extensive mines of which exist near the town, and which afford employment to many hands.

WE'STCHESTER, a beautiful town, in a rich agricultural district of Pennsylvania, U. S., 23 miles west of Philadelphia, with elegant residences, a granite court-house, a white marble bank, 10 churches, an academy, a state normal school, and 2 public libraries. Pop. (1870) 5630; (1880) 7046.

WE'STERN AUSTRA'LIA, a British colony, and the western section of the great island-continent of Australia, embraces the


WEST INDIA ISLANDS
Geographical Miles 69° One Degree
English Miles 69° One Degree
Railways thus
UNITED STATES
FLORIDA
GULF OF MEXICO
ATLANTIC OCEAN
BAHAMA ISLANDS
CUBA SEA
CARIBBEAN SEA
GREATER ANTILLES
LESSER ANTILLES
LEEWARD ISLANDS
WINDWARD ISLANDS
SOUTH AMERICA
CENTRAL AMERICA
HAVANA
HAITI OR SAN DOMINGO
JAMAICA
PUERTO RICO
CURAÇAO
TRINIDAD
BARBADOES
GRENADA
TOBAGO
PANAMA
Gulf Stream
Old Bahama Channel
Windward Passage
Mona Passage
Caicos Passage
Silver Bk.
Mouchoir Passage
Caribbean Sea
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whole of that island west of the 129th meridian. Its extreme length from north-east to south-west is 1370 miles, its average breadth is 650 miles, its area is 978,300 square miles. Pop. (1880) 28,668; (1881) 31,000. Revenue (1881) £180,049; expenditure, £204,337; public debt, £561,000. This colony was formed in 1829, and in 1851 had only 5886 inhabitants; but within recent years a considerable number of emigrants have been sent out under the auspices of the Government Emigration Board. W. A. was formerly named *Swan River Settlement*, from the river Swan, which joins the Indian Ocean, after watering a considerable district in the extreme south-west. Of the whole vast area, this district in the south-west is now, as formerly, the only portion inhabited. There, mountain-ranges rising in elevation from the coast inland, run parallel with each other from south to north; the highest summit being 5000 feet above sea-level. The climate is agreeable and salubrious; the soil, both on the coast and in the interior, is light and dry. Bands of fertile land, where the sandal-wood and other trees grow abundantly, and which are suitable for the culture of the vine, olive, and fig, occur in the middle districts of the country. Rivers, of which the Swan is the chief, abound; but are not of much use for navigation. Magnetic iron ore, lead, copper, and zinc ores are found in large quantities, and a little coal has been found.

In 1880, 165 vessels, of 123,985 tons, entered the ports. There is a pearl-fishery on the N.W. coast, producing to the value of £52,000 in 1880. Imports in 1880 (chiefly groceries, beer, ironmongery, and clothing) amounted to £353,669; exports (chiefly wool, sandal-wood, timber, copper-ore, and horses), £499,183. The capital is Perth, and there are several smaller towns. The colony became (1849), at the request of the colonists, a settlement for convicts, and has much benefited by their labor, a great extent of road, and many public buildings having been constructed by them. In 1868, the home authorities were, however, persuaded by the Australian colonists finally to discontinue transportation to Western Australia. In 1881 there were only 187 British convicts in W. A. (with 83 colonial ones), besides about 300 ticket-of-leave men at large. W. A. belongs to the class of 'crown colonies,' having a governor named by the crown, and a legislative council, partly nominated, and partly elected by the colonists.

WEST INDIES are already described under ANTILLES (q. v.). See also under the names of the islands themselves—Jamaica, Cuba, Martinique, &c.

WESTLAND, a provincial district of New Zealand, was formerly part of Canterbury, and occupies the western portion of the Southern island. It is 300 miles long by 30 broad. Pop. (1881) 14,779. The chief town is Hokitika (pop. 3500).

WESTMACOTT, SIR RICHARD, R.A., an eminent sculptor, the son of Richard Westmacott, also a sculptor in his day of some little note, was born in London in 1775. His predilection for art was early manifested, and was carefully cherished by his father. He received as a youth the best education which London could then furnish, and in 1793 he proceeded to Rome to complete his studies. Here he became in some sort a pupil of the celebrated Canova, who showed him much kindness and attention. His progress was rapid, and he distinguished himself by carrying off the highest prizes offered to the competition of the rising geniuses of the day, in particular a gold medal given by the Pope. In 1797, having, meantime, in recognition of his talent and promise, been elected a member of the Academy of Florence, he returned to London, where, shortly after, he was married to a daughter of a Dr. Wilkinson, then of some medical celebrity. His success in his art was not for a moment doubtful, and very soon he found himself in full employment. In 1805 he was elected an Associate of the Royal Academy; in 1816 he was advanced to the full dignity of Academician; and in 1835 the University of Oxford recognized his eminence by conferring upon him the honorary degree of D.C.L. Two years afterwards, the honor of knighthood was bestowed on him. Previously, in 1827, he had succeeded Flaxman as Professor of Sculpture at the Academy, in which capacity he continued to officiate till his death, which took place on September 1, 1856.

The works of Sir Richard W. by which he is chiefly known are public monumental statues, in some of which he had much success. Of these it may suffice to mention his statues in Westminster Abbey of Pitt, Fox, Perceval, and Addison, with the monuments to Sir Ralph Abercromby and Lord Collingwood in St. Paul's Cathedral. Many of his works in the antique classical manner, are also of exquisite beauty and finish.

WESTMACOTT, RICHARD, R.A., son of the foregoing, was born in London in 1799. After being carefully educated under his father in the art which might seem to run in the family blood, he was sent to Rome in 1820 to prosecute his studies further. In Italy he passed six years; and after his return to London, he gradually won a reputation for himself as one of the ablest sculptors of the day. Besides being eminent in his art, he likewise made himself known as a man of considerable literary and general attainment; and in 1837 we was elected a Fellow of the Royal Society. In 1838 he became A.R.A., and in 1849, R.A. On the death of his father, he was appointed to succeed him in the Professorship of Sculpture, a post which he filled with distinguished ability and acceptance. He died in 1872.

WE'STMEATH, an inland county of the province of Leinster, Ireland, between Meath on the east and Roscommon on the west. Its greatest length, N. and S., is 35 miles, and the greatest breadth is 25 miles; the area being 708 square miles, or 453,468 acres, of which 111,752 are under tillage. The population in 1851 was 111,109; in 1861, 90,879; in 1871, 78,432; in 1881, 71,513, of whom 65,951 were Catholics, and 4954 Protestant Episcopalians. The surface is for the most part level, the hilly district, which is in the north of the county, not reaching at any point a higher elevation than 710 feet. Nevertheless, owing to the number of lakes, and the large extent of wood in some districts, the scenery is in many places highly picturesque. Geologically, W. belongs to the great central limestone series; yellow sandstone only occurring in two very limited districts. Of the numerous lakes which diversify the surface, one chain belongs to the basin of the Shannon, which river, with its lakes, forms the western boundary, and separates W. from Roscommon; the other, towards the east, flows into the basin of the Boyne.

The Shannon is navigable for steamboats throughout that portion of its course which bounds this county; and the inland navigation is further provided for by the Royal Canal, which traverses W. from east to west, and by a branch of the Grand Canal. The county is also traversed by the Midland and Great Western Railway. The climate is mild and not very moist. The soil is a deep loam, producing herbage especially suited to the fattening of cattle, which are largely fed; sheep are also fed, but not in the same proportion: as are also horses and pigs. There is little tillage, and almost the only cereal crop is oats. The total acreage under crops of all kinds in 1880 was 93,551, oats being the chief crop; but scarcely a fourth part of the county is under crops, much of the area being lake and bog, and a great deal of the arable land having gone out of cultivation during the last twenty years. In addition to weekly markets, upwards of 70 fairs are held at different seasons of the year throughout the county. The net annual value of property under the Valuation Act is £314,701. W. is divided into twelve baronies. The chief towns are the assize town and capital, Mullingar (q. v.), Moate, and Athlone, which is partly in the county of Roscommon. It returns three members to the imperial parliament, two for the county and one for the borough of Athlone. The constituency in 1879–80 numbered 3549. The number of pupils at the national schools in 1879 was 13,798. W. anciently formed a portion of the kingdom of Meath (q. v.), but in the 34th of Henry VIII., it was erected into a separate county, and at first included Longford (q. v.) and part of the King's County (q. v.). Many antiquities of the Anglo-Norman period, and some of the Celtic, chiefly tumuli and raths, are found in this interesting and picturesque county.

WE'STMINSTER, THE CITY AND LIBERTY OF, now forms part of the English metropolis. It is bounded by Temple Bar on the east, the Thames on the south, Chelsea and Kensington on the west, and Marylebone on the north. The early history of W. is that of the abbey, still the most interesting of its public buildings. In early times, that part of W. which adjoins the Thames was surrounded by a branch of the river, so as to form an island called Thorney Island, from its being covered with brushwood. Here, on the site of the present abbey, Sebert, king of the East Saxons, is said, in the 7th c., to have built a church. It is supposed to have been replaced by an abbey called Westminster, to distinguish it from the cathedral church of St. Paul's, called originally Eastminster. The first edifice erected on the site, of which we have any certain account, was one built of stone by Edward the Confessor in 1065. The Pyx House, a low apartment, 110 feet long by thirty feet wide, vaulted and divided by a central range of eight plain pillars with simple capitals, is nearly all that remains of it. The principal parts of the existing abbey were built by Henry III. In 1220 he erected a chapel dedicated to the Virgin, and a quarter of a century later he took down the old abbey of the Confessor, and erected the existing choir and transepts, and the chapel of Edward the Confessor. The remainder of the building was completed under the abbots, the western parts of the nave and aisles having been erected between 1340 and 1483.

The west front and its great window were the work of Richard III. and Henry VII. The latter pulled down the chapel to the Virgin, erected by Henry III. at the east end of the church, and built the chapel known as Henry VII.'s chapel. This completed the interior of the abbey as it now stands; the only important addition made since then having been the upper parts of the two western towers, which were the work of Sir Christopher Wren. The whole building forms a cross. Its extreme length, including Henry VII.'s chapel, is 511 feet; its width across the transepts is 203 feet. The width of the nave and aisles is 79 feet;

of the choir, 38 feet; and of Henry VII.'s chapel, 70 feet. The height of the roof is 102 feet, a loftiness unusual in English churches. It is the interior of the abbey which has at all times excited the most enthusiastic admiration. The harmony of its proportions, and the 'dim religious light' of the lofty and long-drawn aisles, leave on the mind impressions of grandeur and solemnity which churches of greater size fail to produce. The abbey was at one time the burying-place of the English kings, and it has become a national honor to be interred within its walls. It is crowded with tombs and monuments. The chapel of Edward the Confessor, at the east end of the choir, contains his shrine erected by Henry III., the altar-tombs of Edward I., Henry III., Henry V., and Edward III. The canopy of that last mentioned deserves especial notice. It is considered to be one of the greatest works in wood extant, and equal to anything in the best age of medieval art.

Against the altar-screen in this part of the church stand the two coronation chairs. One, the king's chair, encloses the stone brought by Edward I. from Scone, on which the Scotch kings were crowned. The other, the consort's chair, was constructed for the coronation of Mary, wife of William III. Both are still used at coronations. Most of the English kings, from the time of Henry VII. down to that of George III., were buried in Henry VII.'s chapel, and there accordingly are the tombs of Queen Elizabeth and Mary Queen of Scots. The most remarkable monuments in other parts of the church are those in the east aisle of the southern transept, known as 'Poets' Corner,' where many of the most eminent British poets have been buried. There monuments are erected to Chaucer, Beaumont, Drayton, Cowley, Dryden, Milton, Gray, Prior, Skakspeare, Thomson, Gay, Goldsmith, Addison, and Ben Jonson. In the north transept are the monuments of Pitt, Fox, Chatham, Canning, and Wilberforce. Elsewhere are the monuments of the great engineers and inventors, Telford, Watt, and Stephenson.

Since Dean Stanley (q. v.) became connected with the abbey in 1864, much has been done to restore and improve the interior, and services conducted in it have attracted much public interest; more especially the anniversary of the foundation, celebrated on 28th December, 1865, and the mission sermon delivered by Professor Max Müller on 3d December 1873, when the dean of an abbey asserted his right to allow a laymen to preach there.

South of the abbey are the Pyx House, chapter-house—since 1866, restored under the direction of Sir Gilbert Scott—cloisters, and the building occupied by W. School, formerly the monks' dormitory, &c. W. School was founded by Queen Elizabeth for the education of 40 boys known as Queen's scholars, who are prepared for the universities. Other persons send their sons to it, and it has long been one of the leading English public schools.

The city of W. sprang up round the abbey, and the English kings, in consequence of the jealousy with which they regarded the privileges claimed by the citizens of London, early took up their abode there. Before Edward the Confessor began to build his new church at Westminster, the residences of the English kings had been the Roman fortress in London, or the Saxon city of Winchester. The king, to superintend the building of the church, took up his abode in the palace. William Rufus, in 1097, erected a palace between the abbey and the Thames. Its chief apartment was a banqueting-hall, which, becoming ruinous in the time of Richard II., he pulled down, and erected in 1397—1399, on the same site, and indeed on the same foundations, the great hall which still exists. It is 90 feet high, and 290 feet long, by 68 feet wide internally, and is roofed by 13 great ribs of timber, combined with a mechanical skill which has not been excelled in any work of the present age. The roof of Westminster Hall is the finest specimen of the purely English art of forming a Gothic roof of wood: with the exception, perhaps, of the Hall of Justice at Padua, it is the largest roof in Europe unsupported by pillars. The law courts were established at the hall in 1224, and they continue to be held in buildings which rest on the northern side of the building, and open into it by side-doors. These law-courts, as an excrescence and out of place, are to be removed to the new buildings now being erected near Lincoln's Inn Fields.

The old Houses of Parliament which adjoined the hall, and like it lay between the abbey and the Thames, were burned to the ground in 1834. It was then determined to erect a new building on the same site, but on a much grander scale. The designs of Sir Charles Barry for 'the New Palace of Westminster' were selected as the best, and the work was begun in 1840. The building is the most magnificent erected in this country for many centuries. It may be roughly said to form a parallelogram, 900 feet long by 300 feet in width. The principal rooms are the House of Lords and the House of Commons, which occupy the center of the building, and run on the line of its greatest length. They are separated by an 'Octagon Hall,' with a diameter of 70 feet between the walls. From this hall, one corridor runs north to the House of Commons, and another south to the House of Lords, beyond which are the royal apartments at the extreme south of the building. The entrance to the 'Octagon Hall' is by a passage known as St. Stephen's Hall, which communicates by flights of steps with an entrance in the east front, and also with Westminster Hall, which, included in the new building, forms its northern vestibule. The state entrance of the queen is at the south-western extremity, and is, of course, in direct communication with the royal apartments.

The building is surmounted by lofty spires and towers. In the center, above the Octagon Hall, rises the central tower, 300 feet high. At each corner there are towers; at the south-west the Victoria Tower, 346 feet high; at the north-west the clock-tower, surmounted by a belfry spire 320 feet high. The clock has four faces, each 30 feet in diameter; and it strikes the hours on a bell weighing 9 tons, and known as Big Ben. The appearance of the eastern front is still marred by the buildings occupied as law courts, and it is believed that, on their removal, the picturesque outline of the palace, seen from the north-east, will for the first time prove all the merit of the architect's designs. The chief subject of regret in connection with the edifice is, that the stone of which it was built, a magnesian limestone from Yorkshire, has rapidly decayed. Many public improvements have been carried out recently in W., the chief being the construction of the Thames Embankment, opened in 1870, and the erection of the India and Foreign Offices at St. James's Park in 1873.—See *Historical Memorials of W. Abbey* (3d ed., 1869); *Dedication of W. Abbey*, by Dean Stanley; Walcott's *Memorials of W.* (1851).

WESTMINSTER SCHOOL, or ST. PETER'S COLLEGE, was founded in 1560 by Queen Elizabeth for the instruction of 40 scholars in Latin, Greek, and Hebrew, and has produced many eminent scholars. It was reorganized under the Public Schools Act (1868), and is recognized as one of the nine great public schools of England. Instruction is now given to about 200 boys.

WE'STMORELAND, a county in the north-west of England, bounded on the E. by Yorkshire, on the S. and W. by Lancashire, and on the N. by Cumberland and Durham. Area, 500,906 acres, of which in 1878 there were less than 50,000 acres in corn and green crops, clover, &c.; while over 196,000 were in pasture. Tillage is mostly confined to the valleys. There is some lead mining: the manufactures of W. are unimportant. Pop. (1871) 65,005; (1881) 64,184. W. is very mountainous, the chief summit being Helvellyn (3055 feet), partly in Cumberland. The other more important summits are Loughrigg Fell, Bowfell, Crossfell, and High Street and Langdale Pikes. Lakes remarkable for their beauty occur. The chief are Windermere (q. v.), partly belonging to Lancashire; and Ullswater (q. v.), between W. and Cumberland. Moorlands are numerous and extensive; but along the courses of the Kent in the south, and the Eden in the north—the principal streams—there are tracts of fertile land. The climate is mild and moist, often with much snow in winter, the deep wreaths of which frequently prove fatal to travelers on the mountain tracks. The soil is mostly a dry gravelly mould, favorable to the culture of turnips, of which great crops are produced. Rich pasture-lands abound, and cattle, mostly of large size, are extensively reared. The county town is Appleby, and the other chief towns are Ambleside, Kendal, and Kirkby-Lonsdale. The county returns two members to parliament.

WESTPHA'LIA, a province of Prussia, lies between Holland, Hanover, Brunswick, Hessen-Nassau, and the Rhine Province. Its area is 7770 English sq. m., with a population (1880) of 2,043,442, who, with the exception of about 20,000 Jews, are of the purest German descent. Of the population, 1,070,212 were, in 1880, Catholics, and 949,633 Protestants. W. is divided into three districts —Münster in the north-west, Minden in the north-east, and Arnsberg in the south. The east of the province presents vast plains covered with grain, while the north-west exhibits an uninterruptedly flat expanse of uncultivated land. The climate is generally temperate. The chief rivers are the Weser (q. v.), the Ems, the Lippe, and the Roer, or Ruhr, each of which is navigable for a considerable part of its course. The prosperity of W. is chiefly due to its flax crops and its mineral treasures, especially coal and iron. The chief of the industrial products are iron, and articles of iron, steel, and copper from the forges of Arnsberg; while manufacturing industry embraces flax-spinning and linen-weaving in Minden, and extensive production of woollen articles, stockings, and ribbons of esteemed quality. The exports consist of these products, and of meat, especially hams.

The capital, Münster (q. v.), had, till 1818, a university, now a higher academy, and is the seat of the supreme Catholic and Protestant religious authorities.—W. derives its name from the Westfalen, a section of the great Saxon people, who migrated hither from the banks of the Elbe soon after the Christian era; and after the subjugation of the Saxons by Charlemagne, the deposed leader, Wittekind, was allowed to remain *Duke of the Engern and West-falen*. At this time, the country called W. (and occasionally denominated *Sauerland*) comprised all Germany between the Weser, Rhine, and Ems; and soon after, it was subjugated by the

dukes of Lower Saxony, and held by them till, on the rebellion of Henry the Lion in 1179, the electoral archbishop of Cologne extended his sway over it. It then became one of the circles of the empire, and belonged to the Cologne electorate till 1802, when most of it was given to the Hesse-Darmstadt family. In 1807 arose the *kingdom of Westphalia*, which, besides a portion of W., also included Electoral Hesse, Hanover, Brunswick, and portions of Upper Saxony. This kingdom, erected by Napoleon as a preliminary to its incorporation into France, was given to his youngest brother, Jerome, who made Cassel his capital, and, despite the large French garrisons with which the country was burdened, and the extensive contributions in men and money which it was forced to pay to Napoleon, succeeded, by the establishment of the Code Napoleon, and by showing in various other ways his strong desire to promote the welfare of his new subjects, in acquiring their esteem. But the oppressive conscriptions and taxes for the behoof of the French army and treasury gradually increased in amount, and excited such resentment, that Jerome's life was several times threatened.

The king repeatedly remonstrated with Napoleon, but without the slightest effect; and despite his efforts, the 'continental system' was introduced into his states. In 1813, Jerome was chased from Cassel by the Russians; and though he returned for a few days, the defeat of Leipzig forced him to take shelter in France. By the treaty of Vienna, the states which had been joined to W. to form the kingdom, were restored to their former possessors, and W. itself, with the exception of a portion which had been annexed to Hesse-Darmstadt, was united to Prussia.

WESTPHALIA, Treaty of, also known as the *Treaty of Münster*, was concluded at Münster and Osnabruck (towns in the circle of Westphalia) in 1648, and in putting an end to the Thirty Years' War (q. v.), restored tranquillity to Germany, established a new system of political equilibrium in Europe, and became the basis of all subsequent treaties down till the French Revolution. The minor states of Germany had long desired a cessation of hostilities; and as early as 1638, plenipotentiaries from France, Sweden, and the Empire had assembled at Hamburg; but it was not till several years after, that all parties agreed to Münster and Osnabruck as the places, and to March 26, 1642, as the time, of meeting of the congresses. Ferdinand, however, was very loath to commit himself to a definite negotiation till the success of his arms, the hope of succor from Spain, or a change in the French policy, should give him less the position of a beaten opponent willing to accept almost any terms; and he accordingly temporized from time to time till his hopes of succor had vanished. In 1644, the congresses opened; the two places of meeting having been chosen to avoid any rivalry between France and Sweden for supremacy, to prevent any collision between the Swedish representatives and the pope, and to separate the Catholics from the Protestants.

The representatives of France, the Empire, Spain, and the Catholics of Germany, met at Münster under the mediation of the pope, and those of Sweden, the Empire, and the Protestants of Germany under the mediation of the king of Denmark; the representatives of Spain, Portugal, the United Provinces, Savoy, Tuscany, Lorraine, Mantua, and Switzerland being also present; so that this congress included all the great European powers except Britain, and almost all the minor powers. As the conflict was still carried on with undiminished vigor, the inclination of fortune to one side was the signal for excessive demands, which were met on the other side by evasive proposals; and it was not till Torstenson's decisive campaign of 1644—1645 that negotiations commenced in earnest, and the representatives made specific propositions. The successes of Turenne and Wrangel in Southern Germany, and the capture of Prague by the Swedes under Königsmark in July 1648, at length overcame all the emperor's dilatoriness, and, the Osnabruck representatives having arrived at Münster a few days before, the treaty was finally signed at Münster, 24th October, 1648.

Its terms, as regards the Germanic Empire, were as follows: The sovereignty and independence of the different states of the empire were fully recognized, and liberty was given them to contract any alliances with each other, or with foreign powers, if these were not against the emperor or the empire; all religions persecution in Germany was forbidden; the treaty of Passau and the religious peace of 1555 were confirmed; and with respect to the secularization of ecclesiastical benefices, everything was to remain in Austria as it was in 1624 (hence called the *normal year*), and in the Palatinate, Baden, and Würtemberg as it was in 1618; the power of putting under the ban of the empire was only to be exercised with consent of the diet; and the Reformed were put on a footing of equality as to privileges with the Lutherans. The territorial changes were as follows: the Lower Palatinate was restored to the eldest son of the unfortunate 'Winter King' (Frederick V., Elector Palatine), and an eighth electorate was created in his favor, but the Upper Palatinate and Cham were given to Bavaria, on condition that, should the two states become united, one electorate was to be abolished (as happened in 1777, see Bavaria); part of Alsace was ceded to France; Upper Pomerania, Rugen with Stettin, Gartz, Damme, Golnau, the isle of Wollin, Peine, Schweine, and Divenau in Lower Pomerania, Wismar, the secularized archbishopric of Bremen as a duchy, and the bishopric of Verdun as a principality, were obtained by Sweden as fiefs of the empire, with three deliberative voices in the diet, and an indemnification of 5,000,000 crowns to be paid by the empire; Brandenburg obtained, as compensation for its cessions in Pomerania, the secularized archbishopric of Magdeburg as a duchy, and the bishopries of Halberstadt, Minden, and Camin; Hanover and Mecklenburg were compensated for their share in these cessions by secularized church lands; and Hesse-Cassel obtained the rich abbacy of Hirschfeld, with 600.000 thalers.

The independence of the United Provinces was recognized by Spain, and that of Switzerland by the Empire. The pope's agent, Fabio Chigi (afterwards Pope Alexander VII.), protested vigorously against the liberal alienation of the possessions of the Church, and withdrew; and the king of Denmark's mediation being stopped by his war with Sweden in 1644, the treaty was concluded under the sole mediation of the Republic of Venice, and France and Sweden became guarantees for its execution. France, Sweden and the Protestants were the only gainers by this treaty, which, by weakening the great central authority of the empire, destroyed its unity, allowed France, as one of the guarantees, a pretext for continual interference with its internal affairs, and gave the *coup de grace* to the independence of the remaining free cities of the empire.

WEST POINT, site of the United States Military Academy, and of a fortress erected during the War of Independence, on the right bank of the Hudson River, 52 miles north of New York. The Military Academy is on a plain, 160 to 180 feet above the river, surrounded by the bold scenery of one of the finest river-passes in the world. The forts and a river chain were taken by the British in 1777, but abandoned after Burgoyne's surrender, and stronger forts were built, which General Arnold bargained to betray—a plot foiled by the arrest of Major André. The academy was established in 1802, for 50 cadets. Since the present system of appointment was adopted in 1843, the number has increased to above 300. It is governed by a board of five visitors and a staff of 51 professors and teachers.

The education is free—each pupil engaging to serve eight years. Each member of congress has the right to nominate one cadet from his district, and ten are appointed by the president. The course of study and discipline is four years: (1) mathematics, engineering, fencing, bayonet-exercise, school of the soldier; (2) mathematics, French, fencing, tactics of infantry, artillery, and cavalry; (3) natural philosophy, chemistry, drawing, riding, tactics; (4) military and civil engineering, mineralogy, geology, chemistry, law, literature, practical military engineering, tactics.

WESTPORT, a small seaport town of Connaught, Ireland, county Mayo, stands in a pretty valley at the mouth of a small stream that falls into Clew Bay, about 35 miles north-north-west of Galway. Formerly W. was supported principally by linen manufactures; but it is now known mostly for its trade in corn and provisions, and for its facilities for sea-bathing. In the immediate vicinity is the Reek, a mountain 2510 feet high. Pop. (1881) 4469.

WEST PRUSSIA. See Prussia, Province of.

WEST TROY, a town of New York, on the Hudson, opposite Troy. It has a lumber trade, and various manufactures; the Watervliet national arsenal is in the center of the village. Pop. (1880) 11,532.

WETSTEIN, the name of a Swiss family illustrious for the talents and learning of its members, originally from Kyburg, in the canton of Zürich. Among the more noteworthy are—(1.) Joh. Jakob W., born at Basel in 1594, who was first in the service of the Venetian state. In 1620, he became a member of the Supreme Council of his native town; represented Switzerland at the Peace of Westphalia (1648); was raised to the rank of a noble in 1653, and died in 1666.—(2.) Joh. Rud. W., son of the preceding, was born at Basel in 1614, and died there in 1683, professor of theology. He was a great opponent of the introduction of the *Formula Consensus*, and assisted Suicer in drawing up his *Thesaurus Ecclesiasticus*.—(3.) Joh. Rud. W., son of the preceding, born at Basel in 1647, and died there in 1711; also professor of theology, favorably known as an early editor of Origen.—But the most distinguished member of the family is Joh. Jak. W., son of Joh. Rud. W., the younger, who was born at Basel, 5th March 1693. After a thorough study of the classics, Hebrew, philosophy, and mathematics, he was made a Ph.D. at the age of 16. Four years later, he became a minister, and gave himself up to the study of the New Testament. In 1717, he began to give lessons in theology at the university of Basel, and continued to do so until 1730, when

(being suspected of Socinianism) he was forced to leave Switzerland. He sought an asylum in Holland, where the Remonstrants appointed him professor of theology at Amsterdam in 1733. He died there 23d March 1754. W.'s great work is his edition of the New Testament, with prolegomena, a collection of various readings, and Latin notes (2 vols., Amst. 1751—1752). Its publication marks an epoch in the history of New Testament criticism. Semler reprinted the prolegomena with additions (Halle, 1764).

WETTE, De. See De Wette.

WE'TTER, Lake, after Lake Wener (q. v.), the largest lake in Sweden, lies in Gothland, about 25 miles south-east of Lake Wener in direct line. It is 70 miles long, 13 miles in average breadth, has an area of 850 sq. m., is 370 feet in greatest depth, and is 300 feet above the level of the Baltic. It receives about 90 small tributaries, though its waters have only one outlet, the Motala River, which, flowing eastward, maintains the communication of the lake with the Baltic. Its waters are clear, and of a beautiful green color, and it is surrounded by lofty romantic shores, almost unbroken by bays. It is remarkable for an irregular alternation of risings and fallings, and for an occasional undulation, which is so rapid and violent as to break the thick sheet of ice with which it is covered in winter. An intricate chain of small lakes, continued westward by the Göta Canal, connects Lake W. with Lake Wener, and thus with the Cattegat. Lake W. contains few islands, and of these the chief is Wisingsö, 7 miles long by 1½ miles broad.

WE'TTERHORN (Peak of Tempests), a lofty mountain of the Bernes Oberland, Switzerland, on the east side of the Grindelwald, and about 10 miles south-east of the Lake of Brienz. From the path by which it is ascended, it rises in one vast precipice of alpine limestone, seeming to threaten the traveler. The three peaks of the W. are respectively 12,149, 12,166, and 12,107 feet high.

WE'TZLAR, a small town of Rhenish Prussia, charmingly situated on the Lahn, 40 miles north of Frankfurt-on-the-Maine. Part of its old cathedral is said to date from the 11th century. W. is notable as the scene of the *Sorrows of Werther*. Pop. (1880) 7428.

WE'XFORD, a maritime county of the province of Leinster, Ireland, is bounded on the N. by the county of Wicklow, on the E. by the English Channel, on the S. by the Atlantic, and on the W. by the counties of Waterford, Kilkenny, and Carlow. Its greatest length north and south is 55 miles, and its greatest breadth east and west is 34 miles. The area is nearly 900 square miles, or 578,980 acres, of which 244,276 are under tillage; 273,884 in pasture; 11,763 in plantations; 42,997 uncultivated, 2392 in towns, and 3668 under water. Pop. (1871) 132,666; (1881) 123,587, of whom 112,710 were Catholics, and 10,015 Episcopalians. The coast-line of W., which extends from Kilmichael Point to the estuary of the Suir, Waterford Harbor, is irregular, and very dangerous for shipping. From the above-named Point to Wexford Harbor there is no opening for navigation; and as Wexford Harbor, besides being intricate and dangerous, is also obstructed by a bar, it offers little security in boisterous weather; but considerable improvements have lately been made. The coast from the southern headland of Wexford Harbor, Rosslare Point, to the mouth of the Suir, presents a succession of bays and headlands. The headland called Carnsore Point is the south-eastern extremity of Ireland. Parallel with the northern coast-line, at a distance of a few miles, is a range of sandbanks; and the southern shores are beset by outlying rocks and islets, which, although somewhat guarded by light-houses and light-ships, frequently prove fatal to shipping. The greater part of the surface is tolerably level, but some detached hills rise to considerable elevation. The mountains of the border are much more elevated, the highest point of the Blackstairs being 2409 feet; and of Mount Leinster, 2610. There are few lakes, and these of small size. The principal river is the Slaney, which for some distance is the boundary between W. and Carlow, but enters W. near Newtonbarry, whence it flows by Enniscorthy into the sea in Wexford Harbor. In its geological structure, W. belongs to the eastern clay-slate tract, which stretches in a south-westerly direction from the north of Wicklow to the Atlantic, and which extends across the level districts as far as the granite range separating W. from Carlow.

Granite is found in the south-east of the county, and in some of the detached hills, as are also beds of greenstone. Silver was formerly raised near a place called Clonmines, where traces of an ancient mine are still seen, and galena has been found in the same place. Copper ore is found at a place called Kerlogne, near W., and plumbago and asbestos near Enniscorthy. The climate is said to be singularly temperate, and the district is more suitable for agriculture than the counties of Carlow and Kilkenny, although inferior in fertility. The total acreage under crops in 1880 was 206,840, or about two-fifths of the county, oats and barley being the principal crops. The breeds of live-stock have been recently so much improved, that W. has carried off first prizes at various cattle shows. The annual value of property in W. is between £374,000 and £375,000. There are but few and inconsiderable manufactures, and the trade is chiefly in the export of agricultural produce, especially barley; butter, cattle, pigs, poultry, and eggs are also exported in large quantities. The pupils at the national schools in 1879 numbered 18,298. W. is divided into ten baronies. Of these the barony of Forth is very remarkable as having preserved, from the 12th c. down to the very last generation, a dialect of English quite peculiar, as well as many peculiar usages and social habits. The principal towns are Wexford (q. v.), Enniscorthy, New Ross, and Gorey; Newtownbarry and Taghmon have each a population of about 1000; and Duncannon is noticeable for its ancient fort and interesting historical associations. The maritime position of W. laid it open early to the incursions of the Danes, to whom the name Wexford, or Weisford, is traced by antiquaries. It was the first landing-place of the English in the invasion, and formed part of the tract granted to them by MacMurrough. By the marriage of Strongbow with Eva, MacMurrough's daughter, it came into his hands; and after the partition of his lands among his daughters at his death, W. underwent many changes of masters. During the civil wars which followed 1641, W. was the scene of frequent contests; and in the more recent insurrection of 1798, it formed the theater of the only formidable conflicts of the peasantry with the regular troops. There are numerous relics of antiquity, Celtic as well as Anglo-Norman, in almost every part of the county. Upwards of a hundred castles are still traceable, and many ecclesiastical remains, of which the monasteries of Dunbrody, Tintern, Ross, and some others are not unworthy of the best days of medieval architecture. W. returns four members to parliament, two for the county, one for the borough of Wexford, and one for that of New Ross.

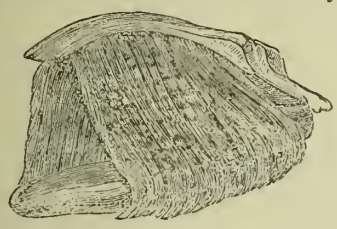
WEXFORD, capital of the county of that name, a seaport, and parliamentary and municipal burgh, is situated at the mouth of the river Slaney, 74 miles south from Dublin, with which it communicates by the Wicklow, Wexford, and Waterford Railway, now completed. The pop. in 1871 was 12,077, of whom 11,196 were Roman Catholics, and 717 Protestant Episcopalians; in 1881, 12,163. The town is situated on the south-western shore of the estuary of the Slaney, which is known as Wexford Harbor, and along which the quay extends nearly 1000 yards, forming a spacious and not inelegant terrace. Behind this, the town extends in two nearly parallel streets. There are two Protestant, and three Catholic churches. Of the latter, two are modern and handsome structures. One of the former, St. Selsker's, is ancient, part of its walls dating from the English invasion. There are also a Presbyterian, a Methodist, and a Quaker meeting-house; a convent of Franciscan Friars, 5 nunneries, a Roman Catholic college, and National, Christian Brothers', and conventual schools. Besides the union workhouse, there are also an infirmary and a fever hospital. The only manufactures of any importance pursued are those of distillation and the grinding of corn; the chief industry of the town being in connection with the export trade of the county, already described. The position of W. for export trade, favorable in itself, is much marred by the shallowness and intricate character of the channel of the Slaney, which has the further disadvantage of being obstructed by a bar. Great improvements have been made, a patent slip and dock have been constructed, steamers are employed in the export of cattle and provisions, and an active shipping-trade is carried on. The W. fisheries also have long been reckoned among the most valuable on the eastern coast. The town is extremely ancient, and was occupied by the Danes as one of their strongest settlements. From the time of the invasion, it became an English stronghold against the native population. During the civil wars of 1641, it was occupied by the confederated Catholics, but was taken by Cromwell in 1644. The insurgents of 1798 also had possession of it for a short time. W. returns one member to the imperial parliament. In 1880, 709 vessels, of 74,064 tons, entered, and 705, of 71,994 tons, cleared the port.

WEY'MOUTH, a township of Massachusetts, U.S., on Boston Harbor, twelve miles south-south-east of Boston, on South Shore Railway, containing the four post-villages of Weymouth, East Weymouth, North Weymouth, and South Weymouth, with large factories of nails, boots and shoes, &c. Pop. (1875) 9819; (1880) 10,570.

WEYMOUTH-AND-MELCOMBE-REGIS, a seaport, a fashionable watering-place, and a municipal and parliamentary borough of Dorsetshire, on a bend of the coast facing the south-east, and at the mouth of the river Wey, three miles north of the Isle of Portland, and eight miles south of Dorchester by railway, seven in a straight line. A projecting point, called the Nothe, separates the two quarters—the old town of Weymouth lying to the south of it, the modern town, Melcombe-Regis, extending to the north, and facing the sea. The two quarters communicate by means of

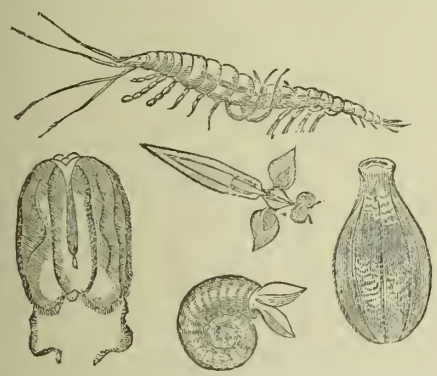
a bridge with a swing in the middle, to permit the passage of ships. The old town is uninteresting in appearance; Melcombe-Regis, elegantly built, stands on a narrow peninsula, with the sea on the east, and an estuary on the west side. Its chief features are the sea-terrace and esplanade, the latter adorned with a statue of George III., who largely patronized Melcombe. The harbor has fourteen feet of water at full tide, and in the bay there is good anchorage in seven or eight fathoms. W.-and-M. is the seat of steam-traffic to the Channel Islands, and steamers ply to and fro daily to Portland. Ship-building, rope and sail making, and the export of Portland stone and Roman cement, employ the great mass of the inhabitants. The town is connected with the Great Western and London and South-Western Railways, and one connecting it with Portland Isle was opened in 1865. Pop. (1871) 13,259; (1881) 13,704.

WHALE, the popular name of the larger cetaceans, particularly of all those belonging to the families *Balænidæ* and *Physeteridæ* or *Catodontidæ*. The latter family has already been noticed in the article CACHOLOT, and some of the species of *Delphinidæ* also sometimes called whales have been described in separate articles, as the CAAING WHALE and the BELUGA. The *Balænidæ* alone remain to be described now. In this family, the head is of enormous size, as in the *Catodontidæ*, but is entirely destitute of teeth,



Jaws of Greenland Whale, showing the Baleen.

instead of which, the palate is furnished with an apparatus of *baleen*, or *whalebone*, for the purpose of straining out of the water the small crustaceans and acalephæ, which form the food of these whales. Rudiments of teeth, however—dental pulps—appear in



Food of the Whale, consisting of minute shrimps, sea-snails, medusæ, &c.

the fœtus of the whale—sixty or seventy on each side of each jaw; but they are re-absorbed into the system, and the plates of whalebone are not produced from them, but from the integuments.

The fibrous structure of baleen, or *whalebone*, its elasticity, and is heaviness, are well known. The plates of it in the mouth of a W. are very numerous, several hundreds on each side of the mouth, and they are very closely placed together, so that the mouth is filled with them; the whole quantity in the mouth of a large W. sometimes amounting to nearly two tons in weight. They are suspended from the roof of the mouth; none proceed from the lower jaw. They extend on each side from the middle line of the palate, like the barbs of a feather; those in the middle of the mouth are longest. The base of each plate is embedded in the substance of the membrane that covers the palate, whilst its edge forms a loose fringe, composed of fibres or pliant bristles. The vast mouth being open, water is taken in; and the small animals which enter with it being retained for food, the water is allowed to escape by the sides of the mouth.

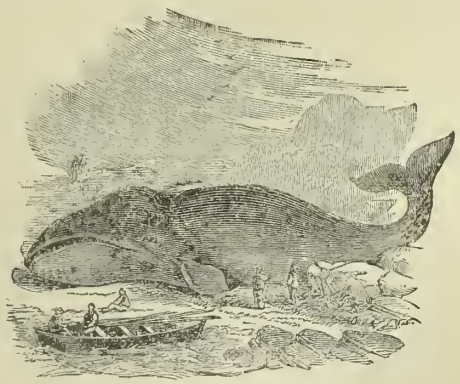
The tongue is a soft thick mass, not extending beyond the back of the mouth. The gullet of whales is very narrow; it is said not to be more than an inch and a half in diameter even in a large W., so that only very small animals can pass through it.—The head of whales occupies from a third to a fourth of the whole length. The skull is unsymmetrical, the right side being larger than the left. The flesh is red, firm, and coarse. The skin is naked, with the exception of a few bristles about the jaws, and its surface is moistened by an oily fluid. The lower surface of the true skin extends into a thick layer of *blubber*, an open network of fibres in which fat is held. The blubber is from a foot to two feet in thickness, the whole mass in a large W. sometimes weighing more than thirty tons, and serves the purpose of keeping the animal warm, as well as of making the specific gravity of the whole body much lighter than it would otherwise be, and of resisting the pressure of the water in the great depths to which it often descends.

The skin of whales is always infested with parasites; molluscs adhere to it; certain kinds of cirrhopods burrow and live in it; and crustaceans, such as the Whale-louse (q. v.) attach themselves to it and feed upon it.

It has been attempted to calculate the age of whales from the transverse lines on the plates of baleen, and in this way it has been computed that they attain the age of 800 or 900 years, each transverse line being assumed to indicate an annual check of growth; but it is evident that there is no good ground for the assumption on which such calculation proceeds.

In the genus *Balæna* there is no dorsal fin, nor elevation of the back corresponding to it, as in some of the family. The belly is smooth, not plaited, as in the other genera of the family. The most important species, and indeed the most important of all the whales, is that known as the RIGHT W., or GREENLAND W. (*B. mysticetus*). It inhabits the seas of the northern parts of the world, and abounds chiefly in the arctic regions. It is sometimes seen on the coasts of Britain, and even in more southern latitudes. It attains a size of sixty or seventy feet in length. The body is thickest a little behind the *flippers*, or pectoral fins, tapering conically towards the tail and slightly towards the head. The tail is five or six feet long, and from twenty to twenty-five feet broad; formed of two diverging lobes, broadest almost where they are united, but with a slight indentation.

The pectoral fins are eight or nine feet long, and four or five feet broad. The mouth is fifteen or sixteen feet long. The eyes, which are situated on the sides of the head, about a foot above and rather behind the angles of the mouth, are not larger than those of an ox; but the sense of sight seems to be acute, at least in the water. The iris is white. The blow-holes are situated on the most elevated part of the head; they are from eight to twelve inches long, but of comparatively small breadth. The upper parts are velvety black, the lower parts white. The upper parts, in very old whales, sometimes become piebald, the black being mixed with white and gray. The period of gestation is uncertain; one young one is produced at a birth, and is from ten to fourteen feet in length when born. The mother displays great affection for her offspring, of which whale-fishers sometimes take undue advantage, harpooning the young one—itself of little value—in order to secure the mother. Suckling is performed at the surface of the water, and the mother rolls from side to side, that she and the young one may be able to breathe in turn. The usual rate of progress in swimming is about four or five miles an hour, and whales often swim not far beneath the surface of the water, with the mouth wide open to take in water from which to sift food. The W. is capable, however, of swimming with much greater rapidity, and when harpooned, it often descends to a great depth in a few seconds. Its tail is extremely powerful, and a single blow of it is sufficient to destroy a large boat, or toss it and its crew



Greenland or Right Whale (*Balæna mysticetus*).

into the air, so that the whale-fishery is attended with no little danger. Whales usually come to the surface to breathe at intervals of eight or ten minutes, but they are capable of remaining under water for half an hour or more. When they come up to breathe, they generally remain on the surface about two minutes, during which they blow eight or nine times, and then descend. The noise which they make in blowing is very loud, and the spout of spray ejected ascends several yards into the air, appearing at a distance like a puff of smoke. They often assume, as if in sport, a vertical position, with the head down, and flap the surface of the water with the tail, making a sound which is heard two or

three miles off. The Greenland W. is not properly gregarious, being generally found alone or in pairs, except when numbers are attracted to particular feeding-grounds, as is sometimes the case in the bays and inlets of northern coasts.

It was formerly supposed that the Greenland W. was an inhabitant of the southern as well as of the northern parts of the world; but the SOUTHERN or CAPE W. (*B. australis*) is now regarded as a distinct species, the head being smaller in proportion than that of its northern congener, and the color a uniform black. It attains the length of 50 or 60 feet. It is usually found in comparatively shallow water near coasts. It occurs not only in the colder parts of the southern hemisphere, but throughout its temperate regions, and its range extends into the tropics. It has been taken even as far north as Japan. Its capture is prosecuted to a considerable extent, particularly on the coasts of South Africa and New Zealand, although this whale-fishery is not nearly so important as that of the northern seas. Several other species of *Balæna* have been described, but they are imperfectly ascertained and characterized, specimens not often coming under the observation of competent naturalists in a perfect state. The *Nordkaper* of the Icelanders has by some naturalists been described as a distinct species, although it is more generally regarded as a variety of *B. mysticetus*. It differs, however, from the common variety in having the body more slender and the head proportionally smaller; the under jaw very round, deep and broad; and the plates of baleen comparatively short. It is of a gray color; the lower part of the head of a brilliant white. It is said to be more active and more fierce than the Common W., so that its capture is attended with greater danger.

The species of the genus *Megaptera* are called HUMP-BACKED WHALES, and by whale-fishers ordinarily *Hump-backs*. They have a rudimentary dorsal fin, in the form of an elevation of the back. There are several species, but some of them are very imperfectly known. *M. longimana*, so called from the length of the pectoral fins, is found in the North Sea, and is included in the British fauna. *M. Americana*, the BERMUDA HUMP-BACKED W., occurs chiefly about the Bermudas, from which its baleen is extensively imported. Another species, *M. Pæskop*, occurs at the Cape of Good Hope.

The genus *Balænoptera*, *Physalus*, or *Rorqualus* is distinguished by having a dorsal fin. See RORQUAL.

All the species of these genera are objects of pursuit to whale-fishers, although the Greenland W. is that which they prefer.

Important as the W. is to civilized man, both for the oil and the whalebone which it yields, it is still more important to the rude natives of arctic regions, as the Esquimaux and Greenlanders, who use its oil for food as well as for burning, and to whom its flesh also is a chief article of food; while its bones and baleen are used for making tents, sledges, boats, harpoons, and spears; the sinews supply a substitute for twine or thread; and the membranes are used instead of glass for windows. There is no essential difference in the way in which the capture of whales is prosecuted by the rudest tribes and the most civilized nations. The whale-fishers approach the whale in boats, and attack it by harpoons to which lines are affixed, following up and repeating the attack, until its strength is exhausted, taking advantage of the necessity which it experiences of coming at intervals to the surface to breathe, and finally killing it with lances, which are thrust into the most vital parts.

In its most simple form, the harpoon is an iron spear about 5 feet in length, with a much flattened point, having sharp cutting



Harpoon.

edges, and two large flattened barbs. Many modifications have been made, the most important perhaps being the gun-harpoon. The ordinary harpoons are attached to a long line at the opposite end to the barbed point, and when the boat is near enough to the W., the man whose duty it is darts or plunges the weapon with all his force into the animal's side. In its fleeing from the attack, the line is rapidly drawn out of the boat, until the creature is tired, and rises to the surface for air. The boat follows, keeping as much of the line as possible, until, exhausted by pain and loss of blood, the animal succumbs. It will be seen that much depends upon the sharpness of the blade-like edges of the barbs, and their power to hold when in; hence many ingenious devices of movable barbs have been contrived, which close on the shaft of the instrument in going into the animal's flesh, but open outwards as soon as there is any strain on the shaft.

The gun-harpoon is a short bar of iron with the barbed spear at the end, and a ring with chain for the attachment of the line; this is fired from a small swivel cannon attached to the whaler's boat. However well the harpoon may be fixed in the animal's body, its death and capture are still very difficult matters to accomplish, and take much time. To obviate this, a very ingenious expedient was suggested by Sir R. Christison, the eminent toxicologist of Edinburgh University, that glass tubes containing prussic acid should be so placed in the shaft of the harpoon, that the moment the cord or line was pulled tight, they would be broken in the animal's body, and occasion instant death. This plan has been tried with great success, but has met with opposition from the whale-fishers, who have a prejudice against using a poison which they see has such deadly effects. Another mode of employing prussic acid is to enclose a glass tube containing it, in a hollow rifle bullet about four inches long, which is fired from a rifle made for the purpose, the bullet containing also an explosive substance connected with a fuse, which is kindled as the rifle is fired, so that the bullet bursts immediately after penetrating the whale, and spreads its deadly contents through the flesh. The bullet is made of zinc, because it breaks into fragments more angular than any other metal. The success of this method has been found to be perfect, but sailors object to its use, dreading to touch the carcass of a whale which has been killed by so powerful a poison, for a whale struck by a bullet charged with prussic acid only disappears for about five minutes, and rises to the surface dead. Strychnia has been used instead of prussic acid, and with similar results.

The lance used for killing the W. has generally a blade 5 or 6 inches long, and 2½ or 3 inches broad, with sharp cutting edges, and a long wooden handle.

The ships fitted out for the northern whale-fishery are generally screw-steamers, of from 400 to 600 tons burden. To protect them from injury by ice, they are fortified with an additional series of planks, iron plates, and a *false* or *ice* stem, on the sides of which are *ice-knees*—angular blocks of wood filling up the concavity formed by the stem and fore-planks. The stern is also defended by *ice-plates* of half-inch iron; and many timbers and stanchions are added in the interior of the vessel, great strength being a more important requisite than fast sailing. Each ship has generally six or seven boats, *carvel-built*, from 23 to 28 feet in length, each capable of carrying 6 or 7, men, with 7 or 8 cwt. of whale-lines, &c.

The crew of a whaler consists of 40 or 50 men, each of whom, from the master to the boys, generally receives, in addition to his fixed wage, a gratuity for every W. caught, and a certain sum for every tun of oil produced by the cargo. Each boat carries 2 harpoons and 6 or 8 lances. When the ship arrives in the vicinity of a whaling-ground, a lookout is stationed at the mast-head. As soon as a W. is discovered, the boats are lowered, and a competition ensues among their crews, all exerting their utmost strength to reach the W. first. The harpooner is ready, as soon as the boat is sufficiently near the W., to hurl his harpoon with all his force; the crew instantly back the the boat, and the W. generally plunges in terror to a great depth, sometimes carrying out more than 200 fathoms of line. It remains below for 20 minutes or more, and when it rises, the boats hasten to it again; it is struck with a second harpoon, and probably, instead of at once descending, it strikes violently with its tail, to destroy its enemies, when great caution is requisite. It cannot now remain long below the surface, and when it comes up, probably spouts blood through the blowholes. When it is lanced, it sometimes dies almost at once, but sometimes there is a terrific struggle—the water is lashed into foam, and dyed with blood. It not unfrequently happens, that instead of dying at the surface of the water, the W. descends, and does not rise again, so that it is lost to the whaler. The carcass of the W. is towed by the boats to the ship, and made fast to the ship's chains. The process of *flensing* is then commenced. Some of the crew, having their boots armed with iron spikes, to prevent them from slipping, descend upon the carcass, and cut into the blubber with *blubber-spades*, removing a broad strip or *blanket* of skin, 20 or 30 feet long, which is hoisted to the deck by means of a hook and tackle.

Great cubical pieces of blubber, of half a ton or a ton in weight, are then cut out, and hoisted on deck. In this way the process is carried on, the W. being turned over and over, that every part may be reached; till, in three or four hours, the whole mass of blubber is removed from it—probably amounting to 20 or 30 tons. Meanwhile, others of the crew have descended into the mouth of the W., and removed the baleen. The remainder of the carcass is then flung adrift, and sometimes sinks, but often swims, in consequence of incipient putrefaction, to afford food for bears and fishes. The blubber, after being received on deck, is cut into smaller cubical pieces, and subjected at leisure to a process by which the cellular tissue is separated from it. This is called *making-off* or *trying-out;* and to accomplish it, the blubber is heated in a large pot, and afterwards strained, the scraps or cracknels from one pot serving as fuel for another, and the ship being made filthy with smoke, soot, and grease. The product is finally stored in casks, to be conveyed home, and boiled for oil. A ton of blubber yields nearly 200 gallons of oil. A single W. often yields blubber and whalebone to the value of £700 or £800. The whalebone is subjected to no process but that of drying till it is brought home.

Ships often return from the whale-fishery *clean*—i. e., without having captured a single whale. The greatest number of whales known to have ever been captured by a single vessel in a season is 44; yielding 299 tuns of oil, of 252 gallons each. This was in 1814; the fortunate whaler belonged to Peterhead, in Scotland, and the oil alone, according to the price of that year, £32 per tun, was worth £9568. When the price of oil and whalebone has been higher, even greater profits have been realized by whalers making fewer captures.

It is usual for whalers to resort to the arctic whale-fishery in spring, and to return in autumn; but Captain Penny adopted with great success, in 1853—1854, the method of wintering in the arctic regions.

The Norwegians sent vessels to Greenland for the whale-fishery in the 9th century. They had previously prosecuted it on their own coasts, and the Norman settlers on the Bay of Biscay carried it on there, whales inhabiting that bay in considerable numbers, till, through the eager prosecution of the fishery, they became so few that about the 15th c. it became unprofitable, and was relinquished. In 1261, a tithe was laid upon the tongues of whales brought into Bayonne, they being then highly esteemed for food. The French, Spaniards, and Flemings early began to fit out vessels for the northern whale-fishery; the English entered upon it with great spirit in the end of the 16th c., and about the same time the Dutch, Danes, and Hamburgers. The British Muscovy Company obtained a royal charter, giving them a monopoly of the whale-fishery of the coasts of Spitzbergen, on the pretence of its having been discovered by Sir Hugh Willoughby, although, in fact, it was discovered by the Dutch navigator Barentz. Other nations were not disposed to acknowledge the claims of the English; the Dutch in particular sent out a strong fleet, between which and the ships of the Muscovy Company an engagement took place in 1618, and the English were defeated. The Spitzbergen bays and seas were afterwards divided into fishing-stations, allocated to the whalers of the rival nations. No nation now asserts a claim to the exclusive right of whale-fishing in any quarter. The Spitzbergen fishery was thrown open to all nations in 1642.

The English for some time prosecuted the whale-fishery sluggishly and with incompetent means; the Dutch carried it on with great vigor and success. During the latter half of the 17th c., the Dutch furnished almost all Europe with oil. In 1680, they had 260 ships and about 14,000 men employed in the whale-fishery; but from that time the Dutch fishery began to decline.

In 1732, Great Britain attempted to encourage the whale-fishery by a bounty of 30*s.* a ton to every ship of 200 tons engaged in it, which was raised in 1749 to 40*s.*, reduced to 30*s.* in 1777, and again raised to 40*s.* in 1781. The object of the bounty was not only to encourage the trade, but to make it a nursery for seamen. Ships, however, were fitted out rather for the bounty than for the capture of whales, and during the next five years after the reduction of the bounty in 1777, the number of ships employed in the trade was reduced from 105 to 39. After 1781, it rapidly increased, and continued to increase although the bounty was reduced. The bounty was finally altogether withdrawn in 1824; yet in 1815, when the British whale-fishery was in its most flourishing condition, only 164 ships were engaged in it. The Dutch whale-fishery had in the meantime almost entirely ceased, owing to the national calamities consequent on the French Revolution. The British whale-fishery is still prosecuted, although not nearly to the extent that it was fifty years ago. The French whale-fishery has in like manner declined. The Americans are at present more actively engaged in the whale-fishery than any other nation. The New England colonies entered upon this enterprise at a very early period, at first merely by boats on their own coasts, which, however, were deserted by whales before the middle of the 18th c., and ships then began to be fitted out for the northern seas. For a number of years, however, the American whale-fishery also has been declining, owing to the scarcity of whales, and because substitutes for whale-oil and whalebone have been found.

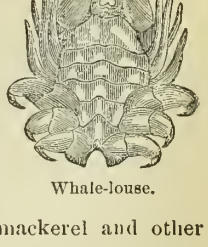
Of all British towns, Peterhead and Dundee are those which of late have shown the greatest enterprise in the whale-fishery, and next to them is Hull. In America, New Bedford demands special notice. It is at present the greatest whaling-port in the world.

The ships engaged in the whale-fishery generally add to their cargoes of oil by the capture of seals.

WHALES, in point of law, belong to the crown, according to the law of England, if they are caught or found within the territorial sea—that is, within the limit of three miles from the shore; or in the inner seas, as distinguished from the open sea. This is contrary to the general rule—that he who first captures a wild animal is entitled to the property thereof. Whales are thus called royal fish; and it is said sturgeons and porpoises also fall under the same class. If the whales are not caught in the territorial seas, which are part of the realm, but in the open sea, then the law of nature applies, or rather a secondary law or custom governs the right of property, and that law, though varying slightly according to locality, is, that the person who first captures the whale is entitled to keep it. In the Greenland seas, the local custom is that the first harpooner who strikes the whale is entitled to the property only if he continue to hold the whale by the line attached to his harpoon; but if his line break, and a subsequent harpooner from another ship finish the capture by obtaining possession, then the latter is entitled, for it is a loose fish. This rule, however, has been qualified in this way, that the first harpooner who strikes the fish and keeps it entangled is entitled, even though a volunteer come up and officiously strike the fish, thereby causing it to struggle and break from the first line. At Gallipagos, South America, the custom is that he who first strikes the whale with a drong, or loose harpoon, is entitled to receive half of it. The same rules govern the right of property in whales when similar questions arise between parties litigating in Scotland. The law of Scotland, as well as England, adopts whatever local custom prevails where the whale was captured.

WHA'LEBONE. The baleen plates which take the place of teeth in the mouths of the Baleen Whales (see WHALE), constitute the whalebone of commerce. They vary in length from a few inches up to ten, and even in rare instances to twelve feet. Their chemical constitution is albumen hardened by a small proportion of phosphate of lime. Their color is usually of a bluish black, but in some species they are striped longitudinally with bands of a whitish color; and they terminate at the point in a number of coarse black fibres of the baleen, which fibres are also found more or less down both sides of the blade. These fibres are much used by brushmakers. There are three principal kinds in the market, and they are generally known as *whale-fins*. The first is the *Greenland*, or Davis' Strait and North Sea fins; second, the South Sea, or black fish-fins; third, the North-west coast, or American whale fins. Whalebone requires some preparation before being fit for use; this, however, is very simple. It is first trimmed—that is, all the hairs are removed from the point and edges of each blade; and generally the surface of each flat side is scraped. The blades are then boiled in water for several hours, until they become soft enough to be cut easily with a common knife. The workman then cuts them into lengths fitted for the purposes to which they are to be applied. They are chiefly used in thin strips, such as stay-bones and umbrella-ribs, and can be easily split for such purposes, owing to their lamellar structure. Generally, the boiling is combined with a dyeing process, to make the whalebone perfectly black, which is preferred to the not agreeable natural color. The quantity annually imported into Britain fluctuates greatly: between 1873 and 1877 the quantity varied from 3500 cwts. to 1800 cwts., and the value from £65,000 to £47,000.—Strips of rattan canes dyed black are used as a cheap kind of artificial whalebone, but the best imitation is made of vulcanite or prepared caoutchouc, which in many respects is superior to the real whalebone.

WHALE-LOUSE (*Cyamus*), a genus of Crustacea, of the order *Læmodipoda*, having the body short and rather broad; the legs short and stout; seven pair of legs; the first pair more slender than the rest; the first, second, fifth, sixth, and seventh pair furnished with sharp hooked claws, the third and fourth not terminating in claws, but in a long almost cylindrical joint. All the species are parasitic on Cetacea, attaching themselves to the skin by means of their claws. Whales are sometimes so completely covered with them, as to appear of a whitish color even at a distance; and when the whale is captured, its skin is found to be deprived of the epidermis. *Cyamus Ceti* is said also to infest the mackerel and other fishes of the family *Scomberidæ*.



Whale-louse.

WHANG-HAI', or YELLOW SEA, an important inlet of the Pacific Ocean, washes the north part of the east coast of China, and is bounded on the W. by the Chinese provinces of Shang-tung and Keang-su, and on the E. by the peninsula of the Corea and Japan. It terminates on the north-west in the Gulfs of Pechih-li and Leao-tong, and opens out in the south-east into the Tung-hai, or Eastern Sea. It is more than 600 miles long, and over 400 miles in average breadth. The W. is shallow, and near the land its waters are of a lemon color, owing to the nature of the bottom, which is often furrowed by vessels navigating it. By degrees, it is becoming more and more shallow, owing to the quantity of alluvium borne down into it by the rivers Hwang-ho (q. v.) and Yang-tze (q. v.).

WHA'RNCLIFFE MEETING. By a standing order of the House of Lords, which was proposed by Lord Wharncliffe, and is still known by the title of the 'Wharncliffe Order,' no bill to empower any company already constituted by act of parliament to execute, undertake, or contribute towards any work other than that for which such company was originally established, or to sell,

lease, or abandon its undertaking, or any part thereof, or to amalgamate with any other undertaking, or to dissolve, is allowed to proceed in the House of Lords, until it is reported that such bill has been submitted to a special meeting of the proprietors of the company, convened by public advertisement, and by circular addressed to each proprietor; that such meeting was held not earlier than seven days after the last insertion of such advertisement; and that at such meeting the bill was submitted to the proprietors present, and approved of by proprietors present, in person or by proxy, holding at least three-fourths of the paid-up capital of the company represented at such meeting. Of late years, a number of bills are in each session originated in the House of Lords; and since the introduction of this practice, the meetings held in conformity with this order are popularly known as 'Wharncliffe Meetings.' The House of Commons has adopted a corresponding standing order applicable to such bills coming from the Lords.

WHARTON, Philip Wharton, Duke of, was the son of Thomas, Marquis of Wharton, an eminent member of the Whig party in Queen Anne's reign, and Lord-lieutenant of Ireland from 1708 until after the fall of the Godolphin administration in 1710. Macaulay says he was licentious and corrupt; but the faults of his Irish administration were largely redeemed by his appointment of Addison as Chief-secretary. George I. made him Lord Privy Seal and Marquis of W. in 1715, but he died three months afterwards. His son Philip, born 1698, was educated at home by his father, who aimed at making him a great orator, a Whig in politics, and a Presbyterian in religion. In a boyish freak, he contracted a clandestine marriage at the Fleet with the daughter of Major-general Holmes. The shock is said to have killed both his parents.

W. soon parted from his wife, and in 1716 went abroad with a French Huguenot tutor, to be brought up according to his father's dying instructions, in strict Presbyterian principles, at Geneva. He contracted debts, spurned the restraints of his tutor, and ran away to Lyon. He visited the Pretender at Avignon, and, it is said, accepted from him the title of Duke of Northumberland. He next visited Paris, and after various extravagances, set out for Ireland, where, although he had not yet reached his 19th year, he was allowed to take his seat in the House of Peers. He soon displayed such splendid abilities in debate, and supported the government with so much zeal, that although still under age, he was, January 20, 1718, raised to the highest rank in the English peerage. He did not take his seat in the English House of Peers until 1720. Here he opposed with much warmth the government measure on the South Sea Bill, and the bill of pains and penalties against Bishop Atterbury. His affairs became hopelessly involved by his extravagance, so that although he had succeeded to an estate of £16,000 a year, he was soon compelled to accept a yearly allowance of £1200 from his creditors. He set up a political paper, called the *True Briton*, in 1723; and lost no occasion of speaking, as well as writing, against the ministry and the court. In 1724, he set out for Vienna, and then visited Madrid, where he was served with an order from the Privy Seal to return home. He treated the order with contempt, and afterwards went to Rome, and appeared openly at the court of the Pretender, from whom he accepted the Order of the Garter. He now assumed the title of Duke of Northumberland. In 1727, he fought with the Spaniards and against his countrymen at the siege of Gibraltar. This last mad act lost him his English title and estates, and led to his conviction under a bill of indictment for high treason. He refused to make his submission to the government; and the rest of his life was passed in France and Spain, at one moment squandering his precarious supplies of money in drunkenness and luxury, and at another suffering the extremest poverty. He died in a miserable condition at a Bernardine convent in Catalonia, May 31, 1731. His brilliant talents and wasted life were sketched by Pope in his Moral Essays, in the lines beginning—

Wharton, the scorn and wonder of our days.

The *Life and Writings of Philip, late Duke of Wharton*, were published in 1732 (Lond. 2 vols., 8vo); and another two-volume publication, entitled *The Poetical Works of Philip, late Duke of Wharton, and of the Duke's Intimate Acquaintance*, appears, with the exception of the title-page and a prefixed biography of W., to have been printed in 1727. This publication, however, contains little that is even attributed to the duke.

WHATELY, Richard, Archbishop of Dublin, was born in Cavendish Square, London, 1st February 1787, and was the fourth son of Dr. Joseph Whately of Nonsuch Park, Surrey, Prebendary of Bristol, Vicar of Widford, and lecturer at Gresham College. He was sent in due time to a private school at Bristol, from which, in 1805, he passed to Oriel College, Oxford. He took his Bachelor's degree in 1808, taking a second class both in classics and in mathematics. He got the English-essay prize in 1810. In the following year, he was elected a Fellow of Oriel College, which at that time ranked among its Fellows not a few men destined to play a considerable part in the world, and already remarkable for their attainments and intellectual activity—e. g., Arnold, Keble, Pusey, and the elder Newman. In 1815, he became one of the tutors of his college; and about this time he wrote (originally for the *Encyclopædia Metropolitana*) what he afterwards expanded into his popular treatises on Logic and Rhetoric. In 1821, he married a daughter of W. Pope, Esq., of Hillingdon, Middlesex. In the same year, he published two works; the one a volume of sermons on *The Christian's Duty with respect to the Established Government and the Laws;* the other a work which is among the most celebrated and characteristic of his writings: this was *Historic Doubts relative to Napoleon Bonaparte*. Its object was to throw ridicule upon the criticism to which the Gospel narratives were subjected by sceptical writers, by applying the same kind of criticism to events within the memory of all the world, and starting doubts as to whether these events had occurred. This *jue d'esprit* with a purpose created a great sensation. It has been translated into several foreign languages. In 1822, W. was presented to the living of Halesworth, in Suffolk.

In the same year, he delivered the Bampton Lectures at Oxford, taking for his subject the 'Use and Abuse of Party Feeling in Religion.' In 1825, he was appointed by Lord Grenville Principal of St. Alban's Hall, which, under his energetic rule, quickly lost the bad character it had long sustained in the university. In 1829, he was appointed Professor of Political Economy; but he was destined not to hold this office long enough to do more than deliver an introductory course of lectures. In 1831, Lord Grey's government, at the instance of Lord Brougham, appointed him Archbishop of Dublin and Bishop of Glendallach. Afterwards, in 1846, his episcopal charge was enlarged by the addition of the bishopric of Kildare.

During the ten years preceding his appointment to the archbishopric, W. had incessantly been writing and publishing, chiefly upon theological and ecclesiastical subjects. He belonged to the Liberal school in religion and in politics; he was opposed, that is, to High Church or Catholic views in theology, and to Toryism in politics. He had taken a keen interest in the political questions of the time, and especially had made himself conspicuous in the university by his advocacy of Catholic emancipation, of which the party in the church which had most sympathy with the theology and ecclesiastical system of the Roman Church were the most determined opponents. When Sir R. Peel, after his change of views on the emancipation question, voluntarily submitted himself for re-election to the university, W., though a Liberal, came forward to support him, and was one of the most active of those who endeavored to prevent his rejection. His *Essays on some of the Peculiarities of the Christian Religion* appeared in 1825; his *Elements of Logic*, in 1826; the *Elements of Rhetoric*, in 1828; his *Essays on some of the Difficulties in the Writings of St. Paul*, &c., also in 1828; his *Thoughts on the Sabbath*, in 1830; and in the same year, the *Errors of Romanism traced to their Origin in Human Nature*. His *Introductory Lectures on Political Economy* were published in 1831. By this time, his writings, and the great activity and ability which he displayed in his various public functions, had placed him among the foremost men of the university, and had also got him rank among the most remarkable thinkers and writers of his time. Though many distrusted him as a Liberal, questioned the soundness of some parts of his theology, or thought his manners too eccentric, and his habit of mind too peculiar, for one who was to rule over others, nobody questioned that his abilities and reputation were equal to the high position bestowed upon him by Lord Grey.

As Archbishop of Dublin, W. was very active in all matters of importance, social and ecclesiastical, and showed a deep interest in every question affecting the welfare of Ireland. He was one of the original members of the Board of National Education, and continued a member till 1853, when he retired, in consequence of a departure, as he thought, having been made from the principles on which, up to that time, the national education had been carried on. He was perhaps the most active member of the Board, and the success of the national system was in a great measure owing to him.

He and members of his family were always foremost in supporting well-devised charitable schemes. His liberality was, in fact, unbounded, though an opposite impression prevailed among those who did not know him, because he wrote and spoke strongly against casual benevolence, and used to say he had never given a penny to a beggar. As archbishop, his rule was firm and judicious. A slight disregard of etiquette was about the worst thing ever alleged against him: he was not disposed to make much difference between a rector and his curate. His activity as an author was not stifled by his energetic discharge of his public duties; indeed, he seems to have been always either writing a book, or

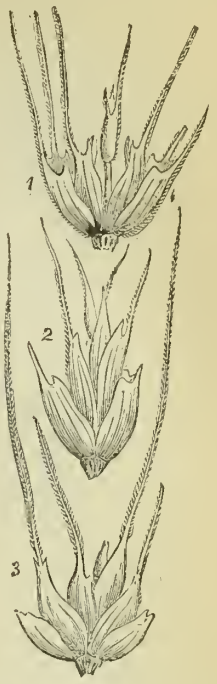
affording literary help to others. Besides many charges, sermons, and a few pamphlets, his *Kingdom of Christ Delineated*, one of the most remarkable of his works; his *Introductory Lectures to the Study of St. Paul's Epistles;* his *English Synonyms;* and his annotated edition of Bacon's *Essays*—perhaps the best example of good editing in the English language—belong to this period of his life. A work published anonymously in 1855, *Scripture Revelations Respecting Good and Bad Angels*, has been generally ascribed to Whately.

He died on the 8th October 1863. The world's esteem and the regard of his friends for him had been growing to the last. In early life, there was much about him to shock the fastidious, and some things which might hurt the sensitive; but his peculiarities softened and wore off as he advanced in years. At Oxford, he was noted for his rough unceremonious manners, for which (together with his dress) he was nicknamed the White Bear; and for the plain speaking and rough ridicule with which he would overwhelm an opponent in an argument. He was remarkable, too, for his fondness for athletic sports, which he indulged with a perfect indifference to the minor proprieties.

He used to say that his abrupt and careless and seemingly unfeeling ways were a recoil from the painful shyness for which he had been remarkable in his youth. Those who knew him, however, made light of his peculiarities; and few things about him are more pleasing than his firm belief in the merits of his friends, and the number, the warmth, and the permanence of his friendships.

He had great talents for conversation, and was famous for his bon-mots, happy repartees, and conversational pleasantries of every kind. His writings are not so much remarkable for subtlety of thought or novelty of view as for strong logic, acuteness, felicity of arrangement and exposition, and the frequency and homely force of his illustrations. He had the happy power of building up materials which might be old into a new, commodious, and almost a beautiful structure. He did nothing for mere ornament's sake: though his imagination was abundantly fertile, it was used only to illuminate his argument; his images are seldom impressive for their beauty, though admirably fitted for didactic purposes. His theological works have been charged with a 'cold rationalistic' tendency, and with being wanting in reverence; and it has been inferred, though perhaps too hastily, from some passages in his writings, that he was heretical on the subject of the Trinity. The *Historic Doubts*, the *Essays on the Peculiarities of the Christian Religion*, the *Errors of Romanism*, and the *Kingdom of Christ*, are perhaps the most valuable and characteristic of his writings.—The *Life and Correspondence of R. Whately, D.D., &c.*, by his daughter, E. Jane Whately, was published at London in 1866. It is an interesting, though in some respects a partial, and in some degree an inadequate, memorial of Dr. Whately. As might be expected, the 'White Bear' side of his character is kept in the shade: but few examples are given of the coarse but racy conversational wit which was one of the Archbishop's claims to distinction among his contemporaries. And it is scarcely possible to gather from it what his exact position was in theology or in literature, though the letters, which form a great part of it, give a very fine impression of the qualities which distinguish his works.

WHEAT, the most valuable and, next to maize, the most productive of all the cereal grasses. The genus *Triticum*, of which the species are popularly known either as *Wheat* or *Wheat-grass*, is distinguished by a spike with many-flowered spikelets, without stalks, and seated one on each notch of the rachis, their sides directed to the rachis, which is zigzag; and two glumes, of which the lower is either awned or awnless; the outer palea of each floret having at the top a notch, in the center of which is the terminal point, sometimes prolonged into an awn, or, in some species, with many florets tapering into an awn without a notch. A number of species are found in Britain, of which *T. repens*, well known as Couch Grass (q. v.), is the most common; but the seeds of none of them are of any value. The native country of the cultivated W. has generally been supposed to be the central part of Asia; but a discovery was made not many years ago by M. Fabre of Agde, in the south of France, that the *Ægilops ovata*, a grass of the regions near the Mediterranean, and of the west of Asia, becomes transformed by cultivation into wheat. The announcement of this discovery was at first received with much doubt, although the possibility of the transformation had been suggested by previous botanists; but it has been confirmed by subsequent observations and experiments. The genus *Ægilops*, as hitherto recognized by botanists, is distinguished from *Triticum* chiefly by its more numerous awns, the glumes of *Æ. ovata* being generally terminated by 3 or 4 awns, prolongations of their ribs, and the *paleæ* by 2 or 3 short awns. The awns of grasses, however, afford very uncertain characters, being extremely liable to disappear through change of circumstances; and among the cultivated varieties of W., every farmer is familiar with some that are awned or *bearded*, and some that are beardless, having scarcely a trace of awn. In the wild *Ægilops*, the ear is also much more easily broken from the rachis than in wheat.



In cultivation, the *Æ. ovata* very soon loses the awns of its palæ and of the lateral ribs of its glumes, and thus assumes the characters of W., the ears at the same time losing their fragility, the grain also increasing in size, whilst the floral envelopes are proportionally diminished, the leaves become larger, and the stem stronger. From seeds of the *Æ. ovata* sown in a garden in 1838, M. Fabre obtained W. of fair quality in 1846. Professor Buckman, of the Royal Agricultural College, repeated the experiment in England. His first sowing was in 1855, and notwithstanding the disadvantages of cold seasons and a cold situation on the Coteswold Hills, he found the spikelets much modified in 1859, the warm summer of that year producing a greater change than had taken place in previous years (see *Popular Science Review* for October 1861). The annexed cut shows the natural state of a spikelet of *Æ. ovata* (fig. 1); the spikelet as modified by cultivation from 1855 to 1859 (fig. 2); and for comparison, an ear of ordinary bearded W. (fig. 3). The identity of the principal cultivated forms of *Triticum* with *Æ. ovata* may now be regarded as fully established. These forms have generally been included by botanists under the name *T. vulgare*.

W. has been cultivated from the earliest ages, and was a chief crop in ancient Egypt and Palestine, as it still is in all the temperate parts of Europe, Asia, and Africa. It is cultivated to a considerable extent in the north of India. In North America, it is very extensively cultivated, and many parts of the United States and British provinces are admirably adapted to it. Wide regions of South America are equally suitable, and W. of the finest quality is produced in Australia.

In the torrid zone, W. does not succeed, except in elevated situations; but it nowhere succeeds better than in subtropical regions, although it is a hardy plant, and when covered by snow, endures even very severe winters in the north of Europe. For its successful cultivation, however, it requires a mean temperature of at least 55° F. for three or four months of the year. It is an annual plant, and its capacity of enduring the cold of winter is of importance only in connection with the advantage to be derived from sowing in autumn, so as to have it more forward in spring. Its cultivation does not extend so far north as that of barley or oats, or even of rye. In Europe, its northern limit is about lat. 60°. The quality of the grain varies much in different soils and climates, and particular varieties are also distinguished by difference of quality as well as by external characters. The W. of the eastern parts of Britain, where the climate is comparatively dry, is superior to that of the western parts, where the sky is more cloudy and the climate more humid, although the crops in the west are not less luxuriant; and the W. produced in Britain is not found suitable for the manufacture of macaroni, to which that of the countries near the Mediterranean is particularly adapted. Although hardy in winter and early spring, W. becomes more delicate and susceptible of climatic influences as it advances in growth; a prevalence of dry weather, with bright sunshine from the time when it comes into ear until it is ripe, is of the greatest importance.

Common W. (*T. vulgare*, *æstivum*, or *sativum*) grows to a height generally of 3 or 4 feet, and has ears or spikes generally 3 or 4 inches long; the spike 4-cornered, the spikelets about 4-flowered; the paleæ ventricose, ovate, truncate, mucronate or awned, compressed under the point, rounded at the back, the grain free. In consequence of long cultivation, in a great variety of climates, the cultivated varieties of W. are very numerous, more so than in any other kind of grain. New varieties are continually coming into notice; and many are in high estimation in particular districts, although little known beyond them. Some botanists have attempted to distinguish species among them, appropriating the name *T. æstivum* to the awnless kinds, and *T. hybernum* to the awned; but intermediate forms are very numerous, and the length or shortness of the awn seems to depend upon accidental circumstances. Nor do the awnless or beardless kinds perfectly correspond with the Summer W. of farmers, preferred for sowing in spring with a view to a crop in the same season, and the awned or bearded kinds to the Winter W., sown in autumn, as some of the hardy varieties of Winter W. are awnless, and some of those usually sown in spring are bearded. Besides being classified as

Bearded and Beardless, the varieties in cultivation are also distinguished according to the color of the grain, as *White* and *Red* wheats. Some having the ears covered with a short soft down are known as *Woolly* wheats. There are also differences in the



4, Chiddam Wheat; 5, Pearl Wheat; 6, Spalding's Prolific Red Wheat.

length and compactness of the spike, and in the size and form of the grain, which is more rounded in some, and more elongated in others.

A number of varieties, having the spike very compact or square, have been sometimes classed together under the name of *T. compactum*, and the distinction is very obvious and permanent, al-



7, Fern Wheat; 8, Mummy Wheat.

though there is no reason for regarding it as characterizing a distinct species. Akin to this is the MUMMY W. (*T. compositum*), in which the spike is branched, and which is said, but on insufficient evidence, to have been produced from seeds found in mummy-cases in Egypt. Mummy W. has been grown in England, of which the ears have had 10 or 11 branches, and 150 grains have been found in one ear; whilst 60 ears have been produced by a single seed. Notwithstanding these apparent advantages, however, this variety does not serve the purposes of the farmer so well as some others. In another group of varieties with compact ears (*T. turgidum* of some botanists), the glumes are remarkably tumid, and always awned. These are known by the names of Gray W., Pollard W., Duckbill W., &c., and in Germany are commonly called English Wheat. Polonian W. (*T. Polonicum*) is the common name of a number of kinds of a very peculiar appearance, with a long, loose, and somewhat nodding spike; the glumes awned, and remarkably long—twice the length of the florets. The stems are also very tall, sometimes more than 6 feet high. These kinds, sometimes called *Grecian* or MOGADORE W., are cultivated in some parts of the south of Europe, in the south of Siberia, and in Africa. HARD W., or HORNY W. (*T. durum*), has rather small, elongated, and very hard grains, the paleæ have remarkably long awns, and the leaves are very broad. It is much cultivated in the countries near the Mediterranean, and Dr. Royle suggests that it would be a valuable acquisition to India, as it yields a good crop on comparatively sterile soils.

The red varieties of W. are generally more hardy than the white; the grain is inferior in quality, and yields less flour, but these disadvantages are more than counterbalanced in many soils and situations by the greater productiveness of the crop. Red wheats are therefore preferred for comparatively poor soils, but the white kinds are generally cultivated wherever the soil and climate are suitable. The varieties with long straw yield the best crops in dry seasons, but the short-strawed kinds are best when the season is wet. W. is particularly suited to clay soils, and rich heavy loams; but with good farming, excellent crops are produced even on light sandy or gravelly, and on chalky soils. Where the climate is moist, a light dry soil is most suitable; soft deep soils being productive chiefly of straw. The land intended for W. must, at least in Britain, be in a high state of cultivation. W. is commonly sown after green crops, beans, or bare fallow; in the south of England, often after grass or clover. It may be sown, at least in autumn or the beginning of winter, when the ground is so saturated with moisture, that any other kind of grain would be almost sure to perish. It is either sown broadcast or in drills, and the practice of drilling becomes more and more prevalent, both on account of the saving of seed and the superiority of the crops produced. The land prepared for W. is very often manured with farm-yard manure; artificial manures—as guano—are also used. In Scotland, it is a common practice, when W. is to be grown after turnips, to plough down the turnip-leaves in autumn, before the W. is sown, and to apply guano in spring. Nitrate of soda is another favorite top-dressing for W., but sometimes causes the plants to grow too rapidly, so that they become tender, and suffer from climatic influences. Many farmers use both guano and nitrate of soda for top-dressing W., and the nitrate of soda is often mixed with common salt, which is thought to be useful in giving strength and vigor to the W. plants, preventing *lodging* and mildew.

W. ought to be reaped before it is *dead ripe*, unless when it is intended for seed, and it ought to be stacked as soon as it is sufficiently dry to be free from danger of heating. On very rich land, W. sometimes becomes too luxuriant in spring, and its growth needs to be repressed by cutting the leaves with a scythe—a practice essentially agreeing with that mentioned by Virgil in his *Georgics* (i. 111), of allowing cattle to feed upon the young blades:

> Quid, qui, ne gravidis procumbat culmus aristis,
> Luxuriem segetum tenerâ depascit in herbâ,
> Quum primùm sulcos æquant sata?

The relative proportions of straw and grain differ very much in different varieties of W., and according to differences of soil, climate, and season. The proportion of the weight of grain to that of the whole plant when dried so as to be ready for stacking, varies from 20 to 47 per cent. The composition of the grain itself varies considerably, as to the proportions of starch, gluten, &c. which it contains. 100 parts of the grain of W., dried in the ordinary manner, contain on an average—water, 14·83; gluten, 19·64; albumen, 0·95; starch, 45·99; gum, 1·52; sugar, 1·50; oil, 0·87; vegetable fibre, 12·34; ash, 2·36: total, 100·00.

The ash is rich in phosphoric acid, magnesia, and potash. Its composition is as follows: Potash, 29·97; soda, 3·90; magnesia, 12·30; lime, 3·40; phosphoric acid, 46·00; sulphuric acid, 0·33; silica, 3·35; peroxide of iron, 0·79; chloride of sodium, 0·09: total, 100·00. For the processes by which starch and gluten are obtained from W., see these articles.

The value of W. depends mainly on the quantity of fine flour which it yields; the best W. yielding 76—80 per cent., sometimes even 86 per cent. of fine flour, whereas inferior kinds seldom yield more than 68 per cent., and sometimes only 54—56 per cent. In

general, the smoother and thinner the grain is in skin, the greater is the produce of fine flour. The greater part of the husk of W. is separated from the flour by the miller, and is known as *bran*. That portion of the bran which is more finely divided than the rest, receives the name of *sharps* or *pollard*. See the articles BRAN and FLOUR.

W. straw contains, on an average, in its ordinary state of dryness—nitrogenous substances, 1·85; non-nitrogenous substances, 67·56; mineral substances, 4·59; water, 26·00: total, 100·00; and the composition of the ash is as follows: potash, 12·14; soda, 0·60; magnesia, 2·74; lime, 6·23; phosphoric acid, 5·43; sulphuric acid, 3·88; silica, 67·88; peroxide of iron, 0·74; chloride of sodium, 0·22: total, 100·00.

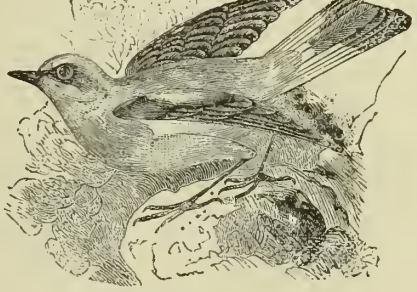
The principal diseases to which W. is subject, some of which are often productive of great loss to the farmer, are either owing to or connected with the presence of parasitic fungi. See BUNT, MILDEW, RUST, and SMUT. An animalcule causes the disease known as EAR-COCKLES (q. v.). W. suffers also from the ravages of numerous species of insects. See HESSIAN FLY, WHEAT-FLY, CORN-MOTH, and WIREWORM. The larva of a Ground Beetle (*Zabrus gibbus*) is often very destructive to young W. in winter and spring.

SPELT (*Triticum spelta*) is regarded as a distinct species from Common W., and is supposed to be a cultivated form of *Ægilops caudata*, a native of the countries near the Mediterranean. The spikelets are smaller than in Common W., and each spikelet has two or three, rarely four, perfect florets, besides a barren terminal one, the outer glumes and the paleæ are very broadly truncate at the top, and notched, the awns very slender; the ripened grain adheres closely to the paleæ or chaff. Spelt is supposed to be the grain called *Zea* by the Greeks and *Far* by the Romans It is of little value in comparison with W., but can be grown on inferior soils, and is cultivated in Switzerland at an elevation where W. would not succeed. The bread made of it is coarse, and is used chiefly by the poorer classes.—Another species, sometimes called LESSER SPELT, or ONE-GRAINED W. (*Triticum monococcum*), is also occasionally cultivated on poor soils and in elevated situations in the center and south of Europe. It is sometimes called St. Peter's Corn. The ear is small and compressed, the spikelets contain only one perfect floret and a rudimentary one; the awns are long; the grain is small, and adheres closely to the chaff.—*Triticum Bengalense* may be regarded as a kind of spelt. It has remote spikelets, long awns, and long irregularly triangular grains. It is cultivated to some extent in India.

Wheat being the most esteemed of all the cereals, particularly for the making of bread, the increase of its cultivation and use has marked the progress of agriculture and of wealth in many countries, and particularly in Britain. It is only of late that bread made of wheat has become a common article of food among the laboring classes in Britain. In some parts of the country, it is still, indeed, far from being a principal article of food among the peasantry, who use barley and oats in various forms. In the 8th c., the monks of the abbey of St. Edmund, in England, ate barley-bread, because the income of the abbey would not admit of their using wheaten bread regularly. At a later period, wheat was largely used, at least in the southern parts of England, for a short time after harvest, but the supply was soon exhausted, and recourse was again had to inferior kinds of food. There was then no trade in corn to equalize the price over the year. In 1317, when an abundant harvest had been gathered in, the price of wheat fell at once from 80*s.* to 6*s.* 8*d.* per quarter. The rejoicings of harvest-home were, therefore, in these times connected with a transition from poor to good fare, and from comparative want to abundance, such as happily does not attend the same occasion in our day. Down to the end of the 17th c., wheaten bread was a principal article of food only among the more wealthy; and servants in their houses were still furnished with oats, barley, and rye. In the northern parts of England, as well as in Scotland, the use of wheaten bread was comparatively rare even at the middle of last century. 'So small was the quantity of wheat used in the county of Cumberland,' says Eden, in his *History of the Poor* (1797), 'that it was only a rich family that used a peck of wheat in the course of the year, and that was used at Christmas. The usual treat for a stranger was a thick oat-cake (called *haver-bannock*) and butter. An old laborer of 85 remarks that when he was a boy he was at Carlisle market with his father, and wishing to indulge himself with a penny loaf made of wheat-flour, he searched for it for some time, but could not procure a piece of wheaten bread at any shop in the town.'

At the period of the Revolution, 1689, the quantity of wheat grown in England was estimated at about 14,000,000 bushels, or about three bushels to each of the population, which was then under five millions. In 1828, about 100,000,000 bushels were produced, or about seven bushels to each of the population, then under fifteen millions. In 1880 there were 2,835,462 acres under wheat in England and Wales, and 73,976 acres in Scotland, the produce of which may be estimated at about 100,000,000 bushels; besides which, a very large quantity of wheat is imported from other countries. The cultivation of wheat now extends to the most northern parts of Scotland, 2409 acres having been under this crop in 1880 in the county of Elgin, and 3312 in Ross and Cromarty, and even in Sutherland 52, and in Caithness 10 acres. The population of England and Scotland being now about 30,000,000, it appears that the quantity of home-grown wheat consumed amounts to about 3½ bushels for each of the population; but the wheat imported in 1880 amounted to about 76,000,000 bushels; raising the amount consumed to nearly 6 bushels per head of the population. Ireland is left out of account, as not being to a great extent either a wheat-growing or a wheat-consuming country. The produce per acre is greater in Britain than in any other wheat-growing country, owing to superior farming, notwithstanding disadvantages of climate and often of soil. The extent of land now under wheat has, however, of late years diminished, owing to the foreign supply, and the high price of butcher-meat making pasturage now profitable. An enormous field of fertile wheat-growing country is being gradually developed in Canada, especially in Manitoba and the N. W. Province. The quantity of wheat produced in the United States in 1880 was estimated at about 448,756,630 bushels. The chief wheat-growing states and their production in 1879 were—Illinois, 44,896,830 bushels; Indiana, 43,709,960; Ohio, 36,591,750; California, 35,000,000; Iowa, 32,786,880; Minnesota, 31,886,520. The progress of wheat-cultivation in the western states has been extremely rapid. In 1821 the total exports of wheat from the United States were valued at $178,314, and of wheat flour at $4,298,043. The total exports of wheat in 1880 were valued at $190,546,305, and of wheat flour at $35,333,197. This rapid progress is due to the increase of wheat-culture in previously unsettled regions. The greater part of the wheat exported from North America is to Great Britain. Of the wheat imported into the United Kingdom in the year 1875, the United States contributed 45 per cent.; Russia, 18 per cent.; Germany, 12 per cent.; British North America, 7 per cent.; Egypt, 4 per cent.; France, 2½ per cent.; and Turkey, 2½ per cent.

WHEA'TEAR, or FALLOW-CHAT (*Saxicola œnanthe*), a bird of the genus popularly known by the name Chat (q. v.), of the family *Sylviadæ*, a common summer visitant of Britain, abounding on downs and fallow fields. Its geographic range is wide. Its



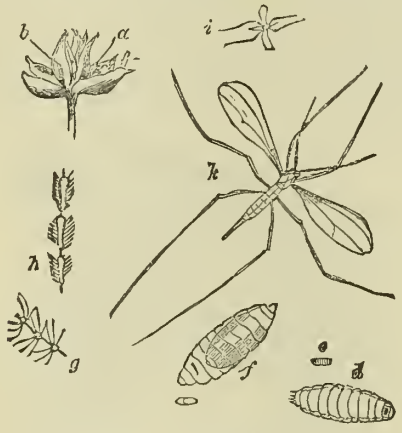
Wheatear (*Saxicola œnanthe*).

winter retreat is in the countries near the Mediterranean, and chiefly in Africa; its summer migrations extend to the furthest north of Europe, and to Iceland and Greenland. A few wheatears spend the winter on the southern coasts of England. The entire length of the W. is about six inches and a half; the tail is almost square; the wings are long and pointed; and the legs are long, enabling the bird to hop about actively in quest of food. Its food consists of worms and insects, and it may often be seen perched on the top of a clod or stone looking out for them, and at the same time on the watch against enemies. The male is of an ash-brown color on the upper parts; the forehead, a band above the eyes, and the throat, white; a black mark extending from the base of the bill to each eye, and expanding behind it, so as to cover the orifice of the ear; the wings, black; the rump, and two-thirds of the tail, except the two middle feathers, white; the tip of the tail, black, the two middle feathers of the tail, entirely black; the breast, buff-color; the belly and flanks, pale buffy white. The female is less gaily colored, brown and gray prevailing.

The W. makes its nest in an old wall, or in a crevice of a quarry or gravel-pit, often in a deserted rabbit-burrow, and generally lays six pale blue eggs. The male has a pleasant, but not loud song, and sings well in confinement, in winter as well as in summer. This little bird is much esteemed for the table, and great numbers are therefore annually caught, not only on the continent of Europe, but in England, where comparatively few small birds are sought after for such use. It is chiefly on the downs of the south of England, where vast flocks congregate before their autumn migration, that wheatears are caught for the market. The shepherds catch them by means of nooses placed in little ex-

cavations made in the ground, advantage being thus taken of the habits of the bird, which upon the least alarm, or even the shadow of a passing cloud, runs to hide itself in any little hollow that may be near. The usual practice of the shepherds is to cut out an oblong piece of turf, about 11 inches by 8, and 6 inches thick, which they lay across the hole that is made, making sloping entrances at the ends of the hole, and setting nooses under the turf in the centre. As many as 84 dozen wheateaters have been thus caught by a single shepherd in a day. It is not unusual for a shepherd and his lad to look after from 500 to 700 of these traps. The season for catching wheatears extends from the end of July to the end of September. They are partly sent to the London market, but very many are consumed at the watering-places on the Sussex coast.

WHEAT-FLY, the popular name of certain species of dipterous insects, which are often very injurious to wheat-crops. One of them, *Cecidomyia tritici* (see CECIDOMYIA), sometimes called the WHEAT MIDGE, and belonging to the same genus with the destructive Hessian Fly of America, is too common both on the continent of Europe and in Britain, but fortunately is not very abundant except in particular years. It is supposed to be the same fly which appeared in the north of New England in 1828, probably imported from the Old World, and thence spread into New York and Canada, destroying a tenth part of the wheat-crop for several years, and only disappearing on being starved out by a change of crop, or by late spring-sowing of wheat. The eggs are deposited in the wheat when it is coming into flower, and the larvæ abstracting the juices, cause the grain to shrivel. The perfect insect appears in June, when great numbers may sometimes be seen on wing in the evening, their chief time of activity. It is about one-tenth of an inch in length, pale ochreous or orange, downy, with large black eyes, and long slender legs; the male with very long antennæ. The antennæ of the male differ much in structure from those of the female, as will be seen by the annexed fig. (*g*, *h*), and are of twenty-five joints, whilst



Wheat-fly (*Cecidomyia tritici*).
(From Morton's *Cyclopædia of Agriculture.*)
a, larva in spikelet of wheat; *b*, pupa in the same; *c*, larva, natural size; *d*, do. magnified; *e*, pupa, natural size; *f*, do. magnified; *g*, a few joints of one of the antennæ of a male wheat-fly; *h*, do. of female; *i*, female wheat-fly, natural size; *k*, do. magnified.

those of the female have only thirteen. The larvæ are small and lemon-colored. A little black ichneumon lays its eggs in the larva of the W., and is thus useful to the farmer by destroying it. —The name W. is also given to species of the genus *Chlorops* (see CORN-FLY) destructive to wheat.

WHEATON, HENRY, American jurist and diplomatist, was born at Providence, Rhode Island, November 27, 1785, educated at Brown University; admitted to the bar in 1802; after which he spent several years in France, and six months in London, engaged in legal and literary studies. On his return to America, he resided in New York, where he contributed papers on International Law to the *National Advocate*, a daily newspaper, and was appointed a justice of the Marine Court. In 1815, he published a *Digest of the Law of Maritime Captures or Prizes*, which has been commended as one of the best works, in English, on the subject. About the same time, he published an *Essay on the Means of maintaining the Commercial and Naval Interests of the United States*. In 1816, he was appointed Reporter of the Proceedings of the Supreme Court of the United States, a post he filled until 1827. His Reports, filling twelve volumes, a distinguished German has called 'the Golden Book of American Law;' and it is considered by the legal profession as a work of extraordinary ability and value. He also made frequent contributions to the *North American* and *American Quarterly Reviews* and delivered addresses before literary societies.

In 1825, he was engaged in revising the statute laws of New York; in 1826, he wrote his *Life of William Pinckney*, of which he furnished an abridgment for Sparks's *American Biographies*. In 1827, he was appointed *Chargé d'affaires* to Denmark, and resided at Copenhagen till 1835, when he was appointed Resident Minister at Berlin, and in 1837, Minister Plenipotentiary, which post he occupied with distinguished credit until 1846. In 1831, his *History of the Northmen* appeared at Philadelphia, London, and Paris; in 1836, his *Elements of International Law;* in 1841, his Essay, for which he received the prize of the French Institute, entitled *L'Histoire du Droit des Gens en Europe, depuis la Paix de Westphalie jusqu'au Congrès de Vienne*, which, in 1846, was published, greatly enlarged, in Leipzig and Paris, and an English translation in New York. This work is a standard authority, and its author received the highest honors from the learned societies of Europe, and his own countrymen. Having retired from political life, he died at his residence at Dorchester, Massachusetts, March 11, 1848.

WHEATSTONE, SIR CHARLES, physicist and electrician, was born at Gloucester in 1802. From school he went to the making of musical instruments, and afterwards entered into business on his own account in London. But he was no ordinary manufacturer: the scientific principles involved in the construction of instruments occupied his thought; he made many improvements, and in 1823, published a paper entitled *New Experiments on Sound*. Endowed with remarkable ingenuity, he produced numerous models and apparatus to illustrate the phenomena of aconstics and of light, his attention having been drawn to the latter by the analogies between the two subjects. Few men have done so much towards enabling the student to apprehend the principles on which scientific theories are based, particularly those of the undulatory theory of light.

In 1833, Mr. W. communicated his first paper, *On Acoustic Figures*, to the Royal Society; followed, in 1834, by *Experiments to measure the Velocity of Electricity*, in which, with a mirror revolving 800 times in a second, he demonstrated the velocity at 288,000 miles in a second—greater than that of light. In the same year he was appointed Professor of Natural Philosophy in King's College, London. In 1836, he was elected a Fellow of the Royal Society; and in a course of lectures at the College on the velocity above referred to, he anticipated the electric telegraph by experimenting through four miles of copper wire. In May 1837, a patent was taken out in the joint names of Cooke and W., 'for improvements in giving signals and sounding alarums in distant places by means of electric currents transmitted through metallic circuits.' From this instrument, which had five needles, has grown that system of electric telegraphs which now ramifies over the length and breadth of the United Kingdom. The first working telegraph—insulated copper wires enclosed in an iron tube—was constructed on the Blackwall Railway in 1838.

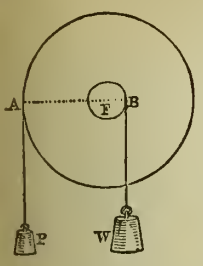
To enumerate the titles only of Professor W.'s papers on scientific subjects, and describe his various inventions, would fill many pages: a few only can be indicated here. In a paper on Binocular vision laid before the Royal Society in 1838, he explained the principle of the stereoscope, an instrument of his invention: in 1849, he showed that, by means of electro-magnetism, a number of clocks far apart might be kept going with absolute exactitude from one central clock; and in 1843, he brought out his new instruments and processes for determining the constants of a voltaic series. In 1840, and again in 1843, the Royal Society awarded him their Royal Medal—a high acknowledgment of the merit of his researches. For a long time after that date, scarcely a year passed without a paper on some recondite scientific subject, or some new invention, or improvement on former inventions, from the hand of Professor W., which heightened his reputation, and procured him substantial pecuniary reward.

Among his inventions are his cryptograph; his automatic telegraph in two forms; his telegraph thermometer and barometer by which an observer at the foot of a mountain could read the indications as shown by the instruments on the summit; a machine for the conversion of dynamical into electrical force without the use of permanent magnets, by which large quantities of electricity can be produced at a cheap rate; and an apparatus for conveying instructions to engineers and steersmen on board large steam vessels.

Professor W. sat many times on the Council, and was a vice-president of the Royal Society. He was also a corresponding member of the leading foreign scientific academies, and in 1873 he was elected Foreign Associate of the science department of the Institute of France. In 1868, he received from Her Majesty the honor of knighthood, and in the same year the Royal Society bestowed on him its Copley medal. He was made LL.D. in 1869 by the University of Edinburgh. He died in 1875.

WHEEL AND AXLE, the second of the Mechanical Powers (q. v.), is a modification of the Lever (q. v.). Its most primiti

form is a cylindrical axle, on which a wheel, concentric with the axle, is firmly fastened. When employed for raising heavy weights, the weight is attached to a rope which is wound round the axle, and the power is applied either to a rope wound round the grooved rim of the wheel, or to a handle fixed at right angles to the wheel's rim (in the latter case, the wheel may be dispensed with, unless it is useful as a conservator of momentum [see FLY-WHEEL], and an ordinary winch substituted). The accompanying figure exhibits a transverse section of the common form of the wheel and axle, and shows that the wheel and axle is neither more nor less than a lever, whose extremities are not points as in the normal form, but the circumferences of the circles, whose radii are FA and FB. Accordingly, the power and weight are not attached to particular points in these circumferences, but to cords wound round them, and thus the imaginary simple lever, AB (formed by joining the points where the cords become tangents to the circles), is preserved unaltered in position and magnitude.



The conditions of equilibrium are, that $P \times AF = W \times FB$, or, since the circumferences of circles are proportional to their radii, that P : W : : circumference of axle : circumference of wheel. When there is no wheel, but only a winch, the circumference described by the power in one revolution is substituted for the circumference of the wheel. The *capstan* and *windlass* are simple and common examples of this mechanical power, and combinations of toothed-wheels, or of wheels from one to another of which motion is communicated by an endless band, are compound illustrations of the same. See WINDLASS.

WHEEL-ANIMALCULE. See ROTATORIA.

WHEEL, BREAKING ON THE, a very barbarous mode of inflicting the punishment of death, formerly in use in France and Germany, where the criminal was placed on a carriage wheel, with his arms and legs extended along the spokes, and the wheel being turned round, the executioner fractured his limbs by successive blows with an iron bar, which were repeated till death ensued. There was considerable variety in the mode in which this punishment was inflicted, at different times and in different places. By way of terminating sooner the sufferings of the victim, the executioner was sometimes permitted to deal two or three severe blows on the chest or stomach, known as *coups de grâce;* and occasionally, in France at least, the sentence contained a provision that the criminal was to be strangled after the first or second blow. Mercy of this kind was, however, not always allowed to be shown to the victims of the wheel: when Patkul, the envoy of Peter the Great, was put to death on the wheel by order of Charles XII. of Sweden, it is said that the officer in command of the guard was cashiered by the Swedish king in consequence of having allowed the head to be struck off before life was extinct in the mangled limbs. The punishment of the wheel was abolished in France at the Revolution; in Germany, it has been occasionally inflicted during the present c., on persons convicted of treason and parricide.

WHEELE'RA, a genus of trees of the natural order *Leguminosæ*, sub-order *Papilionaceæ*. The wood of *W. ebenus*, a native of the West Indies, and of the tropical parts of America, is imported into Britain under the name of *American Ebony*. It is very hard, of a brownish-green color, takes a fine polish, and is employed by cabinetmakers and musical-instrument makers.

WHEE'LING, a city and port of entry of West Virginia, U. S., on the left bank of the Ohio River, and both sides of Wheeling Creek, 40 miles direct, and 92 by river, below Pittsburg. The city is built at the foot of the hills, which rise to the Alleghanies, and is the terminus of the Baltimore and Ohio, and of the river division of the Cleveland and Pittsburg railways. The great national road here crosses the Ohio, over which is a wire suspension-bridge, 1010 feet long. The hills around the city are full of bituminous coal. The principal manufactories are iron and nail mills, glass-works, foundries, and machine-shops. There are three daily and five weekly papers. W., which was incorporated in 1806, had in 1870 a pop. of 19,280; in 1880, 31,266.

WHEEL-WORK. The arrangement for conveying motion from one axis to another by means of toothed-wheels, is familiar to every one; it has been in use since the days of Archimedes, and was in use, probably, for many centuries before; but it is only in modern times that the action of such wheels has been critically examined and understood. To a superficial observer, the action appears to be extremely simple: a tooth of the driver pushes against a tooth of the driven wheel, thereby causing that wheel to turn round; and, since by this turning the teeth must become disengaged, it is requisite that, before one tooth let go, a second tooth of the driver be ready to take hold of another tooth of the driven wheel. For this purpose, it is enough that the distances between the teeth on the two wheels be alike; in other words, that the diameters be proportioned to the number of the teeth.

When two unequal wheels act upon each other, the smaller one turns faster than the larger. Thus, if a wheel with 60 teeth work into one of 20, the latter will turn 3 times as quickly as the former; and it is on this principle that the trains of clock-work are arranged. For example, the *great-wheel* of a common house-clock may have 180 teeth, and may drive a smaller wheel, or *pinion* as it is called, of 15 leaves, and in this case, if the great-wheel turn once in 12 hours, the pinion must turn once in every hour; the axis of this pinion carries the minute-hand.

On the same axis the *hour-wheel* is fixed, which may have, say, 96 teeth, and may drive a pinion of 12 leaves. This pinion, then, must turn 8 times per hour, or once in 7½ minutes. On the same axis with this last mentioned pinion there is fixed the *third-wheel*, having, perhaps, 75 teeth, and this drives a pinion of 10 leaves, which, turning 7½ times as fast, must make one turn per minute. On the axis of this last pinion the *escape-wheel* is fixed. This escape-wheel has 30 teeth, each tooth acting twice upon the pendulum, thus making 60 beats per minute. In such a case as this, there is no difficulty in arranging the numbers of the teeth, and these may be varied in many ways, provided the proper proportions be kept. But in other cases, a considerable amount of skill, and often a great deal of labor, is required for the discovery of the proper numbers. Thus, if it be wished to indicate the moon's age on the dial of a clock, we must have an index turning once in the time between new moon and new moon. This time, which astronomers call a *lunation*, averages 29 days, 12 hours, 44 minutes, and nearly 3 seconds (2·853), and it is by no means an easy matter to find out what number of teeth will produce this motion. The month-wheel would need to turn rather more than 59 times as slowly as the great-wheel of the clock; and if the mean lunation had been 29½ days, without the odd 44 minutes, the thing could have been managed by making a pinion of 8 teeth lead a wheel of 59 teeth, on the axis of which another pinion, say, of 10 teeth is fixed, and made to work a wheel of 50 teeth. But then such an arrangement would go wrong nearly three-quarters of an hour every month, and in three years would indicate new moon a day too early. In order to obtain a better train, we may compute the number of days in 2, 3, 4, 5 lunations until we get nearly a number of half-days. Now, 16 lunations consist of 472 days, 1[illegible] hours, 45 minutes, or almost exactly 945 turns of the great-wheel. This proportion can be obtained by causing a pinion of 12 teeth to lead a wheel of 81 teeth, and another pinion also of 12 teeth to lead a wheel of 105 teeth. This arrangement gives an error of one quarter of an hour in 16 months, or hardly an hour in 5 years. If still greater precision be required, we must carry the multiples further: 33 lunations make 974 days, 12 hours, 13½ minutes, or 1949 turns of the great-wheel of the clock; but then this number 1949 has no divisor, and it is quite impracticable to make a wheel of 1949 teeth; so that we must continue our multiples in search of a better train. In this way, when great exactitude is desired, we often encounter an unexpected amount of labor. For reducing this labor, the method of continued fractions is employed, and the toil is further lessened by the use of tables of divisors.

Such calculations have to be made for the construction of orreries, by which the times of the revolutions of the planets are shown; and engineers have to make them, as when a screw of a particular pitch has to be cut. If, for instance, we have to cut a screw of 200 turns to the French mètre on a lathe having a leading-screw of 4 turns to the English inch, the axis of the lathe must make 50 turns while the screw makes 39 and a fraction, since the mètre is 39·37079 inches. By applying the method of continued fractions, we discover that, for 2225 turns of the lathe-spindle there must be 1752 turns of the screw; and as these numbers can be reduced into products—viz., 2225 into $5 \times 5 \times 89$, and 1752 into $2 \times 2 \times 2 \times 3 \times 73$, we can easily get trains to produce the required effect. From these illustrations, it is apparent that the computation of the trains of wheel-work is intimately connected with the doctrine of prime and composite numbers.

The general sizes of the wheels and the number of the teeth having been fixed on, the next business is to consider the shape which those teeth ought to have. Now, for the smooth and proper action of machinery, it is essential that the uniform motion of one of the wheels be accompanied by a motion also equable of the other wheel. Two curves have been known to give this quality of equable motion—viz., the epicycloid, formed by rolling one circle upon another, and the involute of the circle traced by the end of a thread which is being wound upon a cylinder, or unwound from it. But the general character of all curves which possess this property has been only lately examined.

If it were proposed to construct two wheels which shall have their centers at the points A and B (fig. 1), and the one of which may make five turns while the other makes 3, we should divide the distance AB into 8 parts, and assign 5 of these for AC, the radius of the one wheel, the remaining 3 parts for the radius BC of

the other wheel. Wheels made of these sizes, and rolling upon each other, would turn equably, and if the circumferences be divided into 5 and 3 parts respectively, the points of division would come opposite to each other as the wheels turned. The circumferences of these circles are called the *pitch-lines*, and the

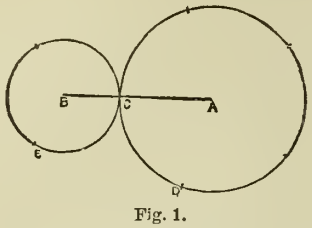


Fig. 1.

portions of them included between two teeth is called the *distance of the teeth:* the distance, or arc CD, on the one wheel must be equal to the distance CE on the other wheel, in order that the motion may bring the two points D and E together. For a reason that will appear in the sequel, we cannot use wheels with so few as 3 or 5 teeth and therefore we subdivide the distances CD and CE into some number of parts, say 4, and thus obtain wheels of 20 and 12 teeth instead. Since the tooth of the one wheel must necessarily come between two teeth on the other, the distance between the teeth must be halved, the one half being given for tooth, and the other half for space.

Having then divided off the pitch-line of the wheel B, as in fig. 2, CD being the distance of the teeth, CG the half-distance, let us sketch any contour, CFGHD, for the shape of a tooth, and let us examine what should be the characters of this outline. In the first place, the form of this outline must be repeated for each tooth; and in the second place, the line should be symmetric from the top, F, of the one to the top, I, of the next tooth, in order that the wheel may be reversible face for face. These obvious conditions having been attended to, let us cut, in thin sheet brass or other convenient material, a disc, having this outline, and let us pin its center at the point B. Having prepared a blank disc on which the outline of A is to be traced, let us slip it under the edge of the previous one, and pin its center at the point A. If, now, B and A being held fast, we trace the outline of B upon A, we move each of them slightly, but in the proper proportion forward, and make a new trace upon A, and so continue as far as needed, we shall obtain a multitude of curve lines marked upon A. The line which envelops and touches all these curves is, obviously, the proper outline for the wheel A; and thus it appears, that whatever outline, within reasonable limits, may have been assumed for the teeth of B, it is always possible, by a geometrical operation, to discover the proper corresponding form for the teeth of A. These forms may be called *conjugate* to each other, inasmuch as, that if the disc A were now cut out and used as B has been, the identic form of B would be reproduced.

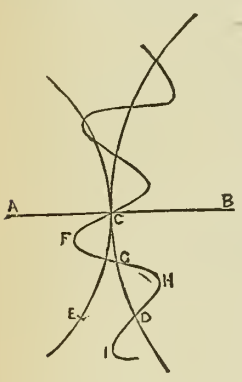


Fig. 2.

We may obtain a whole series of wheels, A′, A″, A‴, &c., from the same original B; and from A, as an original, we may obtain another series, B′, B″, B‴, &c., having various numbers of teeth. And it has been shown that any wheel of the series A will work accurately along with any one of the series B. So far well; but then the wheel A of 20 teeth may not be like the wheel B of the same number of teeth. It becomes, therefore, a desideratum to choose the form of the teeth of B in such a manner that its conjugate of the same number of teeth may have the same form; by such an arrangement, we shall obtain a series of wheels, any one of which will work with any other.

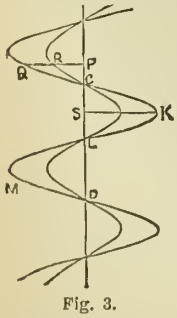


Fig. 3.

If the number of the teeth of B be augmented indefinitely, the outline of the pitch-line will become nearly straight; and so drawing through C (fig. 3) a straight line to touch the pitch-line of A, we shall have the pitch-line of the straight rack, as it is called, which could be worked by any wheel of the series A. The reverse of this rack would work with any one of the series B, and therefore, if the series A and B be identic with each other, the rack must be its own reverse. Thus we obtain a very important general result—viz., that if we mark off along a straight line distances, CD, equal to the desired interval between the teeth, and then draw any line CKLMD, consisting of four equal parts, CK, KL, LM, MD, symmetrically arranged, all the wheels obtained from this, as the original, will work into each other; and, moreover, the forms thus obtained answer for internal as well as external teeth.

Being then at liberty to choose any line whatever, subject to the above condition of symmetry, for the figure of the straight rack, we may inquire whether it may not be arranged so as to bring about other desiderata. This line, it may be noted, is not necessarily curved; it may be composed of straight lines, or partly of straight and partly of curved lines.

The general appearance of this wavy line recalls that curve known as the curve of sines, which, indeed, is the simplest known curve, consisting of equal and symmetric undulations, and unlimited in extent. By changing the ordinates in any ratio, say in the ratio of PQ to PR, the waves of the curve may be made shallower or deeper; and on studying the effects of such a change, we discover some new and very important laws concerning the contacts of the teeth of wheels.

Beginning with the curve of sines *proper*, in which the greatest ordinate, SK, is equal to the radius of a circle of which CD is the length of the circumference, it is found that wheels traced from it can only touch each other at *one* point: of course such wheels cannot work, because the solitary contact is now on the back and now on the front of the tooth. In this case, the contour of the tooth crosses the pitch-line at an angle of 45°. On deepening the teeth, still keeping to the same kind of curve, it is found that the wheels begin to touch at more points than one; and when they are made so deep as that the contour crosses the pitch-line at an angle of 65°, there are always three contacts, neither more nor less. If the teeth be still further deepened, the contacts become more numerous; they appear and disappear in pairs, so that with an inclination of, say, 68°, there would be sometimes three, and sometimes five contacts. When it becomes 70° 17′, there are always five; and with an inclination of 73° 11′, there are always seven points in contact at once.

Of these points of contact, some are on the sides of the teeth, and others are near the top and bottom; the latter, on account of the obliquity of their action, are of no use in driving; they may be called supplementary, and their number is always one less than the number of useful or working contacts. In the system of seven contacts, four are useful, two of them being forwards, and two backwards, so that two teeth are always in action at once; an arrangement by which a gradual improvement in the equality of the teeth is secured by their wearing.

When two properly formed wheels are put in motion, the points of contact move also, and describe a peculiarly shaped line, the nature of which depends on the character of the primary form adopted for the tooth of the straight rack. Conversely, if this path of the points of contact be first assumed, and the law of motion in it be observed, the form of the tooth of any wheel may thence be obtained; and this leads us to the most convenient way of making the delineation.

In fig. 4, the form of the straight rack and the corresponding

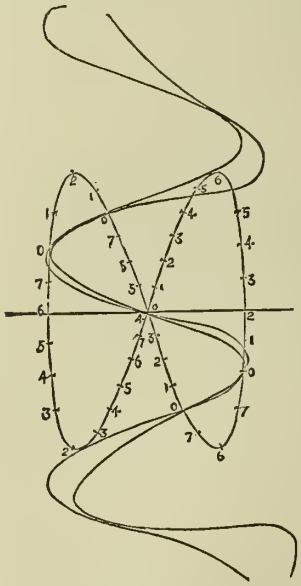


Fig. 4.

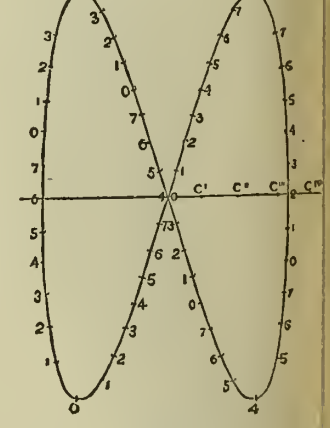


Fig. 5.

shape of the teeth of a wheel of 20 are shown in contact, the depth of the tooth being such as to give five contacts, which in the drawing are at the five points marked 0. If we suppose the rack to be slid upwards, carrying the wheel along with it, the points of contact will change; and when the motion has been one-eighth part of the interval between two teeth, these points will occupy the positions marked 1. When a motion of another eighth i

made, the two upper contacts on the left hand merge into one, and are about to disappear; at the same instant, two new contacts begin at the lower point, marked 2; and thus the motion continues in the order of the numbers marked along the peculiarly shaped path of the points of contact. Those contacts which occur along the crossing lines of the curve, are working contacts; those which happen along the two external arcs, are supplementary. When the form of this path, and the positions of the successive points in it have been obtained by calculation, the outline of any wheel is easily traced geometrically. Figs. 5, 6, and 7 show the path for the system of seven contacts; fig. 5, when the outline of the rack is the curve of sines; fig. 6 when the teeth of the wheels have the

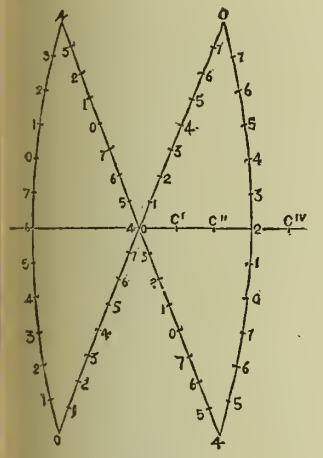


Fig. 6.

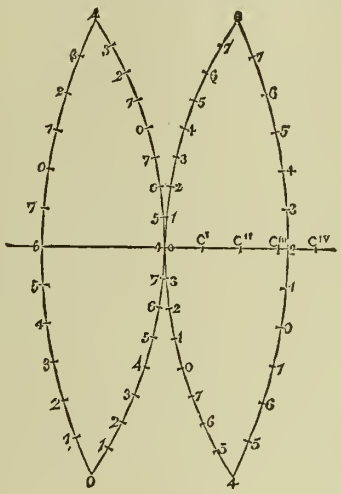


Fig. 7.

involute, and fig. 7 when they have the epicycloidal form. In these figures, C′, C″, C‴, are the positions of the centers of wheels of 1, 2, 3 teeth. In well-constructed machinery, there should never be fewer than seven contacts in the system, since of these only four are working; and therefore only two teeth are fully engaged; and it is necessary that two teeth be engaged at once, in order that the wearing may tend to remove any unavoidable inequalities of workmanship.

When we attempt to delineate the forms of wheels with few teeth by help of any of these orbits, we find that the contours overlap each other; in such cases, the following tooth of the conjugate wheel effaces, as it were, the trace belonging to the preceding tooth; and the contacts, though still holding good of the geometrical curves, become mechanically impossible. Thus it is that there are limits below which we cannot go in the numbers of the teeth. If the overlapping occur at the shoulder of the tooth, some of the useful contacts are awanting; but when the replication is only at the point of the tooth, the want of the supplementary contact occasions no inconvenience. An examination of the different cases shows that with seven contacts, the smallest numbers which can be used on the three systems just mentioned are 19, 17, and 11, so that the system of epicycloidal teeth has, in this respect, the advantage over the others. Clock pinions, then, should not have fewer than eleven leaves.

This method of considering the subject was first published by the writer of this article in *A New General Theory of the Teeth of Wheels* (Edinburgh, 1852).

It remains to cut the actual wheels to the shapes thus formed. The essentials of the operation are these: The blank wheel is attached to the axis of a large divided circle, which can be turned round and held in any desired position. A cutter, generally a revolving cutter, is brought down upon the blank, so as to notch out the space between two teeth; this done, the circle is turned round by the proper number of divisions, and another space is cut, and in this way the whole circumference of the wheel is gone over. In order that the work be well done, it is essential that the cutter be truly shaped; and when the edges get blunted by use, it is no easy matter to avoid spoiling the shape in the resharpening. Whatever system be followed, the form of the tooth varies from one number to another, so that the cutter which answers for a wheel of 20 cannot do for one of 30 teeth; and hence, when accurate results are wanted, there must be a cutter for each wheel.

In order to avoid the expense of so many cutters, each requiring to be carefully made, the slovenly practice is too often followed of having, perhaps, two cutters, one to be used for pinions, the other for wheels; and the result is the intolerable noise which is so common in mills, and which, if properly understood, should be taken as an indication of unnecessary expenditure of power.

When, as in the wholesale manufacture of clocks and watches, multitudes of wheels are to be cut of one size, careful attention can be given to the shape of the cutter. The labor is economized by binding a considerable number of blanks together on the dividing engine, and ploughing out the teeth of the whole of them at once. For the small wheels, technically called pinions, which cannot conveniently be fixed on the dividing-engine, *pinion-wires* are used; these are wires of brass or steel drawn through holes of the proper shape, and having the leaves running all along them. The watchmaker removes the leaves from those parts where they are not wanted, and thus obtains the pinion and its axle in one piece; in this way he gains the advantages of solidity and economy of workmanship.

Among the many purposes to which wheel-work is applied, it sometimes happens that an unequable motion is wanted. Thus, in the construction of an orrery, it is desirable that while one index turns uniformly to show the time, another may turn so as to show the unequal motion of the sun in the ecliptic. In that case, the variations of the velocity are small, and it is enough to divide the teeth unequally, as the slight inequality can hardly affect the working of the apparatus. But when the changes of velocity are considerable, the matter must be more carefully looked into. If we suppose the pitch-lines of two wheels to be uneven, and to roll upon each other without regard to the positions of their centers, the forms of teeth to be arranged upon those pitch-lines may be traced out almost in the manner already explained for round wheels.

The pitch-line must be divided into equal distances, and the disc must receive a half-sliding half-turning motion, so that the pitch-line may pass through the point C (fig. 8) always perpendicularly

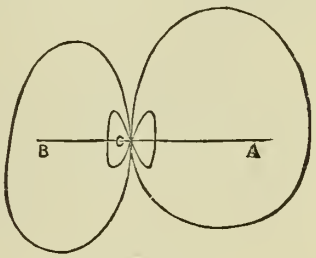


Fig. 8.

to the line AB, which is the line of centers for round wheels. The combination of this motion with the proper motion of the points of contact gives true forms for the teeth.

Thus, the form of the tooth can be obtained when that of the pitch-line is known. Now, when two discs, turning on fixed centers, touch each other at any point out of the straight line joining these centers, there is a slipping of the one surface over the other; and therefore, in order that the pitch-lines may roll together, they must be so shaped as that the point of contact may be in the line of centers. It can be shown that, for any assumed contour of the wheel A, another contour having its center at B, and rolling upon A, is possible. But, except in one or two special cases, the working out of the problem has not been accomplished. It will be enough here to mention the single case of elliptic wheels. The action of these is founded on the well-known property of the ellipse, that the sum of the distances of any point in it from the two foci is constant, and that the curve makes equal angles with these two lines. Hence two equal ellipses turning on their foci, when their centers are at a distance equal to the major axis of the ellipse, will roll upon each other; and teeth formed upon these as pitch-lines will work perfectly. In fig. 9, the ellipses

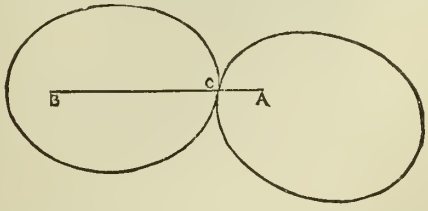


Fig. 9.

have their major and minor axes in the proportion of 5 to 4; with that proportion the focus is at one-fifth part of the major axis from one end; and therefore B, at one part of the revolution, moves four times as fast—at another part, four times as slowly—as A.

Sometimes one of the wheels has to be quite at rest during part of the motion of the other wheel. This is accomplished by causing some part of the wheel that is to be stationary, to bear upon a part of the circumference of the moving-wheel which is concentric with its axis. This is exemplified in the arrangement for counting wheels shown in fig. 10. The object of this apparatus is to count and record the revolutions of the wheel B. As this wheel turns round, a pin E attached to it enters into the slit

GH, and thus carries the wheel A round as long as the pin remains in the slit, that is, until the slit GH be brought into the position IK. As soon as E leaves the slit at I, there would be no further connection between the two wheels, and A could be moved anyhow, altogether independently of B. In order to prevent this, the disc B is made nearly five-sixths entire, and parts of A are scooped out between the slits so as to receive and to fit B. By this means A is prevented from being turned either backwards or forwards until the pin E again come into one of the slits. When this happens, the projecting part at G finds room in the recess F. If there be seven slits, GH, round the wheel A, and if B turn once in twenty-four hours, an index attached to A would show the days of the week; and the index might be made to be stationary all day, the change being effected during the night. Another example of this kind of interrupted motion is seen in the ordinary dead-beat clock escapement, in which the detaining surface of the pallet is concentric with the axis of the crutch.

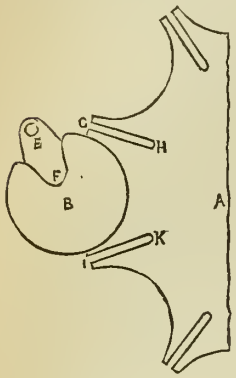
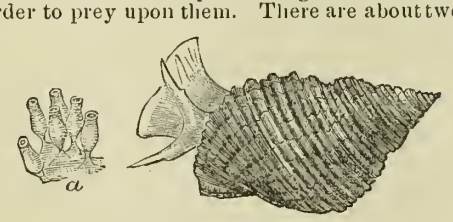


Fig. 10.

When the axes are inclined to each other, *beveled* wheels are used. Just as common wheels may be regarded as fluted cylinders, beveled wheels may be described as fluted cones having a common apex. The principles which regulate the formation of the teeth of these are the same as for plane wheels; but the application of these principles is considerably more intricate. Since both the teeth and the spaces between them are tapered, it is impossible to notch out the intervals by means of a revolving cutter. Attempts have been made to construct machinery for planing the teeth by means of a cutter moving in a line towards the apex of the cone, but the complexity of the apparatus, and the slowness of the process, have prevented its introduction; and thus the accurate formation of beveled wheels has still to be accomplished by hand.

WHELK (*Buccinum*), a genus of gasteropodous mollusks, of the family *Buccinidæ*. The shell is ovate, turreted, and more or less ventricose; its mouth ovate, emarginate, or produced into a very short canal below, the outer lip expanded, the inner lip usually thin and smooth within. The operculum is horny. The animal has a broad head, with two tentacula, with the base of which the stalks bearing the eyes are united; the proboscis is large, and the tongue armed with teeth, which are used for the purpose of rasping substances used for food—almost any animal substance being welcome for this use—or for perforating the shells of other molluscs in order to prey upon them. There are about twenty known



Whelk (*Buccinum undatum*): *a*, the eggs.

species, chiefly found on the coasts of the colder parts of the world. The British coasts produce several species, of which the most abundant is the COMMON W. (*B. undatum*). It occurs from low-water mark to a depth of 100 fathoms, is sometimes three inches in length, grayish or brownish white, with numerous raised ridges and spiral striæ. It is very widely distributed in the northern parts of the northern hemisphere, and is one of the most common molluscs of the arctic regions. It is much used as an article of food, is cooked simply by boiling, and is generally eaten with vinegar and pepper. Great quantities are consumed in London, chiefly by the poorer classes. In former times, whelks would appear to have been more highly esteemed than now. Eight thousand of them were provided for the enthronization feast of William Warham, Archbishop of Canterbury, in 1504. Yet on some parts of the British coasts, as on those of Scotland, whelks are never eaten, a prejudice existing against them as unsuitable for food. The whelks brought to the London market are mostly obtained by dredging. On the coast of Galloway, where they are used as a bait for catching cod, they are procured by letting down baskets containing pieces of fish in about ten fathoms of water. The baskets being taken up next day, are found to contain many whelks which have crept into them to feed on the garbage. The name W. (or *Wilk*) is popularly given in Scotland to the Periwinkle, the W. being known by that of *Buckie*.—There are more than 100 fossil species of W. in the Miocene formations.

WHELK, or BUBUCLE. These are terms used by the older English writers, and by Dr. Craigie in recent times, to signify the cutaneous disorder now commonly known as *Acne*. The simple whelk, the black whelk, the inveterate whelk, and the crimson whelk, correspond to *Acne simplex*, *A. punctata*, *A. indurata*, and *A. rosacea* of the more modern dermatologists. The symptoms of the crimson whelk, or fiery-face, must have been carefully observed by our great dramatist before he could have written Fluellen's graphic description of Bardolph: 'His face is all bubukles, and whelks, and knobs, and flames of fire, but his lips plows at his nose; and it is like a coal of fire, sometimes plue, and sometimes red.'—*King Henry V.*, act iii. sc. vi. The *Chin-whelk* is now known as *Sycosis* or *Mentagra*.

WHETSTONES. See HONES.

WHEWELL, WILLIAM, D.D., was born in 1795 at Lancaster. His father intended him for his own trade—that of a joiner; but the boy having excelled at school in mathematics, was persuaded to go to Cambridge. He entered at Trinity College, and graduated (Second Wrangler, and Second Smith's Prize-man) B.A. in 1816. He became a Fellow, and afterwards a Tutor of Trinity, where also, for many years, he acted as a successful 'coach,' or private tutor. In 1820, he became a Fellow of the Royal Society. Between 1828 and 1832, he was Professor of Mineralogy in Cambridge; and between 1838 and 1855, Professor of Moral Theology, or Casuistry. In 1841, he was appointed Master of Trinity; and in the same year, he was President of the British Association at its meeting at Plymouth. He was also, for a time, President of the Geological Society. In 1855, he became Vice-chancellor of the university of Cambridge. He died at Trinity (1866), in consequence of injuries sustained through a fall when riding.

W., when he acted as a private tutor, produced several text-books on mathematical subjects (one of which, his *Dynamics* [1823], is deservedly admired), which were for a time popular, but may now be said to have been superseded. He also contributed a variety of papers to the Transactions of learned and scientific societies, and to scientific journals, and to the reviews. In some of these, he treated of such subjects as the Tides, Electricity, Magnetism, and Heat; in others, of abstruse and recondite subjects, literary, historical, and metaphysical. Later in life, while he continued to write papers of this class, he concentrated his powers mainly on the production of large works. Among the most important of his books are—*Astronomy and General Physics considered in Reference to Natural Theology*, being the third Bridgewater Treatise (Lond. 1833); *History of the Inductive Sciences, from the Earliest to the Present Times* (3 vols., Lond. 1837); *The Philosophy of the Inductive Sciences, founded upon their History* (2 vols., Lond. 1840); *The Elements of Morality, including Polity* (Lond. 1855). Among his other works are—*The Plurality of Worlds*, which had considerable popularity from its subject; *The History of Scientific Ideas*; *Novum Organum Renovatum; Notes on the Architecture of German Churches; Lectures on the History of Moral Philosophy in England; Indications of the Creator;* translation of Goethe's *Herman and Dorothea;* translation of Auerbach's *Professor's Wife;* translation of Grotius's *Rights of Peace and War;* a translation of Plato's works; and *The Platonic Dialogues for English Readers*. Besides these books, he published many essays, as yet uncollected. His last composition, so far as is known, is an attack on Comte and Positivism, which appeared in *Macmillan's Magazine* after his death.

W.'s acquisitions were most various; it would have been sufficient occupation for the lives of most book-worms to have made them. His writings, again, were so various and voluminous, it might be thought sufficient employment of the life of a mere clever bookmaker to have produced them. W. was neither book-worm nor bookmaker. A clear-headed student, he was always increasing his stock of knowledge; a vigorous and independent thinker and writer, he was always giving forth the results of his studies to the public; and having thus proceeded during a long life of almost uninterrupted good health, he may be taken as illustrating what at the best may be achieved by a man of ambition, ability, and unflagging industry, without genius. He was nowise superficial, like many pretenders to encyclopædic knowledge; he was really master of all that could be learned on a great many subjects. It has been said of him, 'knowledge was his forte, omniscience his foible;' but it is absurd to suggest that a man can have and strain after too much knowledge, if it be, as his was, thorough knowledge. His chief ambition was to grasp, survey, and co-ordinate the sciences; and he did excellent service both to science and history in the effort to gratify it. The task suited one of his extraordinary acquisitions, good sense, and philosophic comprehension. Had he been a man of more imagination and ingenuity, he might, of course, have been better employed in endeavoring to advance some single science. As he was, this was beyond him: he made some original investigations, but the results must be pronounced unimportant.

W. was a large, strong, erect man, with a red face and a loud

voice. He was an effective preacher and lecturer, though in both characters wanting in that 'something' which wins and rivets the hearer. He was accused of being arrogant; and his general bearing gave color to the charge. A story, long current, may be told as illustrating at once his varied knowledge and his personal relations to his brother Fellows. He used so to overwhelm with his learning the company at the Fellows' table and in the Combination Room, that a conspiracy was formed to put him down.

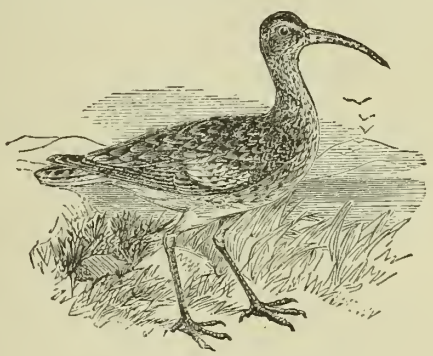
Some Fellows got up a knowledge of Chinese music from scattered articles in old reviews, with which they presumed he would be unacquainted. They then made Chinese music the subject of, as it were, a casual conversation at table. For a time, contrary to his usual habit, he took no part in the conversation. When they had about exhausted themselves, however, he remarked: 'I was imperfectly, and to some extent incorrectly, informed regarding Chinese music when I wrote the articles from which you have drawn your information.' They were caught in their own trap, and had to submit to be instructed. See Todhunter's *W.* (1876), and the *Life* by Mrs. Stair Douglas (1881).

WHEY. When any substance, possessing the property of coagulating casein, is added to milk, the coagulated casein separates in flakes and clots, and sinks to the bottom, constituting what is termed the *curds;* while the supernatant, straw-colored fluid is known as the *whey.* Cheese-making affords the principal source of whey, which, thus obtained, forms, like butter-milk, a very valuable kind of drink. The whey of goat's milk is regarded as specially beneficial, and in Switzerland and elsewhere, large establishments have been set up for carrying out the *whey-cure,* either alone or in association with the grape-cure. There can be no doubt that, were the cases judiciously selected, much good, in the way of eliminating morbid matter, might be effected in a few weeks by confining the patients to a diet of brown bread, grapes, and whey; while, on the other hand, many diseases might be much aggravated by that treatment. In ordinary medicine, we recognize several useful varieties of whey, as: White-wine whey, prepared by the addition of sufficient sherry to a tumbler of heated milk to coagulate the casein. On decanting off the whey from the curds, and sweetening, we obtain a favorite sudorific draught, which may be taken with advantage as a sudorific at bedtime, whenever there is a threatening of incipient cold in the head. *Cream-of-tartar whey* and *nitre-whey*—the former prepared by boiling 100 grains of cream of tartar in a pint of milk, and the latter by the similar use of nitre—act in the same way as wine-whey, but more powerfully. *Tamarind whey* has been already described in the article on that fruit.

WHIG AND TORY, the names which for the last two centuries have been popularly applied to two opposite political parties in Great Britain. Both were at first names of reproach. *Whig* was originally a nickname of the peasantry of the Western Lowlands of Scotland, said by some to be derived from a word or sound used by them in driving their horses; by others, from *whig,* 'an acetous liquor subsiding from sour cream.'—*Jamieson.* Its next application was to the bands of Covenanters, chiefly from the west of Scotland, who, subsequently to the murder of Archbishop Sharpe, took up arms against the government, and after gaining some successes in encounters with the king's troops, were defeated at Bothwell Bridge. Thence the name Whig (or Whigamore) came to be fastened, first, on the whole Presbyterian zealots of Scotland, and afterwards on those English politicians who showed a disposition to oppose the court, and treat Protestant nonconformists with leniency. The word *Tory*—said to be derived from *tora, tora,* in Irish, 'give, give,' or 'stand and deliver'—was first given to certain bands of outlaws, half-robber, half-insurgent, professing the Roman Catholic faith, who harassed the English in Ireland; and was thence applied reproachfully to all who were supposed to be abettors of the imaginary Popish plot; and then generally to persons who refused to concur in the exclusion of a Roman Catholic prince from the throne. These two nicknames, which came into use about 1680, immediately became familiar words, and have since been retained as designations of two opposite political sides—the Tories being, generally speaking, the adherents of the ancient constitution of England without change, and the supporters of regal, ecclesiastical, and aristocratic authority; while the Whigs have been the advocates of such changes in the constitution as tend in the direction of democracy.

The most sweeping constitutional change of the present century which the Whigs have carried is the Reform Bill of 1832. Each party, while preserving within certain limits a general consistency of purpose, has undergone many changes in its principles, professions, and modes of action with the altering circumstances of the country; and among persons who have been considered adherents of each side at any given time, there have seldom been wanting a variety of more or less distinctive shades of opinion. A division in the ranks of either party has often led the more moderate section of that party to coalesce with the opposite side; and at other times, the extreme party of innovation, dropping their connection with the Whigs, have adopted another name, as when those politicians whose desire was to have the whole institutions of the country remodeled on a democratic basis, assumed the designation of *Radical Reformers* or *Radicals.* See also CHARTISM. For a considerable time after the Reform Bill, the governing section of the Whig party were more disposed to maintain the principles of the changes already made, than to insist on further constitutional changes; and the principles maintained by Whigs and Tories sometimes approximated so closely that the difference seemed more one of men than of measures. Sometimes one party, sometimes the other, has appeared as the advocate of measures which have proved beneficial. In the agitation for the repeal of the Corn-laws, which lasted from 1841 to 1846, the Tories were ranked on the side of protection, and the Whigs of free trade; but the relations of the two parties had been the reverse at a former period, when Mr. Pitt's advocacy of free trade between England and Ireland was opposed by the manufacturers of Lancashire, who succeeded in getting his measure postponed. During the last thirty years, the names *Liberal* and *Conservative* have to a great extent superseded the former party designations of Whig and Tory.

WHI'MBREL (*Numenius phæopus*), a bird of the same genus with the Curlew (q. v.), and much resembling it in form, plumage, and habits, but of smaller size, and with a bill considerably shorter in proportion. The female, which is larger than the male,



Whimbrel (*Numenius phæopus*).

is about eighteen inches in length, the bill being about three inches and a half. The plumage of the W. is of a bright ash color, with streaks of brown on the neck and breast. The W. is a very widely distributed bird, being found from the north of Africa and of India to the arctic regions of Europe and Asia. It occurs also in Japan. It is a bird of passage, and visits Britain chiefly in the course of its spring and autumn migrations. A few whimbrels breed in Shetland; but the number is diminishing, the eggs being in great request as a delicacy. The flesh is also highly esteemed.

WHIN. See FURZE.

WHIN-CHAT (*Saxicola rubetra;* see CHAT), a bird very similar to the Stone-chat (q. v.), a summer visitant of Britain and of the northern parts of Europe. It is widely diffused over the British



Whin-chat (*Saxicola rebetra*).

islands in summer, but nowhere very abundant. The head, sides of the neck, and upper parts of the body are blackish brown, each feather bordered with rusty yellow; an elongated streak of white above each eye; the throat and a streak on each side of the neck white; the breast, rust-color; a large white spot on each wing; the tail white, except the two middle quills and the tip, which are blackish brown. The colors of the female are less distinct than those of the male. The W. frequents furze (or whin) bushes. Its song is pleasant.

WHINSTONE (probably from the same root as *whine,* and meaning the sounding, ringing stone), a name popularly given in Scotland to any hard and compact kind of stone, as contra-distinguished to sandstone or freestone, and rocks of slaty structure.

Thus, in most parts of Scotland, it is the common appellation of basalt, greenstone, and other trap rocks, whilst in some districts it is applied to granite.

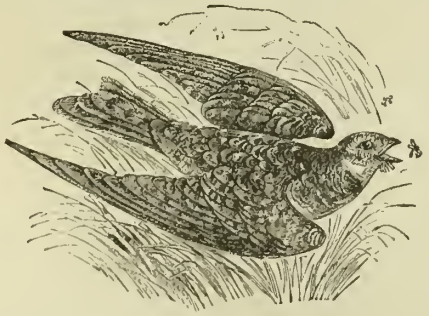
WHIPPING. Corporal punishment by whipping, public as well as private, was formerly often awarded by the criminal law of England for minor offences, such as petty larceny, and was not unfrequently superadded to some other punishment, such as imprisonment or the pillory. In early times, and by the usage of the Star Chamber, whipping could not be competently inflicted on a gentleman.—In Scotland, sentence of whipping was also frequent, the terms of the sentence sometimes requiring it to be repeated at intervals and in different parts of the kingdom. In the last century, the Scottish burgh magistrates were in the habit of awarding sentence of whipping on summary convictions for police offences, such as broils, street outrages, and the keeping of disorderly houses; but in modern practice the competency of inflicting this sentence at common law without the intervention of a jury has been made matter of doubt. Whipping used not long since to be an occasional addition to the sentence of the Justiciary Court on persons convicted of aggravated assaults.

The infliction of corporal punishment by whipping on women was prohibited by act 1 Geo. IV. c. 57. In Act 5 and 6 Vict. c. 51, directed against attempts to injure or alarm the Queen by discharging fire-arms in her Majesty's neighborhood, or otherwise, the infliction of public or private whipping not exceeding three times is made part of the punishment. Act 26 and 27 Vict. c. 44 (not applicable to Scotland) authorizes whipping in addition to penal servitude in convictions for robbery, assaults with intent to rob, and attempts to strangle or render insensible with the view of committing a crime, the number of strokes not exceeding 50 in the case of an adult, or 25 in the case of a boy under 16.

Recent legislation, both in England and Scotland, has made various provisions for the infliction of this description of corporal punishment on juvenile culprits. Whipping of boys under 16 for various offences is authorized by the English Criminal Consolidation Act (1861); it being provided that the whipping is to be private, and not repeated more than once, and the instrument of punishment to be specified in the sentence. Similar provisions, with some additional ones, occur in 25 Vict. c. 18 as to the mode in which the same punishment is to be administered on summary convictions by justices. In Scotland, the Prisons Amendment Act, 14 and 15 Vict. c. 27, and the act 23 and 24 Vict. c. 105, which superseded it, authorize the whipping of boys under regulations made by the Lord Advocate, and approved by the Secretary of State. By act 25 Vict. c. 18, no person above the age of 16 can now be whipped in Scotland for theft, or any crime against person or property. It is a very general impression among magistrates that whipping to the moderate extent allowed by 26 and 27 Vict. has had a most salutary effect in repressing certain kinds of outrage, the apprehension of mere imprisonment, or even of penal servitude, having little efficacy in the way of prevention. Thus, personal chastisement, the oldest form of punishment for crime, has to a certain extent been resumed in the administration of the criminal law.

As regards corporal punishment in the army and navy, see FLOGGING.

WHIP-POOR-WILL (*Caprimulgus* or *Antrostomus vociferus*), a species of Goatsucker (q. v.), a native of North America, common in the eastern parts of the United States. It receives its popular name from the fancied resemblance of its notes to the words *Whip poor Will*. It is about ten inches long, the plumage very



Whip poor-Will (*Caprimulgus vociferus*)

like that of the European goatsucker, much mottled and indistinctly marked with small transverse bands, the top of the head streaked with black, a narrow white collar on the throat. The bristles at the base of the bill are very stiff, and more than an inch long. This bird is seldom seen during the day, but seeks its food by night, catching moths, beetles, and other insects on the wing. Its flight is near the ground, zigzag, and noiseless. Its notes are heard only during the night, and are clear and loud, so that when a few of these birds are close at hand, the noise is such that those unaccustomed to it cannot sleep. In the more southern parts of the United States, the W. is replaced by a larger species, the Chuck-Will's-Widow (q. v.), and on the Upper Missouri and to the west by a smaller one (*C.* or *A. Nuttalii*).

WHI'RLPOOL, a circular current in a river or sea, produced by opposing tides, winds, or currents. It is a phenomenon of rare occurrence on a large scale, but illustrations in miniature may be noticed in the eddies formed in a river by means of obstacles or deflections. The two celebrated sea-whirlpools, Charybdis (see SCYLLA) and Malström (q. v.) are now known to be merely 'chopping seas,' caused by the wind acting obliquely on a rapid current setting steadily in one direction while the tide is flowing, and in the opposite direction when it is ebbing. During calm weather, neither of these so-called whirlpools is dangerous for large ships, but when the current and the wind are strongly in opposition, the broken swell is so violent and extensive in the Malström as to founder large ships, or drive them against the rocks. Though in neither of these two cases, formerly so much dreaded, is there any vortical action, instances of such action do actually occur in various localities, as in the whirlpool of Corrievrekin (q. v.), and in some eddies produced by opposing winds and currents among the Orkney Islands.

WHI'RLWINDS AND WA'TERSPOUTS. Whirlwinds differ in many respects from the storms described in the articles STORMS and TYPHOONS. They seldom continue longer than a minute at any place, and sometimes only a few seconds; their breadth varies from a few yards to nearly a quarter of a mile; during their short continuance, the changes of the wind are sudden and violent; and the barometer is not observed to fall. The direction of the eddy



Dust Whirlwinds.
(From Baddeley's *Whirlwinds and Dust-storms of India.*)

of the whirlwinds, especially when the diameter is very small, differs from the rotation of winds in a storm, in that it may take place either way—right to left, or left to right—according to the direction of the stronger of the two winds which give rise to the whirlwind. Thus, suppose it to arise from a north wind blowing side by side with a south wind, and to the west of it, then, if the north wind be stronger, the whirl will be north, west, south, and east; but it will be in a contrary direction if the south wind be the stronger. Whirlwinds often originate within the tropics during the hot season, especially in flat sandy deserts; these becoming unequally heated by the sun, give rise to ascending columns of heated air. In their contact with each other, the ascending currents result in eddies, which draw up with them large clouds of dust, and the whole is borne forward by the wind that may happen to be blowing at the time. This is the origin of the *dust whirlwinds* of India, which have been admirably described and illustrated by P. F. H. Baddeley. These dust-storms are frequent in dry warm regions; and in the case of the *Simoom* (q. v.), which may be regarded as a succession of such whirlwinds, they appear on a scale of the most appalling grandeur.

Extensive fires, such as the burning of the prairie in America and volcanic eruptions, also cause whirlwinds, by the conflicting currents of heated air they occasion; and these, as well as the whirlwinds already mentioned, are generally accompanied with heavy rains, hail, and electrical displays. Whirlwinds are also of frequent occurrence in France, doing great damage to the

vineyards and other crops; but in Great Britain they seldom occur.

Waterspouts are whirlwinds occurring on the sea or on lakes. When fully formed, they appear as tall pillars of cloud stretching from the sea to the sky, whirling round their axes, and exhibiting the progressive movement of the whole mass precisely as in the case of the dust whirlwind. The sea at the base of the whirling vortices is thrown into the most violent commotion, resembling the surface of water in rapid ebullition. It is a popular fallacy that the water of the sea is sucked up in a solid mass by waterspouts, it being only the spray from the broken waves which is carried up. Observations of the rain-guage conclusively prove this.

What are sometimes called *waterspouts on land* are quite distinct from these phenomena. They are merely heavy falls of rain of a very local character, and may or may not be accompanied with whirling winds. They generally occur during thunder storms, being quite analogous to severe hail-storms, from which they differ only in point of temperature. Also all the moisture that falls is the result of condensation; whereas, in the true waterspout, the rain is mixed with spray which has been caught up from the broken waves, and carried aloft by the ascending currents of the whirlwind.

WHI'SKY (Gaelic, *uisge*, water; *uisge-beatha*, commonly written *usquebaugh*, water of life), a spirit made by distillation from grain, roots, and other materials, the best being produced from barley after it has been malted, though what is termed raw grain whisky (made from wheat, oats, rice, rye, Indian corn, buckwheat, millet, &c.), after being kept for two or three years, is scarcely inferior in quality. W. is also made from beetroot, potatoes, beans, molasses, sugar, &c. In these cases, malt is used to a small extent. The mode of manufacture is described under DISTILLATION. W. was formerly almost exclusively manufactured in Scotland, Ireland, and the United States; but distilleries are now at work largely in England, Prussia, Sweden, France, Holland, and Belgium, the foreign spirit being, however, coarser, and only suited for fortifying wines and for methylated spirit for manufacturing purposes.

According to the statistics for 1871, there was distilled in Scotland 13,813,062; in Ireland, 9,302,253; and in England 7,739,720 gallons. In 1881–82, duty was paid in England on 13,868,006 gallons; in Scotland on 8,620,225; and in Ireland on 7,192,329. The largest quantity is always made in Scotland; but owing to a large quantity of the spirit being removed to England duty free, to be converted by English rectifiers into British gin, duty is paid on it in England. Scotland sends to England, in excess of the quantity returned from that country, about 3½ millions, and Ireland sends upwards of a million gallons annually. The surplus not accounted for is either exported or retained in bond. Owing to legislation in 1848, the export of British spirits rose from less than 300,000 gallons very rapidly, though with great fluctuations, till in 1856—1857, it reached nearly 6 millions of gallons; but owing to continental competition, our export has fallen below 1½ million gallons annually, and the trade is now almost entirely colonial. Export is encouraged by a drawback in excess of duty of 2*d.*, while 4*d.* a gallon is added to duty on foreign spirit imported, 4*s.* on sweetened, and 6*s.* 6*d.* on perfumed spirits. This allowance is to equalize the loss caused by excise restrictions to the native producer. The manufacture of whisky (as well as of other spirits) in the United Kingdom is placed under the surveillance of the Excise, and by act of parliament (6 Geo. IV. c. 80) the distiller is subjected to numerous stringent regulations, with a view to prevent the evasion of the very high duties.

Parliament attempted, about the beginning of the 18th c., to check the excessive use of ardent spirits by imposing the enormous duty of 20*s.* a gallon, and taxing retailers. The trade became unprofitable, and got entirely into the hands of the profligate and criminal classes. Smuggling flourished, the excise-officers were violently opposed, and informers hunted down. The act became a dead letter, and was repealed in 1742, and a moderate duty imposed.

In Ireland, the repressive system was carried to a still greater extent, a fine being imposed on the *district* in which illicit distillation was detected, and the unfortunate operatives subjected to transportation for seven years. The effect of this was, that of 10,000,000 gallons annually (1820—1823) consumed, only about 3,000,000 paid duty; frequent and murderous conflicts took place between the smugglers and the excise-officers and military, and much of the country was almost in a state of rebellion. In Scotland also, illicit distillation flourished afresh at each rise of the duty; lawless violence was resorted to freely, the common people invariably sympathizing with or aiding the smugglers; and in many cases the officers of excise were effectually intimidated. The difficulty of dealing with illicit distillation in Ireland and Scotland led to the adoption, beginning with 1823, of a considerably lower duty in these two countries than in England. The following table exhibits the relative rates of duty on spirits in England, Scotland, and Ireland at different periods during the present century:

	England.	Scotland.*	Ireland.
	s. d.	*s. d.*	*s. d.*
1802	5 4½	3 10½	2 10½
1803	8 0	..	3 7
1804	..	5 10	..
1811	10 3	8 0½	2 6½†
1815	..	9 4½	6 1½
1817	..	6 2	5 7½
1819	11 8½	..	..
1823	..	2 4¾	2 4¾
1826	7 0	2 10	2 10
1830	7 6	3 4	3 4‡
1840	7 10	3 8	2 8
1853	..	4 8	3 4
1855	8 0	8 0	6 2
1858	8 0	8 0	8 0

In 1858, the duty on spirits was equalized in the three kingdoms, thus putting a stop to the systematic and (as was found) irrepressible practice of smuggling spirits from Scotland and Ireland into England, which had prevailed for a long time previously. The duty was in 1860 raised to 10*s.* per imperial gallon, at which rate it still remains. This rate was increased to its present value by Mr. Gladstone with the avowed intention of diminishing the consumption of ardent spirits; and though it does not seem to have produced this effect, neither has it, as was always the case formerly, increased the practice of illicit distillation, owing to the improved moral tone of the population, the more thorough execution of the law, and the great capital embarked in the distilling trade acting as a deterrent against fraudulent distillation on any extensive scale. Illicit distillation is now very much on the decrease, and is almost confined to Ireland. The high price of whisky, besides limiting its consumption, has had a deleterious effect in increasing the temptation to produce a cheaper drink for the poorer classes by introducing noxious materials resembling it in effect and flavor. In years when the vine crop in France is a failure, large quantities of whisky are sent to that country, and returned as French brandy. In the United States, the process of manufacture is the same as in this country, and is largely carried on in New York, Pennsylvania, Ohio, Illinois, Indiana, Kentucky, and, in a less degree, in Tennessee, Missouri, and California. A large quantity is also rectified, and reduced to alcohol, and much is exported and in part returned in the form of 'French brandy,' 'Hollands,' &c. The 'Monongahela' whisky of Pennsylvania, and that from Bourbon County, Kentucky, are considered the best in the United States, and always fetch a high price.

WHIST, a game at cards, believed to be of English origin; probably a development of the game of *trump* (or more properly, *triumph*), which was played in England at least as early as the time of Henry VIII. Trump (or triumph) is mentioned in a sermon delivered by Latimer on the Sunday before Christmas 1529. The game of trump is also mentioned by Shakspeare punning on the word triumph (see Donce's *Illustrations*, and *Antony and Cleopatra*, act iv. scene 12). The game of whist is not mentioned by Shakspeare, nor by any writer of the Elizabethan era.

The earliest mention of *whist* (or, more properly, *whisk*) is in the poems of Taylor the Water-poet (1621). In the first edition of Cotton's *Compleat Gamester* (1674), whist has no place; but it is added in the second edition (1680) as a game 'commonly known in England.' Cotton says that 'the game of whist is so called from the silence that is to be observed in the play;' and this derivation of the word has been generally accepted, and was adopted by Dr. Johnson, to the extent of explaining whist to be a game requiring silence. But if the original name of the game was whisk, Cotton's derivation fails. The derivation from an interjection signifying silence seems to have been taken for granted somewhat hastily.

The game was formerly played nine-up. The change to ten-up seems to have taken place in the first quarter of the 18th century. Whist played ten-up is called *long whist*. About 1785, the experiment of dividing the game into half was tried, and *short whist* was the result. The short game soon came into favor; and in 1864, the supremacy of short whist was acknowledged by nearly all the London and by many country clubs, the clubs adopting as their standard the laws of short whist as framed by committees of the Arlington and Portland.

Edmond Hoyle, the first writer of any celebrity on whist (commonly called the father of the game), was born in 1672—it is said in the neighborhood of Halifax, Yorkshire, but on insufficient grounds. He was educated as a barrister. He first pub-

* The duty differed in the Highlands and Lowlands till 1814, the difference varying from 6*d.* to 2*s.* 5*d.*, giving rise to a considerable amount of smuggling.
† For two years—afterwards doubled.
‡ Reduced to 2*s.* 4*d.* after 1834.

lished his *Short Treatise* about 1742. He used to give lessons in whist at a guinea a lesson. His *Short Treatise* ran through many editions (16 or more) during his lifetime; and since his death, his works have been reproduced in numberless ways. Hoyle died in Welbeck Street, Cavendish Square, on August 29, 1769, aged 97.

The game of whist is played by four persons, two being partners against the other two. The partners sit opposite to each other. The partnership is determined by cutting. The two lowest are partners against the two highest, and the lowest has the deal and the choice of seats and cards. In cutting, the ace is reckoned lowest. Each player has a right to shuffle the pack once before each deal, the dealer having the privilege of a final shuffle. The shuffling being concluded, the player to the dealer's right cuts the pack. The dealer having reunited the packets, is bound to deal the cards one at a time, to the players in rotation, beginning with the player to his left. He turns up the bottom card (called the trump card). The deal being completed, the players sort their cards, and the player to the dealer's left (or leader) plays a card face upwards on the table. The other players follow in rotation, being bound to follow suit if they can. When all have played, the trick is complete. It is then gathered and turned over by the winning side. The highest card wins the trick. The ace is highest in playing; and the other cards reckon in the order, king, queen, knave, ten, &c., down to the deuce, or two, which is lowest. If any player cannot follow suit (i. e., has none of the suit led), he may play any card he pleases. If he plays a card of the suit turned up (called trumps), he wins the trick, unless another player also, having none of the suit led, plays a higher trump. The player who wins the trick becomes the leader for the next trick, and so on till the whole hand (consisting of 13 tricks) is played out.

After scoring, the mode of which will be presently described, the player to the last dealer's left deals in his turn; and in subsequent deals, each player deals in turn, the rotation going to the left.

After the hand is played out, the scoring is thus performed: the side who win more than six tricks reckon one for each trick above six; and the side who either separately or conjointly hold more than two of the following cards, ace, king, queen, and knave of trumps (called honors), reckon as follow: If they hold any three honors, they score two (that being the excess of their honors over their opponents'); and similarly if they hold four honors, they score four. At short whist, players who are at four, cannot score honors. The same at long whist with players who are at nine. The side who thus in one hand or in a succession of hands first reach five at short whist, or ten at long, score the game.

A game at short whist is called a single, if the adversaries have already scored three or four; a double, if they have scored one or two; a treble, if they have scored nothing. A game at long whist is a single, if the opponents have scored five or more; a double, if they have scored less. There is no treble at long whist.

A rubber consists of the best two games out of three. If the same players win two consecutive games, the third is not played. The winners of the rubber win in points the value of the games they have won, and where the rubber has consisted of three games, the value of the loser's game is deducted. And whether two or three games are played, two points are added for the rubber at short whist; one point for the rubber at long. Thus, if at short whist A B (partners) win a single and a double, they win three points on the games, and they add two for the rubber, making five points. Had A B won the same, but C D (their opponents) won a treble, they would have to deduct three points, the value of the opponents' game, and would only win two points. Long whist is now seldom played.

Whist is a mixed game of chance and skill. The chance resides in the holding honors, and the fortune of having high cards dealt in the hand. The skill consists in the application of such knowledge as shall, in the long run, turn the chances of the cards in the player's favor. At the commencement of the hand, the first lead presents a problem of almost pure chance; but as the hand proceeds, observation of the fall of the cards, inference therefrom, memory and judgment come in, so that towards the end of the hand we are often presented with a problem of almost pure skill. It is these ever-varying gradations of skill and chance that give the game its chief interest as a scientific pastime.

In order to become a skillful player, it is necessary to bear in mind that the game is not one of any given player's hand against the other three, but a combination of two against two. In order that two partners shall play their hands to the best advantage, they must strive, as much as possible, to play the two hands as though they were one. To this end, it is advisable that they should pursue some uniform system of play, in order that each partner shall understand the plans of the other, and so be placed in the most favorable position to assist him in carrying them out. The experience of the last hundred years has developed a system of play tending to this result. Of this we proceed to give an epitome.

The first, or, as it is commonly called, the *original* lead should be from the player's strongest suit. A strong suit is one that contains either a large number of cards (four or more) or several high cards. The suit containing the largest number of cards 'numerical strength) is the one to be mostly preferred. The object aimed at in opening with the strongest suit is to exhaust the cards of that suit from the other hands. When this object is accomplished, the cards of the suit which remain in the leaders's hand (called long cards) obtain a value which does not intrinsically belong to them. They often become of great service, for when led, they either compel the adversary to trump, or they make tricks. And when trumps are all out, the player who has the lead makes as many tricks as he has long cards.

On the other side, by opening weak suits, there is considerable risk of sacrificing partner's strength, and of leaving long cards with the opponents.

Some players are prone to lead single cards, but experience shows that weak leads, as a rule, do more harm than good. Sometimes a trick or two is made by playing a trumping game; but the chances are that such tactics sacrifice partner's hand, and clear the suit for the adversaries.

The proper card of the strong suit to lead is, as a rule, the lowest. The intention is for the third player to play his highest, and so to assist in clearing his partner's strong suit. Moreover, if the leader keeps the best cards of his suit in his own hand, he has a fair chance of getting the lead again when his suit is nearly or quite established. But with ace and four or more small ones, it is considered best to begin with the ace, lest the ace is trumped, second round. Also with a strong sequence in the strong suit, it is best to lead one of the sequence first, lest the adversaries win with a very small card. The following are the principal leads from sequences:

From ace, king, queen—lead king, then queen.
From ace, king, and small—lead king, then ace.
From ace, queen, knave—lead ace, then queen.
From king, queen, knave, and more than one small—lead knave.
From king, queen, knave, and one small—lead king.
From king, queen, and small—lead king.
From king, knave, ten, nine, &c.—lead nine.
From king, knave, ten, and small—lead ten.
From queen, knave, ten, and small—lead queen.
From knave, ten, nine, and small—lead knave.

After the first trick, the lead may remain with the first leader. His best play, as a rule, is to continue his suit. If the lead falls to another player, his play, as a rule, will be to open his best suit; and so on. If the lead falls to the first player's partner, he has choice of two modes of play. If he has a good strong suit of his own, as, for instance, one of those in the list above, and containing four or more cards, he would, as a rule, open it; if not, he would, as a rule, do well to continue the suit his partner first led; or, as it is commonly called, to return his partner's suit. The object is to strengthen partner by assisting to clear his strong suit.

In returning a suit, if the player has only two cards of it remaining in his hand, he should return the highest; if more than two, the lowest. The exception is, if he has the winning card, he should return that irrespective of the number of other cards in the suit. The reason of this rule is that, with but two cards of the suit remaining, the player is weak in the suit, and he is therefore bound to sacrifice his good card to support his partner. But with three or more remaining after the first round, he is strong, and is therefore justified in calling on partner to support him.

This rule of play is most important. It should be carefully observed with even the smallest cards, as it enables partner to count the situation of the remaining cards. For example: A leads a suit in which C (his partner) holds ace, three, and two. In returning A's suit, after winning with the ace, C is bound to return the three, and not the two. When C's two falls in the third round, A will know that his partner has no more of the suit. But suppose C's cards to be ace, four, three, and two. In returning the suit C is bound to choose the two. Then after the third round, A will conclude with certainty that C has at least one more card in the suit.

Late in a hand, the considerations with regard to the lead vary. If there is no indication to the contrary, it is best for each side to continue the suits originally opened by them. But the fall of the cards may show that it is disadvantageous to persevere in the suits first led. In such cases, the player must have recourse to other and weaker suits. The general rules to be observed here are—to choose a suit in which there is reason to infer that the right-hand adversary is weak; or—but this is less favorable—one in which the left-hand adversary is strong. In either case, if the suit chosen contains but three cards, none higher than knave, or only two cards, it is generally right to lead the highest.

The second player, as a rule, should play his lowest card, in order to preserve his strength in the leader's suit. The first trick in the suit is left to partner, who has an even chance of holding a

better card than the third player. But if the second hand has a strong sequence, he should play the lowest of the sequence, by which partner's hand may be saved, and a high card still remain over the original leader.

The following are the principal sequences:

With ace, king, queen—play queen.
With ace, king, &c.—play king.
With king, queen, knave—play knave.
With king, queen, &c.—play queen.
With queen, knave, ten—play ten.
With queen, knave, and one small—play knave.

When a high card is led, it is sometimes advisable for the second player to cover it with a higher one. The shortest rule is to put an honor on an honor, if with but two or three cards of the suit. With king or queen, and four of the suit, it is better to pass an honor led.

When the second hand has none of the suit led, he should, as a rule, trump, if he has but two or three trumps; but he should not trump a losing card if he has more than three trumps, the reason of which will be explained when treating of the management of trumps.

The third hand, as a rule, plays his highest card in order to support partner in his suit. The exceptions are, with ace, queen, &c., the queen is to be played; and if partner has begun with a high card, it is often right to pass it.

The management of trumps varies according to whether the player is strong or weak in them. If strong (i. e., with four or more), they should not be used for trumping, if it can be avoided, but should be kept together, in hopes of establishing a suit, and of remaining with the long trump, with which to get the lead after the other trumps are out, and so to bring it in. Thus, if the opponents lead a losing or doubtful card, it is better, as a rule, not to trump it when holding four trumps. But if the opponents lead a winning card, it is, as a rule, better to trump it; though holding four trumps, than to pass it in hopes of bringing in a suit.

With five trumps, the chance of succeeding in exhausting the opponents' hands, and of remaining with the long trump, is so considerable, that a player having five or more trumps, should lead them; and as number is the principal element of strength, he should not be deterred from leading trumps merely because the fourth hand has turned up an honor.

With four trumps only, it is better first to lead the strong suit. When the adversaries' hands are cleared of that suit, or so far cleared that the holder of the long cards in that suit commands it, it is, as a rule, safe to lead from four trumps.

As a rule, less than four trumps should not be led from. But a player is justified in leading from weak trumps, if he holds winning cards in every suit; if the adversaries are both trumping a suit; or if the game is lost, unless partner has strength.

It is most important to return partner's trump lead at once, unless he has led from weakness; for partner, by leading trumps, declares a strong game, and it is then the best policy to abandon one's own plans, and to support his.

It follows that a player should not, as a rule, lead a card for his partner to trump, unless he has four or more trumps; for with less than four trumps, the player is weak; and if he forces his partner to trump, partner is weakened also; and the chances are that by weakening partner under such circumstances, the command of trumps will remain with the adversaries.

But a player may force his partner, although weak himself, if partner has already been forced, and has not afterwards led trumps; if partner has already declared weakness in trumps, as by trumping a doubtful card second hand; if two partners can each trump a different suit; and when one trick from partner's hand wins or saves the game.

The same considerations which make it inexpedient to force partner when weak one's-self, show the advantage of forcing a strong trump-hand of the opponents.

There are yet some general rules of play which have not been explained.

The second, third, and fourth players should always play the lowest of a sequence. The rule here given is in conformity with the play that would naturally be adopted in playing cards that are not in sequence; and by keeping to a uniform plan, players are enabled to infer what cards their partner does or does not hold. It is true that the adversaries often gain the same information; but it is found by experience that it is of more advantage to inform partner than to deceive the opponents.

As a rule, it is advisable to lead out the winning cards of partner's suit. The presumption is that he has led from his strong suit; and by leading out the winning cards, the suit is cleared for him, and his long cards are not obstructed. The reverse applies to suits led by the adversaries. It is mostly right to retain the winning cards of such suits as long as possible, in order to stop the establishment of them.

When a player has none of the suit led, he should, as a rule, throw away from his weakest suit; for by discarding from a strong suit, its numerical power is damaged. But when the adversaries have shown great strength in trumps, it is not advisable to keep small cards of a long suit, as it is not likely that it can ever be brought in. Under such circumstances, the player should throw away from his best protected suit, and keep guards to his weaker ones.

Players should watch the cards as they are played, and endeavor to infer from them where the others lie. Thus, if a player wins a queen with an ace, it may be inferred that he has not the king, the rule being to win with the lowest; if a player leads trumps at starting, it may be inferred, as a rule, that he is strong in trumps, or has a very fine hand. By recording in this way, and by counting the number of cards played in each suit, skilled players will often, towards the close of a hand, know the position of all the important cards remaining in; and by means of this knowledge, they will be able to play the end of the hand to the same advantage as though they had seen all the cards.

And lastly, and most important of all, players should play to the score. Thus, wanting but one trick to save or win the game, a winning card should be played at once. The example is stated as for one trick; but it should always be kept in mind how many tricks are requisite to win or save the game, or even a point, and the play should be varied accordingly.

The previous condensed outline embodies the principal rules of play. For more detailed information, the reader is referred to Professor P.'s Essay on the modern scientific game (Longman, Green, &c.); *Cavendish's Principles of Whist* (De la Rue & Co.); and 'J. C.'s' Treatise on the game (Harrison). They should be read in the order here indicated.

ILLUSTRATIVE HAND.

The following example (the figures for which were kindly lent by the proprietors of *The Field*, in whose columns are given many excellent illustrative hands) is given to show how the play at whist is conducted in accordance with the preceding general rules, and also how inferences from the fall of the cards may be drawn and used. The example is of the simplest kind, and is not intended to exhibit any fine stroke of play. A, B, C, and D are the four players; they sit round the table in the order of the letters, A C being partners against B D. A is the first leader, and D the dealer. We will suppose ourselves to be A, the score to be love-all, and D to have turned up the four of hearts.

A's Hand.

Ace, 2 of ..... ♠
Queen, 8, 7, 5 of ..... ♡
9, 6, 5 of ..... ♣
Quee, Knave, 7, 2 of ..... ♢

[*Note.*—It is a great assistance to inexperienced players to sort the hand from a pack, and play a card to each trick, as would be done in actual practice.]

THE PLAY.

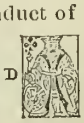
[*Note.*—The cards in each trick are placed in the order in which they are played, the leader's card standing first. The capital letter in front of each card shows by whom it was played.]

Trick 1. A leads. A ♢ B  C ♢ ♢ ♢ ♢ D ♢ ♢ Trick 1. B. wins.

Remark.—A leads from his strongest suit. He leads the lowest card of it. (For reasons, see preceding article.)

Inferences.—C. being unable to win the king, A should note that the best diamond is against him, probably in B.'s hand, as the rule is with ace and king to put on king second hand. (See preceding article.) Some players put on king second hand, with king and one small one; but, as a rule, the smallest should be played, unless the second hand holds a sequence. C dropping the nine, and A holding queen and knave (refer to A's hand), A concludes C to have ten or no more, the rule being to play the smallest when unable to head the trick.

It is in this way, by comparing the cards that fall with those that remain in hand, that players obtain an insight into the game to guide them in their future conduct of the hand.

Trick 2. B leads. B ♣ C  D  A ♣ Trick 2. D wins.

Inference.—A infers clubs to be B's strongest suit. This inference does not affect the subsequent play. But it might; and, at all events, it is an inference that A ought to draw.

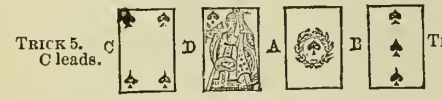
Trick 3. D leads. D ♣ A ♣ B ♣ C ♣ Trick 3. B wins.

Remark.—D. returns his partner's lead (for reasons, see preceding article).

Several inferences might here be drawn as to the position of the remaining clubs—as, for instance, that C has the queen; but as they do not affect the play, they are omitted, for the sake of brevity.

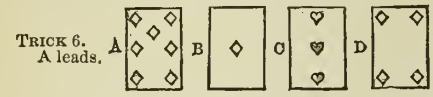


Remark.—B continues his suit (for reasons, see preceding article.)



Inferences.—Spades may be taken to be C.'s strongest suit.

D, putting on queen second hand, probably has king (see preceding article). Also, he may be presumed not to have the knave, or he would play the lowest of the sequence.



Remark. A continues his suit. As a rule, with second and third best (in this case, queen and knave), one of those should be led; but C having played the nine to the king, in the first trick (refer to Trick 1, and last inference therefrom), A would part with strength unnecessarily by leading a high card, as C either has the ten or will trump.

This is an example of direct departure from common rule, owing to previous fall of cards.



Remark.—C continues his suit.

Inference —The ten falling from B.'s hand, it may be inferred that he holds knave or no more.

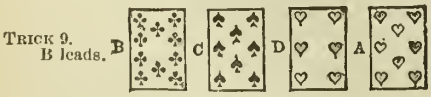


Inferences.—B not playing the knave of spades, C may be inferred to hold it (see inference, previous trick, and last inference, Trick 5).

As regards the lead of the spade here, it may seem at the first glance to be contrary to the rules of play advocated in the preceding article. It is a return of the adversary's lead, and up to the strong hand. But it must be remembered that whist is not a stereotyped game of rule; rules can only be given for the general case, and they have to be departed from more or less frequently as the circumstances of the hand become developed. In the case before us, any other lead would probably be worse. We may take it for granted that D is not very strong in trumps, or he would have led them. The diamond lead would enable the adversary to make the winning diamond, and then probably a small trump on the next round. The spade lead would probably enable B either to make the knave of spades or a small trump (see inference, Trick 7).

It may be asked: Why, if D is not strong in trumps, does he lead a card which may force his partner? This question may be satisfactorily answered by referring to the score (see preceding article). B D have four tricks up, and one more saves the game if either B or D holds an honor. D is justified at this point of the game in forcing his partner, even though weak in trumps. Or D may have four trumps, and so be strong enough to force at any score, but not strong enough to lead trumps (see management of trumps in preceding article).

Remark.—A trumps, as the knave may be with B. He chooses the seven rather than the five, in order to prevent B from making so small a card as the six by overtrumping.



Remark.—B leads the thirteenth club.

Inferences.—It is probable, from this lead, that B has strength in trumps, such as an honor guarded. When a thirteenth card is led before trumps have been played, it generally means that the leader has such strength as above presumed, and that he wants his partner to put on his best trump, in order to make the trumps separately. It may be, however, that the leader only wants his partner to be led up to if the thirteenth card is trumped by the fourth hand. It is a difficult point in the game for the third hand to know whether to trump a thirteenth card high or to pass it.

A further inference from this trick is, that D is probably weak in trumps, as he only puts on the six. If he trumps at all, he will most likely trump with his highest. Looking at the fact that if the trump lead comes from A, the lead will be presumably up to a weak suit, and also that A has the best diamond and his partner the best spade (see inferences, Tricks 5 and 8), A determines to lead a trump. Accordingly,



Remark.—Having but two of the suit, A leads the best (see preceding article).



Remark.—C returns his partner's lead of trumps. As a rule, partner's trump lead should be returned immediately (see preceding article); but it does not follow that C is bound to return trumps here, a strengthening trump being led late in the hand. C, however, does well to return the trump in this case, as, on the whole, perhaps the best chance for the odd trick is to bring the trumps down this round, and to find A with the winning diamonds.

Trick 12.—B leads a diamond (he has only diamonds in hand), and A makes the knave and queen.

A C score the odd trick.

WHISTON, William, was born on 9th December 1667, at Norton in Leicestershire, of which place his father was rector. His earlier education he received at home; subsequently, he became the pupil of a Mr. Antrobus at Tamworth, and finally he went to Cambridge, where he greatly distinguished himself, chiefly as a student of mathematics. In 1690. he took his degree, and obtained a Fellowship in 1693. The year after, he became chaplain to Dr. More, Bishop of Norwich; and in 1698, having been presented to the living of Lowestoft, in Suffolk, he was married to Miss Antrobus, the daughter of his old preceptor, his Fellowship being thus forfeited. Meantime, in 1696, had appeared his *Theory of the Earth*, a work which, despite, or perhaps in virtue of, the oddity of certain of its speculations, procured him a considerable reputation. That his genuine claims as a man of science were considerable, is made clear by the fact, that in 1703, by the express influence of Sir Isaac Newton, whose acquaintance he had made some years previously, he was appointed to succeed him in the Lucasian Professorship at Cambridge. On receiving this appointment, he gave up his living, and again settled himself at the university. In addition to the duties of his chair, he engaged in clerical work; and such was his success as a preacher, that he would probably have attained high position in the church, had not the development of his theological opinions led him into Arian heresy—his frank and fearless avowal of which at once in his preaching and his writings led, in 1710, to his expulsion from his professorship and the university. In the same year appeared the most noted of his original writings, *An Historical Preface to Primitive Christianity Revived*. His subsequent prosecution in the church courts forms a curiously complicated chapter in the history of such matters. The result was, that after five years of vexatious suspense, during which the proceedings swayed hither and thither in the strangest way, they proved in the end abortive, and W. was permitted to remain formally a member of the Church of England.

By many of the clergy, however, much dissatisfaction was expressed; the famous Dr. Sacheverel in particular thundered from the pulpit against the delinquent, and refused to admit him to communion—an example which was followed by others. It seems significant of the social stigma attached to him in the minds of the orthodox, that when Halley, in 1720, proposed him as a member of the Royal Society, his old friend Newton successfully opposed his admission. W. himself, the most amusingly vain of men, remained indeed deeply convinced that Newton's conduct was dictated by jealousy of his superior scientific genius—a notion in which he probably found not many to agree with him. Having no ostensible means of livelihood, W. was frequently reduced to great straits; but he had kind friends, who were ready to assist him at need. In the dissemination of his religious opinions he continued unwearied; his publications on the subject were numerous; also, he occasionally delivered lectures; and he instituted a religious society, which had meetings at his own house. He also busied himself much with scientific crotchets, chief among which

was a scheme for calculating the longitude, of the success of which he was assured. He died on the 22d of August 1752, at the great age of 85. Of all his numerous works, a translation of Josephus was the only one which continued for a time to perpetuate the name of its author; and of this there have been several reprints. His Memoir of his own Life (published in his lifetime in 3 vols. 1749—1750) is a curious specimen of self-portraiture, and conveys a very vivid image of this strange, whimsical, eccentric, but thoroughly honest and conscientious man.

WHI'TBY, a parliamentary borough, market-town, and thriving seaport in the North Riding of Yorkshire, on both sides of the mouth of the Esk, about 50 miles north-north-east of the city of York by railway, and 42 in a straight line. A stone bridge with a swivel, by which vessels are admitted into the inner harbor, connects the two parts of the town. Two piers, of which the west one is about 1000 feet long, run out into the German Ocean, and protect the outer harbor, and it is further protected by two inner piers, which break the force of the waves during storms. On a cliff about 350 feet high stands the parish church, which is approached from the town below by a flight of nearly 200 steps. There are dry docks for the building and repair of ships; iron and jet ornaments are extensively manufactured—the jet found in the vicinity having a world celebrity. Alum and ironstone—the latter found in great quantities—are exported. Of late, W. has risen into importance as a watering-place. In 1880, 909 vessels, of 123,677 tons cleared the port. Pop. (1871) 13,094; (1881) 14,554.

The Saxon name of the place was Streoneshalch, but when the Danes took possession of it they called it Whitby (white town), just as they changed the Saxon Northweorthing into Deoraby or Derby. The termination *by*, which is characteristic of Danish settlements, is a corruption of the old Norse *byr*, modern Icelandic *boer*, a dwelling, farmstead, town. In Devon the suffix occurs in the form *bere* or *beer*, as in Rockbere, Larkbeer.

WHI'TCHURCH, a small market-town of Shropshire, on a height, 20 miles north-north-east of Shrewsbury by railway. Trade in malt, hops, and shoes is carried on. Pop. (1871) 3696; (1881) 3756.

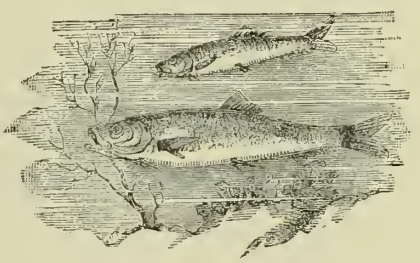
WHITE, Gilbert, author of the *Natural History and Antiquities of Selborne*, was born at Selborne in Hampshire, on July 18, 1720. Educated at Oriel College, Oxford, he received his M.A. degree in 1746, and in 1752 he was made a senior proctor of the university. At an early period of his life he retired to his native village, to indulge his taste for literature and natural history; and there he died on June 20, 1793. His charming *Natural History and Antiquities of Selborne*, which has made W. an indisputable English classic, was published in 1789. Probably no book on natural history has been more frequently reprinted. There is an edition by Prof. Bell (1877), and one by Frank Buckland, with a chapter on antiquities by Lord Selborne (1875). His MS. journal, comprising letters and poems, and a full day-to-day weather report, 1768—1789, in 6 volumes, was found in 1880.

WHITE, Henry Kirke, was born on the 21st March 1785, at Nottingham, in which place his father was a butcher. At the age of 15 he was apprenticed to an attorney; and, while in his business he showed exemplary diligence, his leisure-hours were passionately devoted to intellectual pursuits, and especially to the cultivation of poetry. He also became a member of a literary society in Nottingham, and began to attract notice by his fluency and ability as a speaker. To the *Monthly Mirror* he was wont to send contributions, and the merit of his verses drew to him the attention of Mr. Hill, its proprietor. Acting on the advice of this gentleman, and Mr. Capel Lofft, who also took a generous interest in him, he published in 1804 a small volume of poems, which was cruelly treated by the critics, and found little acceptance with the public. It was the means, however, of securing him influential friends, notably Southey, and the Rev. Mr. Simeon, through whose influence a sizarship in St. John's College, Cambridge, was procured for him. In his studies he highly distinguished himself; but the ardor with which they were pursued speedily proved the ruin of a constitution at all times delicate; consumption rapidly developed itself, and he died October 19, 1806. The year after, two volumes of his *Remains* were published by his friend Southey, to whom his MSS. had been intrusted, prefaced by a pleasing Memoir of the deceased poet. W.'s poetry, however, is now almost forgotten.

WHITE, Rev. Joseph Blanco, was born at Seville, in Spain, on 11th July 1775. His father was a merchant there of Irish parentage, who had married a Spanish lady of old Andalusian family. Finding his father's counting-house on trial not at all to his mind, he quitted it to prepare himself for holy orders, and in 1799 he was ordained a priest. But born with a mind curiously restless and inquisitive, he ceased in no long time to find himself at home in the Romish communion; and in 1810 he came to England, which he never afterwards quitted. Joining himself to the English Church, he seems to have meditated becoming one of its clergymen; an intention which it was quite as well he did not carry out, inasmuch as his speculations rapidly led him to results not recognized by English orthodoxy.

On coming to England, he settled himself in London, where for some years he conducted a monthly Spanish paper called *El Español*. On the cessation of the Peninsular War in 1814, this publication ceased also, as having no longer a *raison d'être;* but meantime its services to the government of the day had been such as to secure for its editor a pension for life of £250 per annum. Subsequently, Mr. W. lived chiefly in London, employed as a man of letters. Though in literary circles recognized as a man of fine talent, and known as a contributor to the *Quarterly* and *Westminster Reviews*, and other high-class periodicals, he scarcely succeeded in making a permanent impression on the public by any of his more formal publications. Of these, the most important were: *Letters from Spain* (1822), contributed some years before to the *New Monthly Magazine; Practical and Internal Evidence against Catholicism* (1825); *Poor Man's Preservation against Popery* (1825); and *Second Travels of an Irish Gentleman in Search of a Religion* (2 vols. 1833). He died on the 20th May 1841, in Liverpool, whither he had removed some years before. In 1845 there was given to the world, as his legacy to it, by much his most striking and valuable work, *The Life of the Rev. Joseph Blanco White, written by himself; with portions of his Correspondence;* edited by John Hamilton Thom (London, 3 vols. 8vo). This book, at the time of its appearance, excited a good deal of interest, and is still eminently worth referring to. The curious picture it presents of a mind at once pious and skeptical, longing and sorrowing after a truth which it can nowhere find, or finding, contrive to rest in, has, in the present unsettled state of religious opinion, a very particular significance. Poor W.'s life-long 'search for a religion' seems not to have been a successful one, and to have landed him at the last in a condition of nearly entire scepticism.

WHI'TEBAIT, a small fish, called by Valenciennes *Rogenia alba*, and for which he constituted the genus *Rogenia* as a distinct genus of the Herring family (*Clupeidæ*), but which is now generally regarded by naturalists as merely the fry of the herring. The W.



Whitebait.

fishery is actively prosecuted on some parts of the British coast, particularly in the estuary of the Thames, where the W. is very abundant in spring and summer, beginning to appear in the end of March or early in April. Adult W. are caught on the coasts of Kent and Essex during winter, and in this condition are about six inches in length. W. is also found in the Forth. It is much in request as a delicacy for the table, forming a favorite dish of epicures. At the time when ordinarily captured, W. are only from an inch and a half to four inches in length. They are caught by means of bag nets sunk four or five feet below the surface of the water. For several months they continue to ascend the river in shoals with the flood-tide, and descend with the ebb-tide, not being able to live in fresh water. They are fried with flour or crumbs; they are often laid on a napkin and sprinkled with fine flour and a little salt, rolled about till well covered with flour, and then thrown into a pot of boiling lard, where they remain till they are of a pale straw color. Londoners resort to Greenwich and Blackwall to enjoy W. dinners. It has become the practice for her Majesty's ministers to repair to Greenwich for a W. dinner every year before the prorogation of parliament in autumn. Some of the corporations of London indulge in a similar annual festivity. The W. has the body more compressed than the mature herring; the belly is serrated; the lower jaw is longer than the upper; the scales are very soft, small, and thin, and very easily rubbed off; the color is silvery white, greenish on the back. The food of the W. seems to consist of minute crustaceans. It seems probable that the fry of all the British *Clupeidæ*—the pilchard, the sprat, and the shad—are indiscriminately taken and used like the fry of the herring, under the name of whitebait.

WHI'TEBOY, the name of an illegal association of the peasantry in Ireland, which for a long series of years was the fruitful source of agrarian outrage, sometimes of a very revolting and sanguinary character. The association had its origin in the early

years of the reign of George III.; and first took an organized form in the county of Tipperary, where it appeared in the shape of a united resistance to an attempt on the part of certain proprietors to enclose and appropriate lands up to that time common. The movement at the beginning was confined to throwing down the newly erected fences, and destroying the enclosure, from which circumstance the rioters were in the first instance called 'Levelers;' but their views soon extended further, and they addressed themselves to the redress, first, of the oppressive exactions of tithes, and afterwards of various other grievances, especially those connected with the tenure of land. The name of Whiteboys was given to them in consequence of their wearing white shirts in their nightly expeditions. Many acts of cruelty and outrage having been committed, a special commission was issued in 1762 for the trial of the offenders; but the repression was only partial and temporary, and Whiteboyism reappeared more than once in the southern province. In 1787, a new association, the members of which called themselves 'Right-boys,' appeared in the same district, and was made the subject of discussion in the Irish parliament. The conflicts of the northern Orangemen (q. v.) and Ribbonmen (q. v.) for a time drew attention away from the minor discontents of the south; but the same spirit of secret combination has continued among the peasantry down to the present day. The Shanavests, Caravats, Rockites, Terry Alts, and other more obscure or more local denominations, must be regarded as embodiments of the very same discontent, which has long held its ground among the poorer classes in Ireland, and which, although undoubtedly exaggerated and embittered by the recollections of hereditary wrong inseparable from the condition of a conquered people, are held, even by politicians of moderate views, to have much justification in the social condition of the people, and in certain striking anomalies of the legislature in reference to Ireland. The ground of discontent furnished by the endowment and establishment of the church of a small minority of the population, has now ceased to exist. See FENIAN SOCIETY.

WHITE COLORS. The principal white pigments used by painters are: (1) *White Lead* (see LEAD), which is not only used as a color, but forms the body of most oil-paints; (2) *Derbyshire White*, which is sulphate of baryta; (3) *Pearl White* or trisnitrate of bismuth; and (4) *Zinc White*, or hydrated oxide of zinc.

WHITEFIELD, GEORGE, one of the founders of Methodism, was born in the Bull Inn, at Gloucester, on the 16th December 1714. He was educated at the grammar-school of his native town, at which he appears to have distinguished himself, especially by elocutionary displays at the annual visitations. On leaving school, he was for a time engaged assisting in the business of his mother, the hostess of the Bull Inn; but he obtained admission as a servitor at Pembroke College, Oxford, when in his 18th year. About three years earlier, John and Charles Wesley had laid, in the university of Oxford, the foundations of Methodism—a system which, at first, resembled the rule of a religious order more than the bond of a religious sect; requiring from its professors ascetic observances and devotion to works of piety and charity. It was not till he had been upwards of a year at the university that W. became associated with the Methodists. He at once made himself remarkable among them for zeal, for the austerity of his aseeticism, for labor too great for his strength among the sick and the prisoners in the jail. His health gave way, and he had to go home, when his native air soon restored him; after which he carried on at Gloucester the same pious and self-denying practices which he had begun at the university. His conduct drew upon him the attention of the bishop of the dioeese, who offered, though W. was only twenty-one, to admit him immediately into orders. The offer was accepted, and W. was ordained a deacon in 1736, before he had taken his degree. He preached his first sermon in Gloucester Cathedral, and the effect of it was remarkable. The vehemence and earnestness of his oratory deeply moved the audience; and five persons are said to have been driven mad with fear and excitement. Complaints were made to the bishop; but this good man gave no heed to them—simply saying that he hoped the madness would last to the following Sunday. During the next two years, W. preached with similar results in various churches in England.

Meanwhile, Wesley had been in America establishing missions among the colonists; and in 1738 he desired W. to join him, a request that was immediately complied with. W. had to go to London to make arrangements for his journey; and this visit, though not his first, seems first to have made him known to the inhabitants of the metropolis, upon all classes of whom—fine gentlemen like Chesterfield, and cool sceptics like Bolingbroke, as well as the more mobile crowd—he afterwards made an impression such as, probably, no other preacher ever produced. His success in London was immediate, and much exceeded all that had befallen him previously. The doors of the church in which he was to preach were besieged before the dawn; the unlighted streets in the early morning were filled with persons carrying lanterns, making their way to the place of worship many hours before the time of service. This lasted until his departure for America. He was hereafter to be almost as closely connected with evangelical labors in America as in England itself; but on this first occasion, his stay was short—only a few months. He returned to be admitted to priest's orders, and to collect funds for the establishment of an orphanage in Georgia. He soon went back to America, but not before a beginning had been made of his split with the English Church, whose clergy he offended by preaching in the open air, whether he got permission from the parish clergyman or not, and by deviating, whenever he thought fit, from the liturgy of the church. But the remarkable and beneficial effects of his preaching on the rude miners and others who flocked to hear him, consoled him for clerical censures; and after this, he seems to have preached almost by preference in the open air. His second visit to America occupied nearly two years. He came back in 1741.

It was about this time that doctrinal differences led to his separation from John Wesley—both of them being by this time disowned by the Established Church. Wesley believed and preached the doctrine of universal redemption; W. was a rigid Calvinist. Each thought his belief of the utmost importance, and in the end, each excommunicated the other. W.'s supporters now built him a large shed at Moorfields, near Wesley's chapel—which, being temporary, was known as the tabernacle; and his preaching gathered immense audiences around him. But he had no talent for organization; and as soon as he went away on his frequent and protracted journeys, his supporters began to disperse. But that the Countess of Huntingdon, a lady of wealth and of abilities, became a convert to his views, W., in all probability, would not have founded a sect. But this lady appointed him her chaplain; she built and endowed chapels to maintain his Calvinistic doctrines; and thus a slight memorial of W.'s preaching, though it more directly commemorated the zeal and energy of Lady Huntingdon, remains in what is known as the Huntingdon connection.

One of his most famous missionary journeys was that which he made to Scotland in 1741. He went to Scotland on the invitation of Ralph and Ebenezer Erskine, well known as leaders of a secession from the Church of Scotland; but his notions were too catholic for his friends; he was as ready to preach in a parish church as to a seceding congregation, and more ready still to preach in the open air; and the Erskines soon differed from and separated from him. That the impression he made upon the people of Scotland was very strong and very general, may be inferred from the fact that the leading corporations of Scotland—Edinburgh, Glasgow, Aberdeen, Stirling—admitted him to their citizenship. At Cambuslang, in Lanarkshire—a mining district, mainly inhabited by rude colliers, then *adscripti glebæ*—his preaching produced one of the most remarkable 'revivals' of modern times; many thousands were stricken with concern about their souls, and violent physical manifestations followed upon their excitement—foaming at the mouth, bleeding at the nose, convulsions—which, by many who read of them, were attributed to Divine influence, by others to the devil. It was on his return from this visit to Scotland, that W., making a stay in Wales, met and married a widow, a Mrs. James. His marriage, like that of Wesley, was not a happy one; and it is recorded that the death of his wife, when it occurred, 'set his mind much at liberty.'

To America, W. paid seven visits, several of which lasted for two or three years. He set out for America for the last time in 1769. He was ailing at the beginning of the voyage; he was ill at the end of it; and he died somewhat suddenly not long after his arrival in America, at Newberry, near Boston, on the 30th September 1770. A collection of his sermons, letters, and controversial writings was published in the following year (*The Works of the Rev. George Whitefield*, 6 vols. London, 1771); and in 1772 were published his memoirs, by Dr. Gillies. His writings do not sustain the impression which would be derived from the accounts of his preaching. They show him as a man of somewhat slender talent and common-place quality of mind; quite unlearned; entirely free from the casuistical turn, as well as deficient in the worldly knowledge and prudence, for which Wesley, like many other enthusiasts, was pre-eminent. His success as a preacher seems to have been in no small degree due to a sonorous but expressive voice; no doubt it was mainly due to the earnestness of his faith, to the fluency and rude strength of his homely language, and to that vehemence and impetuosity of nature which, perhaps, is the thing most distinctive of the orator. Of the *Memoirs of the Life and Character of George Whitefield*, by J. Gillies, D.D., of the College Church, Glasgow, originally published at London, in 1772, subsequent editions, containing additional matter, appeared in 1798, in 1811, 1812, 1813, and in 1827. An anonymous *Life of George Whitefield*, founded upon his journals and letters, and borrowing largely from the work of Dr. Gillies, appeared at Edinburgh in 1826. *Whitefield's Life and Times*, by Robert Philip, D.D., was published at London in 1837; and there has since ap

peared *George Whitefield: a Light rising in Obscurity*, by Andrews (Lond. 1864); and, in 1876, another full memoir by Tyerman.

WHI'TEFISH (*Coregonus albus*, see COREGONUS), a fish of the family *Salmonidæ*, of the same genus with the Gwyniad, Vendace, Powan, Pollan, &c. It is found in the lakes and large rivers of North America, from the St. Lawrence and its tributaries to the Arctic regions, and is one of the most valuable of American fresh-water fishes, abounding over a great extent of country, and being excellent for the table. It is the *Attihawmeg* of the north-western Indians. The body is elongated but thick, the head small and the muzzle pointed, the tail forked, the scales large. The mouth is destitute of teeth. It sometimes attains a length of two feet and a half, and weighs ten pounds. It is bluish-gray on the back, lighter on the sides, and white below. It spawns in October, proceeding from the lakes up the rivers for this purpose. It usually swims in shoals, like its small British congeners. It feeds chiefly on insects and entomostraca. It is caught by nets, which are often spread under the ice, and the fishery is attended with much labor and exposure. The Indians sometimes spear it through holes in the ice. The W. forms the principal food of many Indian tribes, and of the fur-traders, during great part of the year. It is often salted by them. The flesh is bluish-white, changing to a pure white when boiled, whence the name. The most southern lake in which the W. is found is Lake Champlain. No fresh-water fish better deserves to be made the subject of pisciicultural experiments than the W., and its acclimatization in Britain would probably be as easy as it is desirable.—An allied species, the OTSEGO W. (*C. Otsego*), found in Lake Otsego, is also of exquisite flavor; but it is now rare.

WHITE FLUX. See FLUX.

WHITE GUNPOWDER is a mixture that was at one time employed in blasting, but is now scarcely ever employed in consequence of the danger attending its preparation, and the facility with which it explodes by friction. Its ingredients are chlorate of potash, dried ferrocyanide of potassium, and sugar.

WHI'TEHALL, a village of New York, U. S., at the head or southern extremity of Lake Champlain, and termination of the Troy and Champlain Canal, with important railway and steamboat connections, and water-power for saw and flouring mills, machine woollen and carpet factories. It was settled by Major Philip Skene in 1761, and called Skenesborough; in the war of 1812 it was an important military depot. Pop. (1880) 4270.

WHITEHA'VEN, a parliamentary borough and seaport of Cumberland, near the point where the estuary of the Solway Firth joins the Irish Sea, 40 miles south-west of Carlisle by railway, 36 in a straight line, and 34 miles east-north-east of Ayre Point, the northern promontory of the Isle of Man. It contains a market-house, custom-house, baths, and a theater, as well as the West Cumberland Infirmary. The harbor is commodious, but is now dry at low water. The sources of the prosperity of the town are its vicinity to extensive collieries—some of which extend beneath the town and stretch out under the sea—and the extraordinary abundance and richness of the hematite iron ore found in the neighborhood. Coal and iron mines are numerous, there are iron-smelting works, and iron and brass foundries—the manufactured iron being shipped mostly to the Welsh and Irish markets. There are dry docks for the building and repair of vessels; and rope-making and the manufacture of thread and sail-cloth are important branches of trade. W. returns one member to the House of Commons. In 1880, 1924 vessels, of 235,611 tons, entered and cleared the port. Pop. (1881) 19,717.

WHITE LADY, a being who, according to popular legend, appears in many of the castles of German princes and nobles, by night as well as by day, when any important event, whether joyful or sad, but particularly when the death of any member of the family is imminent. She is regarded as the ancestress of the race, shows herself always in snow-white garments, carries a bunch of keys at her side, and sometimes rocks and watches over the children at night when their nurses sleep. The earliest instance of this apparition spoken of was in the 16th c., and is famous under the name of Bertha of Rosenberg (in Bohemia). The W. L. of other princely castles was identified with Bertha, and the identity was accounted for by the intermarriages of other princely houses with members of the house of Rosenberg, in whose train the W. L. passed into their castles. In the castle of Berlin she is said to have been seen in 1628, and again in 1840 and 1850. The most celebrated in Britain is the W. L. of Avenel, the creation of Sir Walter Scott. It was long a common belief in the Highlands that many of the chiefs had some kind spirit to watch over the fortunes of their house. Popular tradition has many well-known legends about white ladies, who generally dwell in forts and mountains as enchanted maidens waiting for deliverance. They delight to appear in warm sunshine to poor shepherds or herd-boys. They are either combing their long hair, or washing themselves, drying wheat, beating flax, or spinning; they also point out treasures and beg for deliverance, offering as reward flowers, corn, or chaff, which gifts turn in the instant into silver and gold. They wear snow-white, or half white half black garments, yellow or green shoes, and a bunch of keys at their side. All these and many other traits that appear in individual legends may be traced back to a goddess of German mythology who influences birth and death, and presides over the ordering of the household. Still more distinctly the appellation W. L. and the name Bertha point back to the great goddess of nature, who appears under various names, and who, as *Berhta* (i. e., the brilliant, shining, white), held her circuit on Twelfth-night and revealed her power.

When the legend goes on to say that the Bohemian Bertha of the 15 c. promised the workmen of Neuhaus a sweet soup on the completion of building the castle, and that this soup, along with carp, is still given in remembrance of it to the poor on Maundy Thursday, we recognize again the festival dishes consecrated to Berhta, such as fish, oatmeal gruel or dumplings, &c., which it is still customary to eat about the time of Twelfth-night and Christmas in most districts of Germany.

WHITE LEAD. See LEAD.

WHITE MOUNTAINS, a mountain-chain of New England, U. S., regarded as an outlier of the Appalachian range, commences at the headwaters of the Aroostook River, in Maine, where its first summit is Mount Katahdin, and extends in a broad plateau, from 1600 to 1800 feet high, west by south nearly across New Hampshire, where it has twenty bold peaks, with deep, narrow gorges, wild valleys, beautiful lakes, lofty cascades and torrents, forming the 'Switzerland of America,' and a favorite resort of summer tourists. Mount Washington, the highest summit in New England, 6285 feet, has a practicable carriage-road and a hotel on its summit; Mount Pleasant, the second of the group, is 4762 feet; the lesser are named Franklin, Monroe, Jefferson, Adams, Madison. In the Franconia group are Lafayette, 5300 feet, and Mooselhillock, 4636. These mountains furnish the chief sources of the Connecticut, Merrimack, and Androscoggin rivers. The rocks are ancient metamorphic, with naked granite and gneiss. The Ammonoosuck River falls 5000 feet in 30 miles, the Androscoggin 200 in a mile. Five narrow and precipitous notches seem to have been rent in the mountains, and give passage to as many rivers.

WHITE PRECIPITATE. See MERCURY.

WHITE RIVER, a river of Arkansas and Missouri, U. S., rises in the Ozark Mountains, flows north-east into Missouri, then turning east and south-east into Arkansas, drains the north-eastern portion of the State, and flowing southerly, empties itself into the Mississippi near the mouth of the Arkansas. It is 800 miles long, and navigable 350 miles.

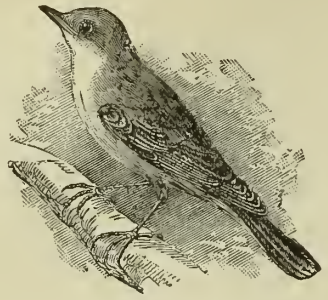
WHITE SEA (Russ. *Bjeloje-More*), an arm or great bay or inlet of the Arctic Ocean, which, between Cape Kanin on the Kaninskaia Peninsula, and Cape Sviatoi on the Kola Peninsula, penetrates the Russian government of Archangel southwards to lat. 64° N. At its entrance between Capes Kanin and Sviatoi it is 100 miles broad; after penetrating the land 150 miles in a south-easterly direction, it narrows to a width of 35 miles; but after sweeping south for 200 miles, it again considerably widens, forming in the north-west the Gulf of Kandalak, and in the south and south-east the great Gulfs of Onega and Archangel or Dwina. The W. S. covers an area estimated at 47,000 sq. m., and the length of its coast-line is over 1000 miles. The coasts in the north and east are mountainous, in other places they are mostly low, and abound in lakes, which communicate with the sea by rivers. The greatest depth of the W. S. is 1133 feet. From the middle of August ice forms on the coasts sometimes to the width of 30 miles, and is not melted till the following July.

WHITE SULPHUR SPRINGS, a watering-place in Virginia, U. S., on Howard's Creek, 205 miles west of Richmond. Pop. about 1000. It has hotel accommodation for 1500 guests. The spring is in the lowest part of a beautiful valley, and is covered by a dome supported by 12 ionic columns, and surmounted by a statue of Hygeia: it is 2000 feet above tide-water; yields 30 gallons per minute of water at 62° Fahr., impregnated with sulphates of lime, soda, magnesia, carbonate of lime, chlorides of calcium and sodium, iron, iodine, sulphur, carbonic acid, sulphuretted hydrogen, oxygen, nitrogen. It is considered efficacious in dyspepsia, liver diseases, gout, rheumatism, and diseases of the skin and kidneys. The Red, Salt, and Blue Sulphur Springs, at a distance of 22 to 24 miles from the above, are also much resorted to.

WHITE SWELLING. See JOINTS, DISEASES OF.

WHI'TETHROAT (*Curruca cinerea*), a bird of the family *Sylviadæ*, a summer visitant of Britain; plentiful during summer in the greater part of England and in Ireland, but comparatively rare in Scotland. It is also common during summer in the south and middle of Europe, and is found even in the north. It places

its nest in a low bush, or among a tangled mass of brambles and weeds. Its food consists both of insects and berries. Its song is not very sweet, but is delivered with great energy, and it seems to vie with other birds in singing, refusing to be outdone. It is very lively and amusing, as a cage-bird, and very easily tamed. The



Whitethroat (*Curruca cinerea*).

whole length of the W. is 5½ inches. Its plumage is brown, of various shades; the breast and belly brownish-white, tinged with rose-color in the male.—The lesser W. (*Curruca sylviella*) is a species of much rarer occurrence in Britain. The Whitethroats belong to the same genus with the Blackcap (q. v.) and the Garden Warbler (*C. hortensis*), which is not uncommon in Britain, and almost rivals the Blackcap in the richness of its notes.

WHITE VITRIOL. See ZINC.

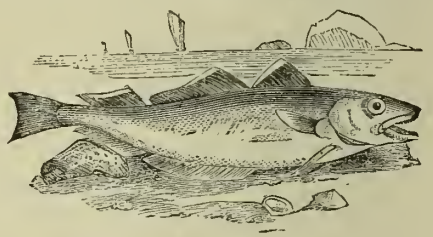
WHITE-WASH, slaked quicklime, reduced to the consistency of milk by means of water. It is used for coloring walls, and as a disinfectant. If merely for coloring, a little size is added, but not when used for sanitary purposes.

WHITE-WOOD BARK. See CANELLA.

WHITGIFT, JOHN, the third Protestant Archbishop of Canterbury, was born at Great Grimsby, in Lincolnshire, according to one account in 1530, according to another in 1533. His father was a merchant, and is said to have belonged to a family long established in Yorkshire. His early years were passed within the Abbey of Wellow, near Grimsby, of which his uncle was the abbot; and from that he went to St. Antony's School in London, a religious house then in great reputation. About 1548, he was entered at Queen's College, Cambridge. After a short time, he removed to Pembroke Hall, of which he continued a member till 1555, when he was elected a Fellow of Peterhouse. He took orders in 1560, and as he showed a remarkable talent for preaching, the Bishop of Ely appointed him his chaplain, and gave him the living of Feversham. In 1563, he was appointed Lady Margaret's Professor of Divinity. In 1567, he became Master of Pembroke Hall; and in the course of the same year, Queen Elizabeth, who admired his preaching, and had made him one of her chaplains, appointed him to the Mastership of Trinity College. About this time, he also obtained the Regius Professorship of Divinity, and took his Doctor's degree. He was appointed Dean of Lincoln in 1571, Bishop of Worcester in 1577, and Archbishop of Canterbury in 1583. He at one time held together—under a dispensation from the archbishop—the Deanery of Lincoln, the Mastership of Trinity, the Regius Professorship of Divinity, and the living of Feversham; and the dispensation enabled him to hold, along with these, any other benefice whatever. This cannot have been often paralleled, even in the history of pluralities. Of course, the man so favored had rendered and was rendering considerable services to the church and to the crown.

His first work, on becoming Master of Trinity, was upon a revisal of the statutes of the university. He obtained such powers for the heads of houses as enabled them to eject from the Lady Margaret's Professorship the able and energetic Puritan, Cartwright, on the score of his Calvinistic creed. He afterwards, at the request of Archbishop Parker, published an answer to an 'Admonition of Parliament' (drawn up by a clergyman named Field), presented to the House of Commons on behalf of the Puritans, in which it was maintained that, in matters of doctrine and discipline, the church should admit nothing as authoritative but what was contained in the Word of God. This work was published in 1572. It has always been held that in it W. vindicated the position of the Anglican Church against the Puritans with no less ability than Bishop Jewell showed in defending it against the Romanists. He was answered by Cartwright on behalf of the Puritans; he replied, and Cartwright rejoined; and as the works on either side were revised by the most learned and eminent men of the two parties, they give an excellent view of the state of opinions in the Anglican Church at this time. After becoming primate, W. labored assiduously to secure uniformity of discipline in the church. He had the full confidence of Queen Elizabeth, who placed all the church patronage of the crown, including the bishoprics, in his disposal, and he was armed with full powers for carrying out his design. He required the clergy not only to subscribe to the Royal Supremacy, the Liturgy, and the Thirty-nine Articles of the Church, but also to a set of additional articles framed mainly with the view of purging the church of Puritanism. The bishops were required to administer those tests; and the clergymen who refused to accept them were deprived of their livings. This measure was harshly conceived; but W. is said to have been a kindly man, and to have used his authority over the clergy gently, especially in his later years. He was made a Privy Councilor in 1586, and in that capacity drew up a set of statutes for cathedral churches, to make their services conform to the principles of the Reformation. He was offered the chancellorship by Queen Elizabeth, but he declined the office. On the accession of King James, he seems to have been much alarmed for the stability of the system which he had spent his life in rearing; and though the monarch treated him with the utmost observance, anxiety upon this account is said to have hastened his end. He died of paralysis on the 29th February, 1603. He is undoubtedly entitled to rank with the ablest and most distinguished prelates that have adorned the English Church. He founded a magnificent hospital and a grammar-school at Croydon.

WHI'TING (*Merlangus*), a genus of fishes of the family *Gadidæ*, differing from the cod, haddock, and their congeners (*Gadus*, or *Morrhua*) in having no barbule on the lower jaw, and also in their more slender form, which adapts them for pursuing their prey more actively and further from the bottom of the sea. The COMMON W. (*M. vulgaris*) is abundant on many parts of the British coast, particularly on the western coasts of Britain, and on the coasts of Ireland; on the northern coasts of Scotland it is comparatively rare. It not unfrequently attains a weight of three



Whiting (*Merlangus vulgaris*).

or four pounds—although the whitings brought to market are seldom of this size; but a W. has been taken of seven pounds weight. The head and body are compressed; the deepest part is at the vent, which is opposite the middle of the first dorsal fin; the upper jaw extends a little beyond the lower; both jaws have long sharp teeth, and there is a triangular patch of teeth on the palate. The scales are small. There are three dorsal fins, and two anal fins; the tail-fin is even. The color is dusky yellow on the back, the sides paler, the belly silver white; there is a black spot on the upper part of the root of the pectoral fin. The W. is a voracious fish, preying on molluscs, worms, crustaceans, and small fishes. It is caught chiefly by hand-lines and long lines; mussels and pieces of cuttle-fish are very generally used for bait. It is in high esteem for the table, and is regarded as particularly delicate and easy of digestion. The flesh is of a pearly whiteness, whence the English name. It very soon suffers change, however, and is in good condition only a short time after being caught; but great numbers of small whitings are sent to market, salted, and dried, under various names.—Another species of W., COUCH'S W. (*M. albus*), is sometimes taken on the British coasts. It is more abundant in the Mediterranean. It is more slender than the Common W., and the under jaw is a little longer than the upper. The Coal-fish (q. v.) and the Pollack (q. v.) also belong to the genus *Merlangus*.

WHITING is an impure carbonate of lime, prepared by grinding and then washing chalk, so as to separate the coarser particles from the finer ones, which are collected in masses and dried. It is extensively used for size-painting, and as an article of household economy, for cleaning plate; and on emergency, may be employed as an antidote (in suspension in milk) in cases of poisoning with oxalic, or one of the mineral acids.

WHI'TLOW, or PARONY'CHIA, is a painful inflammatory affection of the phalanges of the fingers, almost always proceeding to suppuration. There are several varieties of this affection, according to the texture primarily attacked; thus, it may be situated in the skin, the cellular (or connective) tissue beneath the skin or under the nail, the tendons or tendinous sheaths running along the fingers, or the periosteum. If the skin be the seat of inflammation, vesicles appear, which soon discharge pus, after which relief is rapidly afforded. Such cases require little care or attention, and give rise to hardly any constitutional disturbance. If the cellular tissue is the primary seat of inflammation, there is a painful sen-

sation of tenseness and throbbing of the part, and often considerable febrile disturbance, until the pus can be evacuated. Although this form is painful, no serious mischief is to be apprehended. When, however, the tendons and their sheaths, or the periosteum, are affected, a much more serious form of whitlow is developed, which has been already discussed in the article TENDON. In this form, the suppuration may extend up the arm, and occasion destruction of the joints, and even death.

Whitlow may originate either spontaneously, or after an external injury, such as a prick from a needle, thorn, &c. In the treatment of the milder forms, the finger or thumb should be held for half an hour or longer in water as hot as can be borne, after which lunar caustic should be rubbed freely over the painful surface; and if there are any febrile symptoms, the patient may take a powder, consisting of 4 grains of calomel, 3 of James's Powder, and 3 of Dover's Powder, at bedtime, to be followed in the morning by an ordinary black draught. The hot local baths should be carried on till matter shows itself; and as soon as its presence and seat are determined with certainty, an incision should be made, to admit of its escape. Even if suppuration has not taken place, a free incision into the inflamed part often gives great relief. There is a very pernicious popular idea that the application of cobblers' wax, or some other stimulating substance, will draw the inflammation to the surface, and bring the whitlow 'to a head.'

WHITMAN, WALT, an American poet of singular originality, audacity, and eccentricity, was born at West Hills, Suffolk Co., N. Y., in 1819, and educated at the public schools of Brooklyn and New York. Successively printer, schoolmaster, journalist, and carpenter, he acted as a volunteer nurse during the Civil War. From 1865 till 1874 he held a government clerkship, but latterly he was disabled by paralysis. His chief work *Leaves of Grass*, appeared in 1855. It is a collection of rhapsodical utterances without rhyme, and in some cases without rhythme, describing 'man's physiology complete.' By many these are regarded as poetry of a novel but high type; they certainly do not lack keenness of thought and vigor of expression. Additions were made in all the issues which followed. Other writings, including a diary of hospital and camp experiences, were issued under the title of *Two Rivulets*. An excised edition of *Leaves of Grass*, was prepared in 1868, by W. M. Rossetti.

WHITNEY, ELI, American inventor, was born at Westborough, Massachusetts, December 8, 1765, and was educated at Yale College, where he paid his expenses, partly by school-teaching, partly by mechanical labor. Having graduated in 1792, he went to Georgia as a teacher; but finding a generous patron in the widow of General Greene, of the Revolutionary army, he resided on her estate, and studied law. The cotton culture at this period, especially that of the best kind, the 'green seed,' was limited by the slow and difficult work of separating the cotton from the seed by hand; but Mrs. Greene told her complaining neighbors that she was sure W. could help them out of their trouble, for he could make anything. At their desire, he set to work under great disadvantages, for he had to make his own tools, and even draw his own wire; but the reports of his success prompted some lawless people to break into his workshop, and steal his machine, and get others made before he could secure a patent. He, however, formed a partnership with one Miller in 1793, and went to Connecticut to manufacture cotton gins; but the lawsuits in defence of his rights took all his profits, and 50,000 dollars voted him by the state of South Carolina. Finally, in 1798, he got a government contract for the manufacture of firearms, and was the first to effect the division of labor, by which each part was made separately. He made a fortune by this manufacture, carried out with ingenious machinery at Whitneyville, Connecticut; while he had but barren honor from the gin, one of the most important of the whole series of inventions connected with the cotton manufacture. He died at New Haven, January 8, 1825. See COTTON.

WHI'TSTABLE, a long, straggling, maritime village in Kent, on the south shore of the mouth of the Thames, at the mouth of the Swale, 6 miles north-north-west of Canterbury, with which it is connected by railway. It is noteworthy chiefly because some of the largest artificial oyster-beds lie off the coast, which are regularly farmed by different companies and proprietors. There are breweries, rope-works, copperas-works, and boat-building-yards. Some Roman pottery has been found among the oyster beds, indicating that probably a Roman station existed here. Pop. (1871) 5481.

WHI'TSUNDAY, in Scotland, is one of the usual terms for regulating the letting of houses and farms. It was formerly movable, but was fixed in 1690 to mean the 15th May. In many respects, local usage overrules the statute. Thus, in Edinburgh, the term of entry to a house was the 25th May until 1881, when by an Act it was fixed for the 28th; but rents are payable on the 15th.

WHI'TSUNTIDE ('White-Sunday-tide'), the English name of the season of Pentecost (q. v.), is so called from the white garments anciently worn by the newly-baptized catechumens, to whom that sacrament was usually administered on the vigil of Pentecost. The name 'Whitsuntide' comprehends the entire octave or the week which follows Pentecost Sunday; but the word is more strictly applied to the Sunday, Monday, and Tuesday of that week. The two latter days, down to a very recent date, were observed in the Roman Catholic Church as holidays of strict obligation. Many festive observances were anciently practised in connection with the Whitsuntide holidays, which in England and other Protestant countries still subsist, having outlived the religious association out of which they originated.

WHITTIER, JOHN GREENLEAF, American author and poet, was born at Haverhill, Massachusetts, December 1807, in the Society of Friends. He worked on a farm and at shoemaking in his boyhood; but at the age of 18 he studied for two years at a local academy. He became editor in succession of several New England newspapers, returned again to his farm, and in 1835 was elected to the Massachusetts legislature. Next year he became secretary of the Anti-slavery Society, and editor of a paper in that cause. In 1840 he settled at Amesbury, Massachusetts, but was still connected with an anti-slavery newspaper, the *National Era*. Among his prose works are *Legends of New England* and *Literary Recreations*. His poems include *Ballads* (1838), *Songs of Labor* (1850), *In War Time* (1863), *Mabel Martin* (1874), a *Centennial Hymn* (1876). A complete edition of his poems was published in 1876. These poems have that rugged picturesqueness, and correspondence of sound to sense, which secure wide circulation.

WHITTINGTON, RICHARD. As the existence of this remarkable man is by many supposed to be wholly mythical, it has been thought not out of place here to state briefly the few authentic facts of his life. W. was descended from a good Gloucestershire family, and was born probably about 1360, the younger son of Sir William Whittington, who possessed the estate of Pauntley in that county. His father died not long after W. was born, and Richard, who had no fortune, set out for London, to endeavor to make one by means of trade. That he left London on account of ill-usage, but was induced to return by his interpretation of the friendly sound of Bow Bells, and that he afterwards made his living through the instrumentality of a cat, are stories not improbable, but which cannot be well authenticated. He appears, however, to have apprenticed himself to a mercer, and to have rapidly risen in the world. It is not known at what date he set up for himself, but we find him a member of the Mercer's Company in 1392, in which year he was elected an alderman of the city, and in the following year was appointed sheriff. In 1398, W. was elected Lord Mayor of London; was again chosen to fill that office in 1406; was elected member of parliament for the city in 1416; and in 1419, for the third time filled the office of Mayor. These statements accord with the popular story of W.'s having been 'thrice Lord Mayor of London,' although some antiquaries doubt if he filled that office oftener than twice. W., on account of various services rendered to Henry V., received from that sovereign the honor of knighthood. We are not informed of the date of W.'s marriage; but from various authentic sources we learn that his wife's name was Alice, daughter of Sir Hugh Fitzwarren. She appears to have died several years before her husband, and to have left no issue. W. died in the spring of 1423, aged about 63 years. There can be no doubt that W. was diligent and exceedingly prosperous in business, upright and liberal in character—'a virtuous and godly man, full of good works (and those famous)'—and in many respects considerably in advance of his time. His liberality appears to have been unbounded. At his death, he left the bulk of his property to be laid out in purposes of charity, and in completing those works which had been commenced under his own superintendence. For further details concerning the life of this remarkable man, we refer the reader to the Rev. Samuel Lysons's *Model Merchant of the Middle Ages* (Lond. 1860), an admirable and judicious biography of W.; also to various volumes of *Notes and Queries*.

WHI'TTLESEY, or WHITTLESEA, a decaying village and market-town in Cambridgeshire, 5 miles east of Peterborough. The population in and about W. are mostly employed in agricultural pursuits and in brickmaking. *Whittlesea-mere*, a shallow lake, which formerly existed in the north of Huntingdonshire, 4 miles south-west of W., was 2 miles in length by 1 in breadth, and abounded in fish, water-fowl, &c., is now drained and laid out in fenlands, which are under cultivation. W. is connected by a branch with the Great Northern and Great Eastern Railways. The population, in 1871, was 4297; (1881) 3681.

WHO'RTLEBERRY (*Vaccinium*), a genus of small shrubs, of the natural order *Vacciniaceæ*, having a 4—5-toothed calyx, a 4—5.

cleft bell-shaped or urceolate corolla, with the limb bent back, 8 or 10 stamens, with two-horned anthers, and a 4—5-celled many-seeded berry. The species are numerous, mostly natives of the northern parts of the world, with evergreen or deciduous, more or less ovate leaves.—The COMMON W., or BILBERRY (*V. myrtillus*), called in Scotland the *Blaeberry*, is very common in Britain, and in the middle and north of Europe. It is found also in Iceland and in the northern regions of North America. It delights in dry situations, but is often found in woods, and often on very elevated mountains. It varies from a few inches to almost two feet in height, and has ovate deciduous leaves, and dark purple berries. A variety occurs, but rarely, with white berries. The berries are very sweet and agreeable, and are much used for making jelly. A kind of spiritnous liquor is also made from them in Germany.—The BOG W., or GREAT BILBERRY (*V. uliginosum*), is common in the northern parts of Britain, and in the north of Europe and Asia. It is said to cover extensive tracts in Greenland. It grows in marshy situations, and is a taller plant than the Common Whortleberry. It has deciduous, obovate, entire leaves, and a fruit larger than the Common W., and inferior to it in flavor. The fruit is said to cause giddiness when eaten in large quantity. An intoxicating liquor is made from it in Sweden and in Siberia.



Whortleberry (*Vaccinium myrtillus*).

The only other British species is the RED W. (*V. Vitis Idæa*), which is often called *Cranberry*, because of the similarity of its acid fruit to the Cranberry (q. v.). It is a native of the north of Europe, Asia, and America, and is plentiful in some parts of Britain. Its fruit is much esteemed for preserves, and is used in the same way as the cranberry. Large quantities are sent to the south of Europe from the shores of the Gulf of Bothnia. The plant is a pretty dwarf shrub, with obovate evergreen leaves, and racemes of flowers. *V. buxifolium* is generally regarded as a mere American variety of it.—Many species of *Vaccinium* are in occasional cultivation as ornamental shrubs, and the fruit of most of them is agreeable, although in general it wants acidity. Their more general cultivation has perhaps been prevented by the prevalent notion that they require a peat soil, but they succeed on other soils also. Most of them are North American, and the fruit of some of them is often brought to market in North American towns.—The BLACK W., or HUCKLEBERRY (*V. angustifolium* or *Gaylussacia angustifolia*), is a shrub about two feet high, much branched and erect, with deciduous oval leaves. The berries are of a shining black color, and sweet. It is widely diffused from Canada to Georgia. The BLUE TANGLE-BERRY (*V. frondosum*, or *Gaylussacia frondosa*), is a rather larger and more spreading shrub, which grows near lakes and springs. The fruit is slightly acid.—The BEAN W. (*V. ursinum*, or *Gaylussacia ursina*) is found on the mountains of North Carolina; the BOX-LEAVED W. (*V. brachycerum*, or *Gaylussacia brachycera*) in Pennsylvania and Virginia. There are other North American species, as *V. Canadense*, *V. humifusum*, and *V. parvifolium*, humble evergreen shrubs. Several species are natives of Mexico. *V. arctostaphylos* is a native of the coast of the Black Sea; and *V. padifolium* is a native of Mount Caucasus and of Madeira, on the loftiest parts of which island it forms impenetrable thickets, growing from six to ten feet high.

WHY'DAW, or WHIDAW, a maritime province of Dahomey (q. v.), on the Bight of Benin. It is populous and very fertile, and exports palm-oil, gold-dust, ivory, and many slaves.—The town of W. is the principal seaport of Dahomey, a decaying place, owing to the suppression of the slave-trade. It is still, however, the principal seaport of the kingdom. Pop. formerly 50,000, now under 12,000. It is situated about a mile and a half from the sea, close to a lagoon and a swamp, between which and the sea a sandy neck intervenes. Into the lagoon flow several rivers, known to slave-traders.

WHYDAW BIRD, WHYDAW FINCH, or WIDOW BIRD (*Vidua*), a genus of birds of the family of Weaver-birds (q. v.), having long wings, and a boat-shaped tail, the two middle feathers of the tail of the males excessively lengthened during the breeding-season. The name is derived from the country of Whydaw in Western Africa, and Widow Bird is a mere corruption of it, which, however, has given to the genus its name *Vidua* (Lat. widow), regarded as appropriate, because the long tail of the male drops off after the breeding-season, and also because of the general dark color of the plumage. The species are natives of the tropical parts of Africa and the south-east of Asia. They are frequently brought to Britain as cage-birds, both on account of their plumage and the sweetness of their song. The best known species (*V. paradisea*) is a small bird, about the size of a canary, with black and brownish-black plumage, with a broad collar of orange-rufous color, and breast of somewhat similar color; two feathers of the tail in the male very broadly webbed in the breeding season, and ending in a hair-like shaft, two feathers very much elongated, sometimes a foot in length, and about three-quarters of an inch in breadth.

WICHERN, JOH. HEINRICH, superintendent of the Rauhes Haus (q. v.), near Hamburg, and known by his exertions in the affairs of the German Home Mission, was born at Hamburg on the 21st April 1808. He attended the Gymnasium of his native town, and then studied theology at Gottingen and Berlin. Shortly after passing his examinations at Hamburg, he directed himself to practical usefulness, visited the poor and the wretched in the courts and lanes of the town, and undertook the direction of a Free Sunday School for poor children, in which he soon gathered round him from 400 to 500 scholars, instructed by 40 voluntary male and female teachers. At this time, W. declined the offer of a charge in the neighborhood of Hamburg, as he already entertained the idea of an institution such as the Rauhes Haus, which he opened in 1833. From about 1840, W. was much engaged with undertakings of a similar kind in Germany, to which his mother-institution gave rise. The example was soon followed by France on a great scale (Mettray, near Tours), then by England, Holland, and other countries. It was chiefly through the instigation of W., that at the first Protestant Ecclesiastical Assembly held at Wittenberg in 1848, for the purpose of concerting united action, a central Home Mission Committee was appointed, under which title W. had formed the idea of comprehending all exertions on behalf of the poor, the miserable, and the morally and religiously lost. This Home Mission has exerted a wide and beneficial influence on the north of Germany; and as a member of the committee, W. found in it an extended field for his exertions. Traveling through all parts of Germany, W. was the means, by his exhortations, of founding all sorts of institutions and societies for education and the care of the sick, of the poor, and of prisoners. On his return from a visit to England in 1851, the Prussian government commissioned him to inspect all the houses of correction and prisons, to the general supervision of which he was appointed in 1858. Prevented by this constant practical usefulness, he has published but little. In his *Home Mission of the German Evangelical Church* (Hamburg, 1849), he explains his views of Christian charity, and its relation to the ecclesiastical and social questions of the day. Since 1844, he has published his *Fliegende Blätter* (Fugitive Leaves), which contain parts of his discourses at the ecclesiastical diets. In 1851, W. received from the university of Halle the degree of D.D.

WICK, a royal, parliamentary, and municipal burgh and seaport, capital of Caithness-shire, stands on both sides of Wick Water, at the mouth of that stream, and at the head of an inlet called Wick Bay, 16 miles south-south-west of Duncansby Head, and 20 miles east-south-east of Thurso. The parliamentary boundaries include the royal burgh, containing (1871) 1767 inhabitants, which, with the suburbs of Louisburgh and Boathaven, containing 1000 more, lies on the north side of the river and bay, and Pulteney-town on the south side, pop. over 5000—the total pop. of the parliamentary burgh being, in 1881, 8026. Pulteney-town, a settlement of the British Fisheries Society, is a flourishing town, managed by Improvement Commissioners. The bay is about a mile long by half a mile broad, exposed to frequent storms from east and north-east. There is an excellent tidal harbor of considerable capacity, the property of the said society. The society some years ago undertook the construction of a breakwater in deep water, and spent large sums upon it. Considerable progress was made with the work; but a series of storms destroyed the greater part of it, and the completion of it seems now to be abandoned. The institutions within the parliamentary burgh comprise a county court-house and prison, nine churches and chapels, a town-hall, the Pulteney-town Academy, and a chamber of commerce. There are two weekly newspapers. W. is the great center of the herring-fishing in Scotland. Everything in the town is subservient to the herring-fishery; and the trades—chiefly barrel-making, boat-building, and rope-making—are directly supported by it. A railway connecting W. with the south was opened in 1874. In 1883, government agreed to assist W. in the costly work of improving and extending the harbor. In 1880, the number of herring-boats was about 600; and during the same year, 1263 vessels of 149,478 tons, entered, and 1241, of 139,956 tons cleared the port.

WICK, the material used for the center of candles and lamps, which, from its porous nature, draws up the oil by capillary attraction in such quantities as to burn easily. Usually, wicks are made of cotton, but formerly flax, hemp, and rushes were used.

For ordinary candles, the wick consists of a bundle of cotton thread, lying parallel with each other; but for wax, spermaceti, paraffin, stearin, &c., they are usually of twisted or plaited cotton. Very ingenious contrivances have been applied to the manufacture of candle-wicks, to prevent the necessity of snuffing. See CANDLE.

WI'CKLOW, a maritime county of the province of Leinster, Ireland, is bounded on the N. by the county of Dublin, E. by the Irish Channel, S. by the county of Wexford, and W. and S.-W. by the counties of Carlow and Kildare. Its greatest length is 40 miles, and greatest breadth 33; the total area being 781 sq. m., or 500,178 acres, of which 118,000 are under tillage, 249,200 pasture, 19,500 in plantations, 112,300 towns, waste, &c., and 1090 under water. Pop. (1851) 92,978; (1871) 78,697; (1881) 73,553, of whom 58,571 were Roman Catholics, 13,722 Protestant Episcopalians, and the rest Protestants of other denominations. The coast-line stretches in a southerly direction about 39 m., is in many parts precipitous, and being, moreover, obstructed by sandbanks, is very dangerous for shipping. The surface ascends in some parts most abruptly from the sea, and a large portion is mountainous and unproductive. The Wicklow Mountains, however, form rather a group than a range, and on the western and north-western side decline less precipitously towards the central plain. The most elevated point is Lugnaquilla, which is 3039 feet above the level of the sea. Several other peaks approach this elevation, and the glens which lie between the several mountains or groups are exceedingly picturesque, especially Glendalough, Glendalure, Imail, the Glen of the Downs, and Avoca, the scene of Moore's well-known Irish melody, *The Meeting of the Waters*. The valleys are, for the most part, of limited extent; but some plains of considerable size lie upon the eastern and southern shore. The lakes, although strikingly beautiful, are few in number, and of small size; and the rivers, some of which drain the eastern, and others the western slope are little more than mountain streams, at least so far as their course lies within the limits of this county.

The Liffey and Slaney rise in W., but do not reach any considerable volume until after they have issued from it. The great central group of mountains is a mass of granite, which protrudes through mica and clay slate, to which latter formation the minor elevations both on the eastern and the western side generally belong. The granitic protrusion, which is one of the most remarkable and best defined in the kingdom, falls away on the east side towards the sea, and on the west, towards the great central limestone. The minerals of W. are numerous and varied in character. In the granite and mica-slate are found galena, green and white lead ore, and copper pyrites. From the clay-slate tract are obtained gold, silver, copper, iron, lead, zinc, tin, tungsten, manganese, arsenic, and antimony. The quantity of gold found is very small. Silver is found in combination with lead, which is raised with great success and profit at Glenmalure. The copper mines also are very productive; and of late years, the utilization of the sulphur, which was formerly wasted, has added largely to the profit of the mining operations.

The climate resembles that of Wexford (q. v.). The soil is very various in character. In the mountains, it is thin and poor, but generally dry, although there is a considerable proportion of bog. In the valleys and level districts, the subsoil is generally gravel, and the soil is for the most part either dry, or, even in the boggy districts, susceptible of drainage. On the whole, in the lowlands, the soil is moderately fertile; but there is little cultivation of wheat, the chief agricultural pursuits being dairy-farming and grazing; and the culture, on a limited scale, of barley, oats, turnips, and potatoes. In 1880, the acreage under crops was 105,181, of which more than one-half—viz., 58,312—was under meadow and clover; and 24,629 were under oats. In 1880, the number of cattle was 78,735; sheep (of which a small breed prevails in this county), 198,687; horses, 12,056; and pigs, 15,948.

The total annual value of property in W., under the Valuation Act, was £272,380 in 1874. The schools, in 1880, numbered 101, with 11,998 pupils. Throughout the greater part of the county, the occupations of the people are purely agricultural. The fisheries are almost wholly neglected; and the manufacture of flannels, once extensive, is now nearly extinct. There is a large number of villas, with extensive and highly cultivated parks, especially in the picturesque district which lies between Bray and Wicklow. The county is divided into eight baronies. The principal towns are Wicklow (q. v.), the capital, Arklow, Baltinglass, Shillelagh, Rathdrum, Bray, and Newtown-Mount-Kennedy. W. returns two members to the imperial parliament.—W. is described by Ptolemy as the territory of the Cauci, and the names of the rivers mentioned by him are still traceable in their modern appellations. At the invasion, the greater part of the lands of W. were granted to Maurice Fitzgerald, and W. was included by John in the shire of Dublin. Generally speaking, however, the authority of the English in W. was little more than nominal; the territory being under the command of the chief of the O'Byrne. A vigorous effort was made by the Lord-deputy, Sir Arthur Chichester, to establish the king's authority in W., and in 1605 it was erected into a separate county; but again, in 1641, the population joined in the general uprising. From the date of the settlement, however, they were effectually held in subjection. During the rebellion of 1798, W. was the scene of more than one conflict, and the peasantry, in some districts, suffered severely from the vindictive character of the repressive measures adopted by the ascendant party.

W. abounds with antiquities of the highest interest. Many tumuli, raths, cromlechs, and other Celtic remains are preserved; and there are very many ecclesiastical remains of almost every period of Irish Christian architecture; those of Glendalough, which include a round tower, are especially interesting.

WICKLOW, a seaport, capital of the above county, is situated at the mouth of the river Vartrey, N. lat. 52° 58′, W. long. 6° 3′, 32 miles south-south-east from Dublin, with which city it is connected by the Wicklow, Wexford, and Waterford Railway. The pop. in 1881 was 3391, of whom above 2000 were Catholics, about 600 Protestant Episcopalians, and the rest of other denominations. It is an assize town, the smallest in Ireland. The municipality is administered by 21 town commissioners; but although it is a seaport the export trade is extremely small; nor are the fisheries of much value. The principal exports are the products of the mining operations and the agricultural produce of the district. The streets are narrow and ill-built, nor is there any public building deserving of notice.

WICLIFFE, JOHN DE, the greatest of all the 'Reformers before the Reformation,' was born in 1324, and is supposed to have been a native of the parish of the same name, near the town of Richmond in Yorkshire. He studied at Oxford; but of his early university career nothing is known.

W. first emerges into public notice in 1361, when his name appears as master of Balliol Hall—as Balliol College was then called. In May of the same year he was instituted to the rectory of Fylingham in Lincolnshire, and shortly after resigned his mastership and went to reside at his rectory. About 1363 he took his degree, and began to read lectures on divinity at Oxford, in which his anti-Romish views were first expounded. In 1368, he exchanged the rectory of Fylingham for the living of Ludgershall, in Bucks; and in 1374, was presented to the parish of Lutterworth, of which he remained priest till his death.

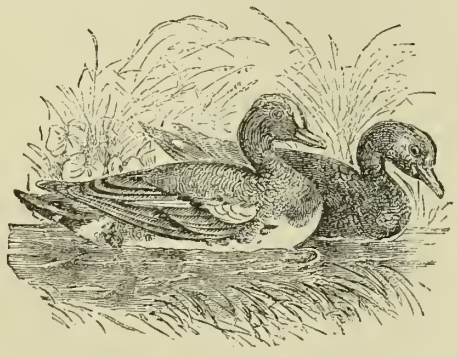
In the great struggle maintained by Edward III. and his parliament against the pretensions of the papacy, regarding the exaction of certain tribute-money which had been granted by King John in acknowledgment of the fealty of the kingdom to the Roman see, W., who had been advanced to be one of the king's chaplains, was called upon to reply to a defence of the papal claim, which had been anonymously sent abroad. This he did publicly at Oxford in an ingenious and powerful manner, and thus early showed his antipathy to the pretensions of Rome. A clear evidence of his growing reputation is furnished by his appointment in 1374, as second in a commission sent to Bruges to confer with the papal legate as to certain abuses on the part of the papacy complained of by the English parliament. It was probably on his return from this mission, that W. was promoted to a prebend in the diocese of Worcester, and at the same time presented to the rectory of Lutterworth in Leicestershire. Here he labored with great zeal, preaching not only on Sundays, but on the several festivals of the Church, and showing himself 'a most exemplary and unwearied pastor.' Here also he began at length to speak his mind as to the papacy. The insight into papal doings which he had received at Bruges seems to have confirmed suspicions previously forming in his mind, and he is said, soon after his return to England, to have styled the pope 'Antichrist,' 'the proud worldly Priest of Rome, the most cursed of Clippers and Pursekervers' (cut-purses). Then began in real earnest his troubles with the hierarchy. In the beginning of 1378, he was summoned to a meeting of Convocation, to be examined for his opinions. He obeyed the summons, but he appeared attended by his friend John of Gaunt and others. A great tumult ensued, the London citizens bursting into the chapel, and frightening the synod of clergy, who were ordered to sist proceedings. The papal authority was then invoked against him, and Gregory VI. issued several bulls, three addressed to the Archbishop of Canterbury and other bishops, one to the king, and one to the university of Oxford, commanding an inquest into W.'s erroneous doctrines. W. was accordingly again summoned before the prelates at Lambeth; but on this occasion he escaped with an injunction to refrain from preaching the obnoxious doctrines.

This only served to make W. a more thorough Reformer. He now entered upon his great work of translating the Scriptures, or rather, for the most part, of revising existing translations, and circulating them among the common people. He had a great retinue of poor preachers. He also challenged the doctrine of transubstantiation; though he always believed in some kind of real pres-

ence. Many of the people, the burghers and the middle class, heard him gladly, and matters seemed tending to an open rupture with the papacy. But the times were not as yet ripe for this. Many who otherwise sympathized with the Reformer were afraid of his views about transubstantiation. He was especially summoned to answer on this head, first, before a synod at the Greyfriars, London, and finally before Convocation in 1382. He appeared, and defended himself with great subtlety and power. His defence was unavailing. Twenty-four 'erroneous' statements were picked out of his works, which were in consequence condemned and ordered to be burned. He was banished from Oxford, but was allowed to retire to his parish of Lutterworth. His health was already shattered by hard work and many anxieties, and on the last Sunday of the year 1384, he was struck down by paralysis while conducting public worship, and two days afterwards expired. W. appears to have been a man of simple faith and of earnest and manly courage. He made a strong impression upon his age; an impression there is reason to think not entirely effaced even to the time of the Reformation. The Lollards, as his disciples were called, were to be found not only among the poor, but in the church, the castle, and even on the throne. Political mischances, however, overtook the party in the following century, and only a few traces of it survived here and there when the movement of the 16th c. began. See HUSS.—T. Arnold published 3 vols. of W.'s select works in 1871; and F. D. Matthew his hitherto unprinted *English Works* in 1881. The *Trialogus* was edited by Lechler in 1869; see Lechler's *Johann von W.* (1873), trans. (1878); by Prof. Lorimer; and *Wyclif's Place in History*, by Montagu Burrows (1882).

WI'DDIN, or VIDIN, a town in the recently constituted principality of Bulgaria, on the right bank of the Danube, 140 miles from Belgrade. For centuries, W. has been a strong post in all the contests between the Turks and their northern neighbors, and it was called by the Turks the Virgin Fort, from its never having been taken. W. has thriving industries and trade. The Berlin Congress of 1878, which erected Bulgaria into a principality, determined that the extensive fortifications of W. and other Bulgarian fortresses should be demolished. Pop. about 15,000.

WI'DGEON, or WIGEON (*Mareca*), a genus of ducks of the non-oceanic section, with the hind-toe not webbed, having the bill shorter than the head, and of equal width throughout, much rounded at the tip, with a broad strong nail; the lamellæ of the upper mandible prominent; the wings long and pointed; the tail wedge-shaped. The species are pretty numerous, migratory birds, appearing in great flocks in the warmer countries which they visit during the winter. The COMMON W. (*Anas* or *Mareca penelope*) is plentiful in Britain during winter. A few breed in



Widgeon, Male and Female (*Anas penelope*).

the most northern parts of Scotland, but the ordinary breeding-place is in more northern regions. This species is found at some season of the year in almost all parts of Europe, and in Asia, as far south as the north of India. It is found also in North America, along the Atlantic coast. It is known as one of the birds of Japan. Its whole length is about 18 inches. The forehead and top of the head in the male are white, the cheeks and hind-part of the neck reddish chestnut; the upper parts grayish white, crossed with irregular zigzag lines of black; the tail nearly black; the wing-coverts white tipped with black; the primaries dark brown; a green speculum edged with black; the throat, pale rufous; the breast and belly, white. The female is very different, the head and neck rufous brown, speckled with dark brown; the back varied with two shades of brown; darker in the center, and paler in the edges of the feathers. The W. is the most common of all the duck tribe in Lapland, frequenting grassy swamps, lakes, and rivers. Flocks of W. appear in Scotland and England, on lakes and rivers, in winter, and most abundantly in severe winters. They feed during the day time, and chiefly on grass.

The note of the W. is a shrill whistle, whence its French name *Siffleur*, and the English names, *Whew Duck* and *Whewer*. Its flesh is good for the table.—The AMERICAN W. (*Anas* or *Mareca Americana*) is a larger bird than the European W., being about 22 inches long. The upper parts are finely waved transversely with black and reddish brown, the under parts are mostly white, the top of the head is almost white; the wing-coverts white, the greater tipped with black; the speculum green, encircled by black. It breeds chiefly in the northern parts of America, and is common in winter on the coasts of the United States, and in the rice-grounds. Its flesh is highly esteemed. It is known as an occasional, but very rare visitant in the British Islands.

WIDOW (see JUS RELICTÆ, SUCCESSION, MARRIAGE). A widow's right to dower, by the common Law of England, extends to a life estate in one-third of the lands and tenements of which her husband died seised, and which any issue she may have had might by possibility have inherited. The law of dower was considerably altered by a statute 3 and 4 Will IV. c. 105; and in cases where married parties are entitled to real property, their rights are generally regulated by contract. There are certain modes of conveying and devising property so as to prevent dower arising, and a widow's right to dower is also generally prevented by giving her a jointure. A woman loses her dower by a divorce, but not by judicial separation or other misconduct.

WIELAND, CHRISTOPH MARTIN, one of the greatest of German poets, was born 5th September 1733, at Oberholzheim, near Biberach, his father being pastor of that place and afterwards in Biberach itself. The precocity of his powers early excited attention, and when only 12 years of age, he had essayed his poetical talent both in Latin and in German verses. In 1750, W. went to the university of Tübingen to study law, but occupied himself more with the classics, and with recent literature both native and foreign. From Tübingen, he returned to Biberach in 1752. At this time, Klopstock's example had an entraordinary influence on him, so that he gave himself up to a mystical piety, foreign to his nature, which he gives utterance to in the *Empfindunger des Christen* (The Christian's Experiences.) While in this mood, an invitation from Bodmer led him to give up the intention of graduating at Göttinger, and go to Zürich. The number and nature of his productions at this time show the effect which the example of Bodmer's desultory way of working was beginning to have upon him. He soon, however, returned to the more congenial field of the literature and life of the Greeks. The lively interest which he took in Frederick the Great, prompted W. to work out the idea of a hero in a great poem, for which purpose he fixed on Cyrus. The first five cantos appeared 1757, and a new edition 1759; but the reception it met with was not very cordial, and consequently it remained unfinished. The beautiful episode from the *Cyropaideia* of Xenophon, *Araspes und Panthea*, appeared about this time and revealed W. as the poet of love. In 1760, he received an appointment in his native town in connection with the law-courts. At this period, he engaged in the arduous task of translating Shakspeare (8 vols., Zür. 1762—1766). However little W., whose mind had been formed after Greek, Roman, and French models, and who was constitutionally inclined to pleasant and easy trifling, was calculated to enter fully into the spirit of Shakspeare, he nevertheless was, for his time, tolerably successful, and opened up the path for his successors.

W. now spent much of his time at Warthausen, near Biberach, the estate of the Count von Stadion, an accomplished and highly intellectual man, but thoroughly a man of the world, and averse to all religious enthusiasm. From the tone of the society he met here, as well as by the course of his reading, W. became imbued with that modern French philosophy which runs through the most of his later writings. In some of these, there is an unmistakable tendency to licentiousness, from which his personal life always remained free; in most of them, however, he has blended the Greek sensibility to outward impressions with the French love of pleasure into a peculiar graceful philosophy of life. The first production which bears the impress of this French-Greek sensuousness was the poetical tale *Nadine*, which he himself calls a creation in Prior's manner. In 1766 and 1767, *Agathon*, a romance in 3 vols. made its appearance, which greatly contributed to establish W.'s fame. His views on the subject of love are most fully and worthily expounded in the didactic poem *Musarion* (1768), a work of singular grace and harmony of treatment, which he himself called a philosophy of the Graces. W. had, in the meanwhile (1765) married a lady of Augsburg, and accepted a call to Erfurt (1769) as Professor of Philosophy in the university. He terminated what may be called the erotic period of his literary career with the *Verklagter Amor* (The Impeachment of Love), wherein he, in a manner, vindicated the kind of poetry to which he had till then devoted himself.

A period of delightful leisure and undisturbed work began for W. when the widowed Duchess Anna Amalie invited him to Weimar (1772), as tutor to her two sons, with the status of Hofrath, and a salary of 1000 thalers, which was continued to him after his duties as tutor ceased. W. was entirely in his own pla

in the society of the distinguished men (such as Musäus and Von Einsiedel) already gathered round this court; and his genius began to soar more courageously. He wrote his vaudeville, *Die Wahl des Hercules* (The Choice of Hercules), and the lyrical drama, *Alceste* (1773), which were received with great approbation.

Of greater importance for German literature was the publication of the *German Mercury*, a monthly periodical, to which W., till towards the close of his life, devoted himself with the greatest earnestness, and which he made the vehicle for disseminating his æsthetical views. On the whole, however, his criticism was neither genuine nor very deep, and suffered from that conventional narrowness which was then dominant in France. His letters on his *Alceste* in the *Mercury* (September 1773) contain sufficient traces of this tendency, at which Goethe and Herder were so much offended. The former wrote in relation to it the satire *Götter, Heldeu, und Wieland* (Gods, Heroes, and Wieland). W. answered the attack with pleasantry and with his characteristic good nature. Shortly afterwards, Goethe himself joined the circle at Weimar, the soul of which was the Duchess-mother, Anna Amalie. W.'s literary powers developed themselves here more and more; and for more than 20 years, almost nothing of any importance occurred, either in the political or literary world, in which he did not take a more or less active part. His literary productiveness showed itself chiefly in the *Geschichte der Abderiten* (History of the Abderites, 1773), a charming work, depicting the follies of small communities, in which the muse of Wisdom is disguised under the garb of the Satyr. This was followed by a series of tales and stories, partly imitations of foreign originals, and partly of his own invention. *Oberon*, a romantic heroic poem, the most perfect and enduring of his greater works, appeared 1789 (last ed. Leip. 1853). It was followed by the translation of Horace (*Letters*, 1782; *Satires*, 1786) and of Lucian (1788).

W. pronounced the *Epistles* of Horace with the commentaries to be those of his works on which he put the greatest value. He has given us a complete sketch of his conception of the Greek world in the *Aristippe* (1800). A collected edition of W.'s works up to 1802, in 36 vols., with 6 supplementary vols. in large quarto, and large and small octavo (new edition with the poet's life, 53 vols., 1828; 36 vols., 1839), was got up by the bookseller Göschen in Leipzig. From the proceeds, W. was enabled to buy the estate of Osmannstädt, near Weimar. From 1798 to 1803, he lived here in the circle of his numerous family (his wife, in the course of 20 years, had brought him 14 children), and devoted the greatest part of his time to literary labors, among which his *Attic Museum* (1796–1804) and the *Neue Attic Museum* (1805—1809) were not the least. In these publications, he strove to make his countrymen familiar with Greek poetry, philosophy, and rhetoric. In 1803, he sold his estate, and returned to Weimar, where he very soon became intimate with Schiller. Here he lived to see the day of the battle of Jena, the death of the Duchess Amelie, and also of Herder and Schiller. The marks of honor which he received from Alexander and Napoleon, and his admission to the French 'Institut,' helped to alleviate his many griefs, among which one of the greatest was the death of his wife, 1801, with whom he had lived for so many years in great happiness. His own death took place 20th January, 1813.

W. had neither the spirit of a reformer like Klopstock and Lessing, nor did he attain the poetical greatness of Goethe or Schiller; nevertheless, he did great service to German literature, which has not always been sufficiently recognized. He gave to German poetry, as it was rising into true national importance, the still wanting grace and harmony of expression and versification, in which respect Goethe learned much from him.

The poetic handling of medieval chivalry was an entirely new creation of his, and thus the school of romantic poetry is indebted to him for its origin. He also introduced poetical materials from England, France, Spain, and Italy, which were not without influence. In all his appropriations W. exercised that fine discernment which seizes upon what is universally human, so that he nowhere appears as a blind imitator. His criticism, too, with all its shallowness, contributed much to the diffusion of general culture. —Compare, besides Gruber's *Biographie Wieland's* (4 vols., Leip. 1827; vols. 50—53 of the *Works*), *Wieland's ausgewählte Briefe* (4 vols., Zür. 1815), *Auswahl denkwürdiger Briefe* (2 vols., Wien, 1815), and *Briefe an Sophie Laroche*, (Berl. 1820); also Löbell's *C. F. Wieland* (1858).

WIELI'CZKA, a small town of Austrian Galicia, 10 miles directly east-south-east of Cracow, and the same by railway. It is remarkable for its salt-mines, in which the majority of its inhabitants (3060 in number in 1880) are employed. The mines were discovered in 1250, and have been continuously worked since that time; though some assert that there is abundant evidence to prove that they have been worked since the 9th century. The town itself is entirely undermined by the excavations, which extend upwards of 9590 feet from east to west, 3600 feet from north to south, and are 1780 feet in depth. The mines extend to four stories or 'fields,' one below the other. In the second story, the visitor is rowed across a salt-lake, and when he has reached and is exploring the third story, he is informed that the lake he lately crossed is now right above his head. The stories are simply large chambers excavated in one enormous mass of rock-salt, of great purity, and apparently of inexhaustible extent. In one of the chambers, the miners have scooped out a Gothic chapel, and skillfully carved a number of statues and obelisks, from the solid rock-salt. The mines produce 61,500 tons English per annum.

WIE'SBADEN, chief town in the Prussian district of the same name, in the province of Hesse-Nassau (formerly the independent duchy of Nassau), one of the oldest and most famous of the German watering-places, delightfully situated on the south slopes of Mount Taunus, 26 miles W. of Frankfürt, and 5 miles N.W. of Mainz by railway. The town has been called 'a city of lodging-houses,' and this may be understood from the fact, that during the 'season' the number of the visitors is greater than that of the resident inhabitants. But though almost every house is appropriated to the reception or entertainment of guests, the town is well and regularly built. The *Kursaal* comprises an extensive dining-hall, in which frequently 300 people sit down to dinner, and which also serves as a ball-room, together with good reading-rooms, &c. In the large gardens behind the *Kursaal*, it is the habit of the visitors to sit in the evenings at their numerous small tables, regaling themselves with coffee or ices—the men smoking, the women knitting—and all either chatting or listening to the music played by a band on such occasions. Other buildings are the *Schlösschen* (Little Palace), containing a library of 60,000 vols., and a collection of antiquities, in which are a number of curious Roman *bassi-relievi*, statues, altars, &c. found in the vicinity; the handsome Protestant church, finished in 1860; the superb Greek chapel, built by the Duke of Nassau as a mausoleum, in which repose the remains of his first wife. There are 14 hot springs, all of a high temperature, and numerous bathing-houses throughout the town; but the principal is the *Kochbrunnen* (Boiling-spring), the temperature of which is 156° Fahr. The spring has all the appearance of a boiling caldron, and so copiously does it pour forth its waters, that, though they are used both for drinking and to supply the principal baths in the town, a vast quantity escapes, and runs away through gutters and drains, sending up clouds of vapor in its passage along the streets, and adding to the warmth of the temperature of W. in summer.

Next in heat and volume to the *Kochbrunnen* is the spring that rises in the garden of the *Adler* (Eagle) Hotel, the temperature of which is 134° Fahr. The use of the W. hot-springs is considered highly efficacious in cases of gout, rheumatism, scrofula, and other skin diseases and nervous affections. The waters of these springs are saline, and contain silica and iron. The prosperity of W. is entirely due to its springs; and the beauty of its situation and environment, the agreeable walks and rides, and the never-failing gaiety that prevails during the season, render it one of the most popular of the spas. The season lasts from June to September, and, though the public gaming-tables were abolished in 1872, the number of visitors annually is near 40,000. Pop. (1880) 50,238.

W. is very ancient; its springs are the *Fontes Mattiaci* mentioned by Pliny. The Romans built a station here, and erected a fort on a hill on the north-west side of the town, still known as the Römerberg, and which was garrisoned by the 22d Roman legion. The *Mattiaci*, a subdivision of the German tribe called the *Catti*, allied themselves with the Romans; but in the 3d c., the barbarian Germans rose against the Romans, and destroyed their forts, including Wiesbaden. Urns, tiles, coins, &c. are found abundantly whenever the foundation of a house is dug; and that the Romans appreciated the virtues of the waters is proved by the remains of ancient baths that have been found, and by the votive tablets recording the thanks of Romans who had been restored to health by the waters, still preserved in the museum.

WIG (Lat. *pilus*, the hair; *pilare*, to pluck off the hair; from which was formed *piluccare*, and hence *pilucca*, a head of hair; this was transformed in Ital. into *perruca*, French *perruque*, whence Eng. *periwig*, shortened into *wig*). The use of false hair for concealing baldness, or for the supposed adornment of the head, appears to belong to all ages and countries. There is an Egyptian wig in the British Museum, supposed to be about 4000 years old; and some of the South Sea islanders are said to be skillful wig-makers. Xenophon mentions that Astyages wore an immense wig. Several of the Roman emperors wore wigs, and Lampridius relates that the wig of the Emperor Commodus was highly perfumed, and sprinkled with gold dust. After this, there are no historical traces of the wig till about the end of the 14th c., when wigs made their appearance in France, and hence spread gradually over other European countries. The fashion of wearing wigs set in strong in the reign of Louis XIII. (1610—1643), and for more than a century, no gentleman of fashion could

appear without one. Such was the extravagance in this article of dress, that as much as three guineas an ounce was paid in England for fine qualities of hair, and wigs were made at a cost of £140. It was only towards the end of the 18th c. that the unnaturalness of this ornament appears to have been thought of, and it began to be superseded by the queue with Hair-powder (q. v.). Except by judges and barristers, wigs are now used only in cases of baldness, and then they are made in imitation of nature, which was by no means the case with the wigs of old times.

WI'GAN, a prosperous market and manufacturing town, and municipal and parliamentary borough, in Lancashire, on the Douglas, 15½ miles south-south-east of Preston, and about the same distance from Liverpool on the south-west, and Manchester on the south-east. Originally rather irregularly built, W. has for some years progressed rapidly in the improvement of its streets and buildings. It is well sewered and liberally supplied with water. The parish church of All Saints is an ancient stately edifice, and has recently been almost entirely rebuilt. There are 21 churches and chapels belonging to the Establishment; 9 Roman Catholic, and 21 other dissenting places of worship. W. stands in a coal-field, where cannel coal abounds. Cotton-spinning, the manufacture of calicoes and other cotton goods, checks and home-made linens, are extensively carried on. There are also brass and iron foundries, factories for edge-tools, chemical-works, paper-works, and corn-mills. The river Douglas, and the Leeds and Liverpool Canal, afford facilities for inland navigation. Pop. (1871) 39,110; (1881) 48,196.

WIGHT, Isle of, an island in the English Channel, remarkable for the variety and beauty of its scenery, and the mildness and salubrity of its climate, lies almost centrally, close off the southern coast of England, in which it is partially embayed, and is divided from it by a channel varying from less than 1 mile to more than 6 miles in breadth, known as the *Solent* (q. v.), which spreads out to the east into the broad and safe anchorage of *Spithead* (q. v.) and *St. Helen's Roads*. Its form is remarkably regular, its longer and shorter diameters (22 miles 5 furlongs, and 13¾ miles in length respectively) running almost due east and west, and north and south. Its shape is rhomboidal, and has been compared to a bird with expanded wings or to a turbot. It is 56 miles in circuit, and embraces an area, including its inlets, of 98,320 acres. Pop. (1881) 73,652.

Newport, which returns one member to parliament, the island returning one, is the capital; the other chief towns are *Ryde*, *Cowes*, and *Ventnor* (all described under their separate headings) of which the first and last have sprung up from small villages within the present century. *Yarmouth* is a small decayed town near the western extremity of the island, formerly returning two members, a privilege once also possessed by *Newtown* on the north-west coast, a once important town, now sunk to an insignificant hamlet. On the south-east coast, the delightful health-resorts of *Sandown* and *Shanklin* have lately acquired the size and importance of towns. Railway communication has been opened between Ryde and Ventnor, and between Cowes and Newport. Throughout the island there are good though generally narrow roads, for the most part picturesque and bounded by hedgerows. The chief physical feature of the island, to which it owes its shape and much of its beauty, is a long undulating range of chalk downs, extending, as a kind of backbone from the *Culver Cliffs* on the east, to the *Needles* on the west, rising to its greatest elevation in Mottiston Down, 661 feet (Ashey Down is 424 feet, and Bembridge Down 355 feet) above the sea. The river Medina, rising near the southern extremity of the island, flows north through a gap in this range, expands into a tidal estuary below Newport, and flows into the Solent at Cowes, and divides the island into the hundreds of the East and West Medine. In addition to the central ridge, a second range of chalk downs of greater elevation—St. Boniface Down, 783 feet, Dunnose (Shanklin Down), 771 feet, St. Catherine's, 769 feet—rises at the southern point of the island, and expands into a broad promontory, the south face of which forms the picturesque district known as the *Undercliff*, or 'Back of the Island,' of which Ventnor is the capital. This district owes its remarkable beauty to a series of landslips on a gigantic scale, of pre-historic date, which have laid bare a long wall of rugged cliff, below which a succession of sunny terraces, due to the gradual subsidence of the strata, slope gently down to the sea. The whole of this part of the island is completely sheltered from the colder winds, and enjoys a well-merited reputation as a residence for invalids suffering from consumption or any disease of the respiratory organs. Its remarkable healthiness is attested by the returns of the registrar-general, which prove that the death-rate of the district is absolutely the lowest in the kingdom; while the mildness of its climate is evidenced by the luxuriance of the myrtles, fuchsias, sweet-scented verbenas, and other exotics, which live through the winter without protection.

In a geological point of view, the Isle of W. is most interesting. The great variety of strata displayed within so small an area, under circumstances so favorable for examination, renders it one of the best available localities for the young observer. The north side of the island presents a succession of Tertiary or Eocene strata, including beds of fresh-water lime-stone, which have been extensively worked for building-stone for many centuries, and based on beds of London and Plastic Clay. In Alum Bay, at the west extremity of the island, the rapid succession of vertical layers of sand and clays of bright and varied hues, produces a singular and beautiful effect. The central ridge or backbone consists of strata of chalk imbedding layers of flints, and the underlying formations in an almost vertica position. Isolated masses of chalk that, in consequence of their superior hardness, have survived the marine and atmospheric waste, form the well-known *Needles*, at the west opening of the Solent, and the picturesque rocks of Freshwater Bay. The downs at the south of the island belong to the same formation, but here the strata have been undisturbed, and are nearly horizontal. The cliffs of the Undercliff are of the Upper Greensand, or Firestone, underlying the chalk. Below this comes the Gault, or Blue Marl. To the action of the land-springs upon this unctuous formation, the land-slips to which the Back of the Island owes its beauty are due. The Lower Greensand succeeds the gault, occupying the greater part of the area between the north and south chalk downs. This forms excellent corn-land, and presents a wall of cliff to the sea, diversified with many narrow picturesque gorges, locally known as *Chines*, where a small rivulet has eaten away the friable strata. The chief of these are those of Shanklin, Luccombe, Blackgang, and Whale Chine. The freshwater Wealden formation is the lowest visible in the island, and is seen in the cliffs of Brook to the west, and of Redcliff Bay to the east. Bones of the colossal iguanodon and other saurians are found in this formation.

The *soil* of the island is very varied, both in nature and fertility. That of the northern half is, to a considerable extent, a cold stiff clay, more suited for the growth of wood, especially oak, than corn. Of late years, however, much of the woodland has been cleared, and judicious draining operations, in which the late Prince Consort led the way on the royal domain of Osborne (near East Cowes), have produced very beneficial results. Farming is still on the whole somewhat primitive; even on large farms the flail may still be seen in use. The soil of the south half is chiefly a red loam, which is exceedingly productive, especially in crops of barley, and, in the more rich and sheltered lands, of *white* wheat. *Red* wheat is grown in abundance in other parts of the island; while the stiffer clays of the north grow capital crops of oats. The chalk downs afford admirable pasturage for sheep, which are celebrated for the pureness of their wool, chiefly exported to Yorkshire, and which furnish the London market with early lamb. The chief exports are wool, corn, flour, cement stones (septaria), and white glass-house sand. The principal communication between the mainland and the island is by steam-boats plying daily between Portsmouth and Rhyde, at both of which places there are good landing-piers.

The *history* of the Isle of W. presents but comparatively few points of interest. It is supposed, with much probability, to have been the tin mart of the Greek traders mentioned under the name of *Ictis* by Diodorus Siculus. The Romans knew it as *Vecta* or *Vectis*, which is merely the Latinized form of the native name. It was conquered for the Romans by Vespasian in the reign of Claudius (43 A.D.). Cerdic, the founder of the kingdom of Wessex, took the island 530 A.D., and handed it over to his nephews, Stuf and Wihtgar. In 661 A.D., it was reduced by Wulphere of Mercia, and given to Ethelwold, king of Sussex, from whom it was wrested (686 A.D.) by Ceadwalla of Wessex, to whom, under the benign influence of Wilfrid, Archbishop of York, the island owes the introduction of Christianity. During the three centuries preceding the Norman Conquest, it was repeatedly devastated by the Danish pirates, who made it their stronghold, to which they retired with their plunder.

William the Conqueror gave it to his kinsman, Fitz-Osborne; Henry I. transferred it to the family of De Redvers, in whose hands it remained till the reign of Edward I., when it passed by sale to the crown. During the French wars of Edward III. and his successors, the island was repeatedly invaded and pillaged by the French. At the close of the reign of Henry VIII., the armada dispatched by Francis I., under the command of D'Annebault, made several landings on the coast, and inflicted some damage, but were ultimately driven back by the prowess of the islanders. The most interesting event in the history of the island is the imprisonment of Charles I. in the castle of Carisbrooke, after his flight from Hampton Court, from November 23, 1647 to September 15, 1648. Carisbrooke was also the place of the imprisonment of his children, Prince Henry and the Princess Elizabeth, the latter of whom died there, and was buried in Newport Church, where a beautiful monument by Baron Marochetti has been erected to her memory by Queen Victoria.

Among the celebrated natives of the Isle of W. we may notice Dr. Robert Hooke, the experimental philosopher, born at Fresh-

water, 1635; and Dr. Thomas Arnold of Rugby, the regenerator of public-school education, born at East Cowes, 1795.

The antiquities are not numerous. Sepulcinral barrows occur on the downs, and Saxon burial-places have been discovered in several localities. There are the remains of a Roman villa, with a tesselated pavement, at Carisbrooke. The remains of Quarr Abbey, near Ryde, are very scanty. Carisbrooke Castle is a fine ruin, occupying a commanding position. The churches are picturesque, but not remarkable for beauty of architecture. There are but few monumental brasses or other sepulchral memorials of interest.

WI'GTON, a market and small manufacturing town of Cumberland, in the midst of a specially agricultural district, 11½ miles by railway south-west of Carlisle. It carries on manufactures of ginghams and checks. Pop. (1881) 3948.

WI'GTOWN, a county forming the south-west corner of Scotland, is bounded on the W. by the Irish Channel, N. by Ayrshire, E. by the Stewartry of Kirkcudbright and the Solway Firth, and S. by the Irish Sea. Its extent from east to west is computed at from 32 to 34 miles, and from north to south 24 to 28 miles. This county, which constitutes West Galloway, was formed about the year 1341; and is between 54° 38'—55° 4' N. lat., and 4° 16'—5° 6' W. longitude. W. is somewhat irregular in form, being deeply intersected by two arms of the sea, one of which, Loch Ryan, a long narrow inlet, stretches southwards from the north-west corner for fully 9 miles into the county, while Luce Bay on the south makes a wide indentation 18 miles long with an average of 12 wide, the heads of the inlet and bay being only 6 miles apart. The western part of W., known as the *Rhins of Galloway*, thus forms a peninsular whose length (from north to south) is 28 miles, and breadth 1½—6 miles; its northern extremity is Corsewall Point, and its southern the Mull of Galloway, each promontory being provided with a light-house. The south-eastern half of W. is separated from the Stewartry by Wigtown Bay, 15 miles long and 14 wide at its mouth, and between this latter and Luce Bay, W. extends southwards in a blunt triangular form, terminating in Burrow Head. The inhabitants of W. were originally of Celtic origin, and up to the middle of the 16th c., a Celtic dialect was universally spoken; and for a century afterwards, it was in use in the remote districts. W. is irregular in its surface, but its eminences are inferior in height to those of any other county of Scotland—none of them exceeding 500 feet. The soil is varied, and—with the exception of a portion lying along the sea-shore, especially in the south-east, which consists of a rich loam—the quality is mostly inferior. There is a large extent of moss and moor, mostly of a very poor and unproductive nature, judging from the appearance and produce of much of what has been reclaimed. There has, however, been a considerable improvement made of late years in farm-buildings. The climate is rather mild, but moist, the rainfall being comparatively great. There are many dairy establishments in this county, almost exclusively for making cheese similar to the Somersetshire cheddar. The cows are frequently let for hire at from £9 to £12 per cow, the farmer supplying all food, and the dairyman the labor. Most of the cows are of the Ayrshire breed; it is difficult to obtain the pure native breed of cattle; and the Galloway pony, formerly in such vogue, is now hardly to be met with.

The area of W. is over 512 sq. m., or 327,906 acres, of which about three-fifths would be unprofitable to reclaim. The government returns for 1880 give 145,947 acres under all kinds of crops, bare fallow, and grass; under corn crops, 38,719; under green crops, 18,780; clover, sanfoin, and grasses under rotation, 59,622; permanent meadow pasture, 28,339. There were 4068 horses for the use of agriculture; also 40,144 cattle, 126,967 sheep, and 7412 pigs.

Besides numerous small streams, W. contains three rivers of considerable size, the Cree, which forms the eastern boundary, and the Bladnoch—both of which fall into Wigtown Bay—and the Luce, which empties itself into Luce Bay; the former two are navigable for a few miles, and yield salmon and trout. The county also possesses several small fresh-water lochs. In the Rhins of Galloway, on the south-west, is situated the parish of Kirkmaiden, the most southerly point in Scotland—hence 'from Maidenkirk to John o' Groat's.' There were at an early period a considerable number of religious houses in the county; and the church, believed to be the oldest in Scotland, founded by St. Ninian, was built near the site of what is now the village of Whithorn. At the Reformation there were 21 parishes; the number was reduced to 17, but is now 20. The principal towns are Wigtown, Newton-Stewart, Stranraer, and Whithorn. There is no mineral wealth, and little trade or manufacture carried on in W. There is a distillery at Bladnoch, a woollen manufactory at Kirkcowan, and some saw-mills and starch-mills at Stranraer and elsewhere. The mail-coach was first run through W., in 1804, and was only superseded by a railway from Castle Douglas to Port Patrick in 1857. This line is now connected with Dumfries eastward and with Glasgow, by way of Girvan, to the north. The valued rent of W. in 1674 was £5634; the valuation for 1881—1882 was £268,434. Pop. (1881) 38,602; parl. constituency (1881—1882), 1700.

WIGTOWN, a royal, municipal, and parliamentary burgh, market-town, and seaport in the south-west of Scotland, capital of the county of Wigtown or West Galloway, is situated on Wigtown Bay, near the mouth of the Bladnoch Water. It is 40 miles west-south-west of Dumfries, and nearly 150 miles distant by railway from Edinburgh. The parish church was erected in 1852. It is of Gothic architecture, and much superior to the ordinary run of country churches. In the churchyard there are three tombstones in memory of martyrs who suffered in the time of Episcopal persecution. Two of them are old. On the summit of the Windy-hill, the highest ground in the neighborhood of the town, an obelisk of freestone was placed some years ago, in memory of these same martyrs—two of whom, women, are said to have been drowned here. The authenticity of this event, though lately questioned by some, is doubted by very few in the locality where it is said to have happened. A large and very handsome building, which is used as a town-hall and court-house, was erected in 1863. There is no particular trade carried on in the town. At Bladnoch Bridge, however, which is held to be part of the burgh, although nearly three-fourths of a mile distant to the south, there is a distillery of considerable extent; also an iron foundry and a coach-building establishment. W. unites with Whithorn, Stranraer, and New Galloway in electing a member to the House of Commons. Pop. of W. (1881) 1725. In 1880, 639 vessels, of 39,658 tons, entered; and 654, of 39,049 tons, cleared the port.

WIKANA, the *Wacaka des Indes* of the French, a dietetic preparation of cacao much used in France for invalids. It consists of roasted cacao nibs and sugar, in the proportion of three parts of the latter to one of the former, well mixed together, and flavored with cinnamon, vanilla, ambergris, and musk.

WILBERFORCE, WILLIAM, was born at Hull, on 24th August 1759. His father was a wealthy merchant, descended from an old family, proprietors of Wilberfoss, in the East Riding of York. W., at the age of 9, on his father's death, was sent to school at Wimbledon, where, under the care of a pious aunt, he ran the risk of becoming a Methodist. But his mother did not approve of a serious education, and removed him to a Yorkshire school, where the religious impressions he had received were soon dissipated by a life of gaiety. His constitution was delicate, but he was quick and spirited, and fond of society, in which his lively conversation and musical talent made him a great favorite. While at school, he addressed a letter to a York paper 'in condemnation of the odious traffic in human flesh,' a subject he seems never afterwards to have lost sight of. At 17, he entered St. John's College, Cambridge, and in due time he passed his examinations with credit. He came, on attaining his majority, into possession of a large fortune, and determined to enter parliament. In 1780, he was returned for Hull. He had known Mr. Pitt when at Cambridge, and in London they became inseparable friends. W., in parliament, however, remained independent of party. The elevation of Mr. Pitt to the premiership gave him an opportunity of taking office, but he declined to do so. He rendered, however, efficient service to his friend. In March 1784, on the eve of a dissolution, he spoke at a county meeting in York, called to vote an address against the Coalition Ministry; and such was the effect of his eloquence, that when he had concluded, a resolution had been come to by the freeholders that he should be asked to stand for the county. He did so; and in spite of opposition from the great Whig families, he was returned without a contest. W.'s success in the leading county, set an example to other constituencies, which was of very great advantage to the Pitt ministry. In the same year, W. made a tour on the continent with some ladies of his family and Isaac Milner, the Dean of Carlisle, during which the serious impressions of his youth seem to have been revived.

In 1787, he in a great measure eschewed gaiety, and founded an association for the discouragement of vice; and in the following year, while in very bad health, he entered on his great struggle for the abolition of the slave-trade, to which he thenceforward dedicated his whole time. He was powerfully supported by the Quakers, and by Mr. Thomas Clarkson, who kept alive interest in the subject beyond the walls of the House of Commons. In 1789, he first proposed the abolition of the slave-trade in the House of Commons, and met, as he expected, with powerful opposition. In 1804, his bill was first carried through the Commons; it was thrown out in the Lords; and in the following year it was again lost in the Commons. In 1806, however, a resolution was moved by Mr. Fox, pledging the Commons to a total abolition of the slave-trade in the following session. It was adopted by the Lords. Just before the discussion began in January 1804, a work had been published by W. against the slave-trade, which had a marked influence on public opinion and the subsequent debates. The bill was passed by the Lords. In the Commons, it was car-

ried by an enthusiastic majority. Sir Samuel Romilly, who supported the measure, compared the feelings of Napoleon, then at the height of his glory, with those of the English philanthropist, 'who would that day lay his head upon his pillow, and remember that the slave-trade was no more;' and the whole House burst into applause, and greeted W. with enthusiastic cheers. W. now sought to secure the abolition of the slave-trade abroad. He at the same time entered on an agitation for the total abolition of slavery itself. Declining health, however, compelled him in 1825 to retire from parliament, in which, since 1812, he had sat for the borough of Bramber. The movement against slavery was then intrusted to Sir T. Fowell Buxton. Three days before W.'s death, news was brought him that the Abolition Bill had passed a second reading, and he thanked God he had lived to see his countrymen spend 20 millions sterling in such a cause. He died 29th July 1833, and was buried as a national benefactor in Westminster Abbey.

In 1797, W. married the daughter of Mr. J. Spooner, the banker of Birmingham, by whom he had a large family. W. is the author of a *Practical View of Christianity*, which, on its publication in 1797, met with great success.—See the *Life of Wilberforce*, by his sons. His third son, Samuel (born 1805, died 1873), became bishop of Oxford in 1845, and bishop of Winchester in 1869. He distinguished himself in parliament by his eloquence, and was author of a *History of the Episcopal Church in America*, *Agathos*, and *The Rocky Island*, allegories, sermons, &c. See *Life of Samuel W.*, 2 vols. 1879–81.

WILDBAD, a small town of Würtemberg, in the Black Forest, about 32 miles south-south-east of Carlsruhe, 18 miles of which are by railway to Pforzheim, and the remaining 14 by road, through a beautiful portion of the Black Forest. It is noted for its thermal springs and baths, the water of which ranges from 90° to 100° F. in temperature. The baths consist of numerous basins formed round the springs as they gush from the rocks, and floored with sand for the comfort of the bathers. From the circumstance that these baths are natural, or *wild*, and not artificial, the town derives its name. The waters are nearly pure, the principal ingredient they contain being common salt. They are peculiarly beneficial for rheumatism, gout, stiffness of limbs, paralysis, &c., and for some skin-diseases. The season lasts from May till September, and the number of visitors has steadily increased from 470 in 1830 to about 5000 annually. Goitre abounds here and in the neighboring close valleys of the Black Forest. Pop. (1880) 3572.

WILD-FOWL, a popular term, synonymous with *Water-fowl*, and generally applied to web-footed birds, but sometimes employed also to include herons, plovers, and other birds which frequent rivers, lakes, and sea-shores. The different kinds are noticed under their proper heads.—*Wild-fowling* is one of the most difficult, and yet one of the most interesting pursuits of the British sportsman. *Rock-fowling* (see FOWLING) is not included under this term.

Wild-fowling is prosecuted in a great variety of ways. The wild-fowler seeks his game with a gun and dog, generally a retriever; or he uses a small boat, called a *punt*, adapted to the shallow waters in estuaries which wild-fowl frequent; or he proceeds a little further to sea, in a boat with sails; sometimes he employs a yacht, or he endeavors to approach his game on land by the aid of a *stalking-horse;* or he has recourse to decoys, and other contrivances, by which great numbers of wild-fowl are captured. It is chiefly on the eastern and south-eastern coasts of England that wild-fowl abound in Britain, and they are most abundant in severe winters, coming as migratory birds from the north; but the draining of the fen-lands has greatly reduced their numbers. The ancient Greeks and Romans captured wild-fowl by various kinds of nets, one of which, called the *argumentum*, was not unlike the modern decoy-pipe, the birds, however, being generally driven, and not enticed into it. The *panthera* was a large purse or drag-net, placed along the banks of rivers. The ancient wild-fowlers sometimes practised a system of decoying, apparently less perfect than the modern system, but essentially of the same nature, enticing the birds to their snares by movements intended to excite their curiosity, and for this purpose the fowlers clothe themselves in feathered jerkins, and danced with peculiar motions and gestures. Nooses and bird-lime were also much employed in ancient times. The Egyptians made much use of the *throw-stick*, a missile similar to the boomerang of the Australians, and which was dexterously thrown so as to hit the neck of the bird. In more recent times, falconry was much practiced for the capture of wild-fowl. The gun, decoys, and flight-ponds are now chiefly in use. Although many wild-fowl are killed with the ordinary fowling-piece, it is not thus that the greatest numbers are obtained. Much larger guns are used in punts and yachts, by which many are killed at one shot.

The *stalking-horse* is still used in some parts of England, in order to enable the wild-fowler, armed with an ordinary fowling-piece, to get within reach of the birds, whilst they are feeding on the level swampy ground which they chiefly frequent. A horse well trained for the purpose advances towards them, the fowler concealing himself on the side of it furthest from them. An ox is sometimes trained for this use, and indeed the kind of animal with which the birds are most familiar in the locality is most suitable.



Fig. 1.—Stalking-horse.
(From Blaine's *Encyclopædia of Rural Sports*. By kind permission of the publishers, Messrs. Longman.)

Artificial stalking-horses are sometimes employed, made of canvas, and stuffed with straw, the head being down, as if grazing. This practice is common in some parts of France. The use of the stalking-horse is very ancient. Wild-fowl shooting is not unattended with danger. In the pursuit of wounded birds, on the ooze, the sportsman or fowler must use *splashers*, thin boards about 18 inches square, attached to the feet, to prevent him from sinking; and if he fall, it is very difficult for him to regain his feet. He cannot raise himself by resting his hands on the mud, which only makes him sink deeper and deeper, nor can he do it by getting upon his knees. The only method is to roll over on the back, drawing the arms out of the mud, and placing one foot with his splasher firmly on the ooze, to press both hands on the knee of the leg so raised, and give a vigorous spring. The punter is also in great danger of losing himself in foggy weather when pursuing wounded birds, and being unable to get back to his punt, when a fearful death awaits him on the return of the tide.

The curly-coated retriever is the best dog for the wild-fowl shooter, but good training is necessary to fit the dog for his use. The punter ought not to carry a dog with him, because the dog, having no opportunity of exercise after his return from the water, soon suffers from the cold of the winter weather in which the sport is pursued.

Sledging for wild-fowl is practised by professional wild-fowl shooters on some parts of the English coast, particularly that of Hampshire. The sledger traverses the oozes by means of a small light sledge called a *launching-punt*, with a gun in the fore-part. He pushes it ahead, crawling on his knees, and often at full length on the mud, till he gets within range. His most severe work is on sands and dry ground.

The *gunning-punt* is a small generally flat-bottomed boat, about 17 feet in length, with a gun placed in the front of it, generally carrying about half-a-pound of shot at a charge. The punt must be nicely trimmed, so that the gun is nearly on a level with the surface of the water, and the fowler, having approached the birds where they are congregated, often kills great numbers by its discharge. The sport is pursued both by day and by night. The punt is generally constructed to carry only one person, and although he rows it in the ordinary manner till he discovers the birds, he is obliged then to lie down in the punt, and force it forward by a pole or by the oars with no little exertion, till he gets within range. The danger is not inconsiderable of his mistaking another punt in the darkness of night for an assemblage of wild-fowl, and firing at his fellow-sportsman. In a clear moonlight night he proceeds, if possible, against the light, so that he may see, and not be seen. By a successful shot, great numbers of wild-fowl are often killed. The punt-gun is capable of being *tipped*, that is, elevated so as to shoot water-fowl on the wing; and the most successful shots are often made by waiting till they rise, and tipping the gun.

The punter cannot expect to recover all his wounded birds, and

there are men on some parts of the coast who make their living during winter mostly by seeking for them in the morning.—The *sailing-punt* is a mere modification of the ordinary gunning-punt; the sail saving much hard work to the fowler, but its use is attended with greater danger, and it is utterly unsuitable for rough water. A *shooting-boat* is therefore sometimes used; but

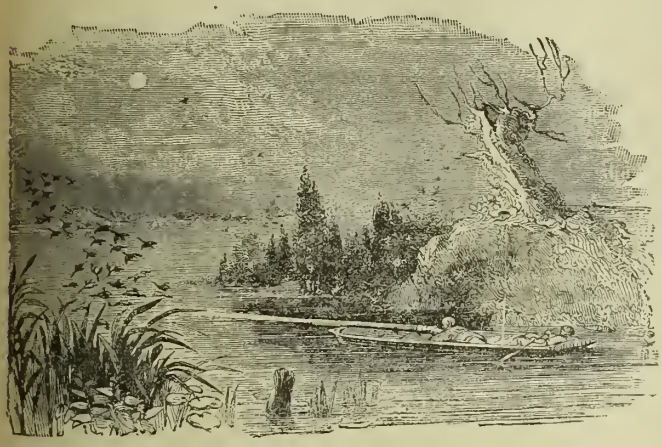


Fig. 2.—Gunning-punt approaching Wild-fowl.
(By permission of Messrs. Longman.)

in it the gun cannot be fixed level with the surface of the water, as in the punt, and still more is this the case with the *shooting-yacht*. The practice of the sportsman is therefore considerably difficult, and the best shots are generally made after the birds are on the wing. The helmsman of the shooting-yacht must be quick and skillful in luffing up, in such a manner as to cross the flight of the birds, that they may be well exposed to the gun, which is generally larger than the punt-gun. Great numbers of wild geese, swans, &c., are often killed from the shooting-yacht. In approaching the birds, the greatest caution is necessary, and the men in the yacht must be carefully concealed behind the bulwarks.

Notwithstanding the draining of the fen-lands, many of the decoys of the eastern coast of England are still very valuable, and in some instances, they afford a considerable part of the living of the parochial clergy. A good decoy-pond attached to a rectory adds not a little to its value. It is in severe winters that the decoy-pond is most productive. It must be in a secluded situation, and the proprietor takes care to keep it as secluded as possible, permitting no use of the gun or rifle in its neighborhood. An extent of three or four acres is about the best for a decoy-pond. Very large ones are found to be comparatively much less productive. The decoy-pond ought to be surrounded with trees and copse; reeds and sedges being permitted to flourish near the water. Several *pipes* are led off from the pond, in different

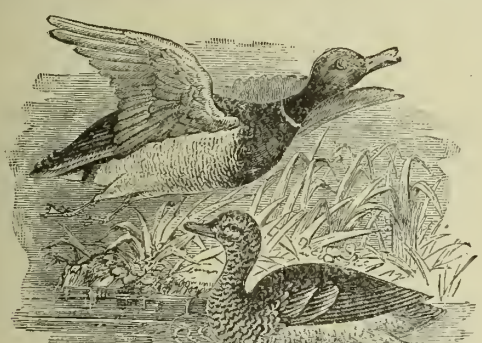


Fig. 3.—Wild-duck or Mallard, Male and Female.

directions, ditches of six or eight inches in depth, of a curved form, and becoming narrower towards the extremity. It is in these pipes that the wild-fowl are caught, particularly mallards, teal, and widgeons, and often in very great numbers. The length of the pipe is generally from sixty to eighty yards, its breadth at the mouth from twenty to thirty feet, diminishing to two feet at the extremity, where it terminates in a tunnel-net, generally carried out on the dry land. The whole pipe is spanned with a light netting, spread upon semi-circular bars of iron rod, in an arch of about twelve feet above the water at the entrance, but becoming lower as the pipe becomes more narrow. To attract wild-fowl to the pond, and to induce them to enter the pipe, *decoy-ducks* are kept, constant inhabitants of the pond, and regularly fed. Wild-fowl come more readily to the pond because of their presence, and follow them also to the mouth of the pipe, and into it, when they come at the well-known whistle of the decoy-man, to feed on the grain which he scatters for them on the water. It is only thus that the decoy-ducks are of use. They are not trained in any way, nor do they display any intelligence beyond response to the whistle which invites them to their food. Very different is the case with the decoyer's dog, the *piper*, so called not from any vocal powers, but from his use in enticing birds into the pipe. The dogs best adapted for this purpose are of a peculiar breed, small, fox-like, and very lively and frolicsome. They are very carefully trained, and their peculiar qualities seem to be in some measure hereditary.

On the convex side of the curve of the pipe, for about thirty or forty yards, instead of netting coming down to the ground, screens made of reeds are placed of height sufficient to conceal the decoyer; but they are placed obliquely, with narrow outlets between them, through which his dog may pass, and with bars in the intervals about 18 inches high, for the dog to leap over. When the wild-fowl have been attracted to the mouth of the decoy, and the decoyer, peeping through the screens, perceives that they are in the proper situation, he sends out the dog, which makes sportive gambols in their sight, and they are attracted by the strange object, as sheep are when a small dog plays about in the field where they graze. They enter the pipe in pursuit, as if for gratification of their curiosity, and the dog leaps over the first leaping-bar, and disappears behind the screens, where his master immediately rewards him with a piece of cheese or other delicacy. When the

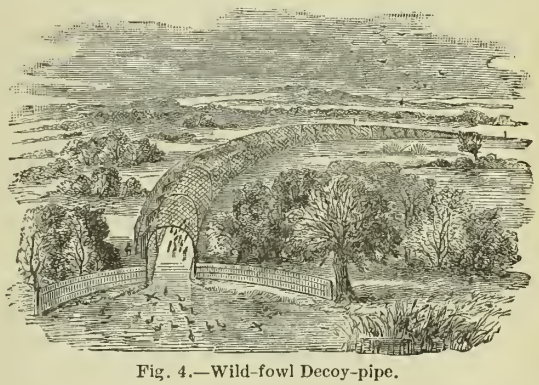


Fig. 4.—Wild-fowl Decoy-pipe.

wild-fowl have advanced a little further, the dog is sent out again, repeats his gambols, leaps over the second leaping-bar, and gets a second piece of cheese. The curiosity of the birds seems to increase, and when they have proceeded far enough the man shews himself, whereupon a rush is made by the birds towards the far end, where they are captured. The dog is trained to keep perfect silence. A single bark would disperse the birds. The success of the decoyer depends very much on the state of the weather, and he must consider the direction of the wind in order to the choice of the pipe he is to use. Into such details, however, we cannot enter. It is in the daytime, and not by night, that wild-fowl are captured in the decoy. They generally leave the decoy-pond at night for neighboring feeding-grounds. The decoyer often finds it profitable not to attempt the capture of birds when they first appear on the pond, but to wait for a few days, when they congregate in greater numbers.

Decoys are of so great value that many acts of parliament have been passed for their regulation and protection. A decoy which has been established for twenty years enjoys certain privileges secured by law, particularly as to the quietude of its vicinity, which must not be disturbed by the firing of guns at wild-fowl apparently going to the pond, even by the proprietors of land over which they pass.

Flight-ponds alone remain to be noticed. These are used chiefly for the capture of pochards or dun-birds, which very seldom enter the pipes of the decoyer. The same pond is sometimes used both as a decoy-pond and a flight-pond. The pochard, having its legs placed far back, cannot rise from the water so suddenly as the wild-duck or widgeon, and skims the surface for many yards, proceeding by a very gradual ascent. To capture flights of pochards, nets are used, which are fixed to a cumbrous apparatus of poles at the side of the pond. The pond may be about seventy or eighty yards square. On an embankment, about ten yards from the water, strong posts are fixed, about twelve feet high, two together, and about fifty yards apart—the corners of the pond being generally occupied by trees. Further back, about fifty feet, are slighter posts, about fifteen feet high. Other posts are required for the working of the net, the position and use of which we cannot explain; but the purpose of the whole is that the net, which

is of the form of a parallelogram, may be suddenly thrown up into the air. In order to this, it is attached to cross-bars, which work between the twin posts, and heavily-weighted boxes attached to two poles, aid in bringing it into an erect position when required. The fowler's skill relates very much to the moment of raising his net, which he does by drawing a bolt or trigger. The net ought to rise so as fully to confront the birds as they issue from the pond. Pens are formed on the embankment in front of the net of reed-screens about three feet high, by two or three feet square, and the birds falling into them on being thrown back from the net, are caught, not being able to rise again. The number of pochards caught at once is sometimes very great. For full particulars concerning Wild-fowling, the reader is referred to Colonel Hawker's well-known work on *Shooting* and to *The Wild-fowler* by Folkard.—An Act was passed in July 1876 *For the Preservation of Wild-Fowl*, making it punishable by fine to kill them, or to use any instrument for that object, during the breeding season—15th February to 10th July.

Folkard, in his excellent work upon Wild-fowling, remarks that writers upon sporting literature generally apply correct terms to game and birds of the land, while water-fowl are invariably classed by them as 'flocks.' The modern terms, as applied to water-fowl, are, according to Folkard, as follows: 'A herd of swans. A gaggle of geese (when on the water). A skein of geese (when on wing). A paddling of ducks (when on the water). A team of wild-ducks (when flying in the air). A sord or suit of mallards. A company of widgeon. A flight or rush of dunbirds. A spring of teal. A dopping of sheldrakes. A covet of coots. A herd of curlews. A sedge of herons. A wing or congregation of plovers. A desert of lapwings. A walk of snipes. A fling of oxbirds. A hill of ruffs. A small number of wild-fowl, as ducks and geese (about thirty or forty), is termed a "trip." The same of widgeon, dunbirds, or teal, is termed a "bunch;" and a smaller number (from ten to twenty) is called a "little knob." Of swans, it would be said, a "small herd;" and sometimes of geese, a "little gaggle," or a "small skein;" and so of ducks, a "short" or "long team." '

WILD HUNT (Ger. *Wilde* or *Wüthende Jagd;* also *Wildes* or *Wüthendes Heer*, Wild or Maddening host; *Nachtjäger*, Night Huntsman, &c.), the name given by the German people to a fancied noise sometimes heard in the air at night, as of a host of spirits rushing along over woods, fields, and villages, accompanied by the shouting of huntsman and the baying of dogs. The stories of the Wild Huntsman are numerous and widespread: although varying in detail, they are uniform in the essential traits, and betray numerous connections with the myths of the ancient gods and heroes. The root of the whole notion is most easily discernible in the expression still used by the peasants of Lower Germany when they hear a howling in the air, 'Wode hunts' (*Wode jaget*), that is, Wodan or Odin marches, as of old, at the head of his battle-maidens, the Walkyries, and of the heroes of Walhalla; perhaps, too, accompanied by his wolves, which, according to the myth, along with his ravens, followed him, taking delight in strife, and pouncing upon the bodies of the fallen.

The heathen gods were not entirely dislodged from the imagination of the people by Christianity, but they were banished from all friendly communication with men, and were degraded to ghosts and devils. Yet some of the divine features are still distinctly recognizable. As the celestial god Wodan, the lord of all atmospherie and weather phenomena, and consequently of storms, was conceived as mounted on horseback, clad with a broad-rimmed hat shading the face, and a wide dark cloak; the Wild Huntsman also appears on horseback, in hat and cloak, and is accompanied by a train of spirits, though of a different stamp—by the ghosts of drunkards, suicides, and other malefactors, who are often without heads, or otherwise shockingly mutilated. One constant trait of the stories shows how effectually the church had succeeded in giving a hellish character to this ghost of Wodan—when he comes to a *cross* road, he falls, and gets up on the other side. On very rare occasions, the Wild Huntsman shows kindness to the wanderer whom he meets; but generally he brings hurt or destruction, especially to any one rash enough to address him, or join in the hunting cry, which there are many narratives of persons in their cups having done. Whoever remains standing in the middle of the highway, or steps aside into a tilled field, or throws himself in silence on the earth, escapes the danger. In many districts, heroes of the older or of the more modern legends take the place of Odin; thus, in Lusatia and Orlagau, Berndietrich, that is, Dietrich of Bern; in Lower Hesse, Charles the Great; in England, King Arthur; in Denmark, King Waldemar. The legend has also in recent times attached itself to individual sportsmen, who, as a punishment for their immoderate addiction to sport, or for the cruelty they were guilty of in pursuing it, or for hunting on Sunday, were believed to have been condemned henceforth to follow the chase by night. In Lower Germany, there are many such stories current of one Hakkelberend, whose tomb even is shown in several places. Still, the very name leads back to the myth of Wodan, for Hakkelberend means literally the mantle-bearer (from O. H. Ger. *hakhul;* O. Norse, *hökull* or *hekla;* Ang.-Sax. *hacele*, drapery, mantle, armor; and *bern*, to bear). The appearing of the Wild Hunter is not fixed to any particular season, but it occurs frequently and most regularly in the twelve days between Christmas and Epiphany.

Another version of the Wild Hunt is to be found in the legend prevalent in Thuringia and the district of Mansfeld. There the procession, formed partly of children who had died unbaptized, and headed by Frau Holle or Holda (see BERCHTA), passed yearly through the country on Holy Thursday, and the assembled people waited its arrival, as if a mighty king were approaching. An old man, with white hair, the faithful Eckhart (see TANNHAUSER and VENUSBERG), preceded the spirit-host, to warn the people out of the way, and even ordered some to go home, so that they might not come to hurt. This is the benign goddess, the wife of Wodan, who, appearing under various names, travels about through the country during the sacred time of the year. This host of Holda or Berchta also prefers the season about Epiphany. In one form or other, the legend of the Wild Hunt is spread over all German countries, and is found also in France, and even in Spain. In Lower Germany, it has been preserved in an older and purer form than in Upper Germany. It has probably some connection with Celtic mythology, but not apparently with the Sclavonic.—See Grimm, *Deutsche Mythologie*.

WILFRID, SAINT, an Anglo-Saxon bishop, was born, of noble parents, in the kingdom of Bernicia in 634. He was remarkable when a boy for his good looks, graceful manners, and ability. He became at 14 the attendant on a Saxon nobleman, who had retired to spend the last years of his life in the monastery of Lindisfarne. There his attention was directed to the controversy as to the time of celebrating Easter (q. v.) existing between the two sections into which the Anglo-Saxon Christians were divided; the one advocating the Roman practice, which was that of the continental churches generally, the other adhering to the Scoto-British. W. resolved to visit Rome to ascertain which was in the right, and thither he went at the age of 19, with recommendations from the courts of Kent and Bernicia. He returned to England a warm partisan of the Roman party. From Alfrid, king of Northumbria, he received a grant of land and a monastery at Ripon, and there, in 664, he was ordained a priest.

The synod of Whitby, which met in 664 to discuss the disputed questions between the two parties in the church, was attended by the most distinguished members of both, and among others, by Colman, Bishop of Lindisfarne, and Wilfrid. We have a curious account of this conference. The king presided, and seems at first to have been puzzled by the arguments, but he noticed that Colman always referred to St. Columba, W. to St. Peter—and it struck him that the relative power of these saints had a close connection with the points at issue. 'St. Peter,' said W., 'is the rock on which the Lord founded his church, and to him he intrusted the keys of heaven.' 'Did St. Columba not receive the same power?' asked the king. Colman could not say he had. 'Then you both admit that God has given the keys to St. Peter?' Both said they did. 'Well,' continued the king, 'if it is so, I shall not oppose him. Were I to do otherwise, I might find no one to open the gate when I came there; St. Peter might turn his back on me. We must not offend him.' The council and audience were carried away by this argument, and the king decided in favor of the Roman party. W. was afterwards named Bishop of York, but he did not enter into possession of his see until 669. He then surrounded himself with great pomp, built churches, one of which, at Hexham, was said to be the finest north of the Alps, and strove to oppose the ecclesiastical to the royal power. A quarrel followed with the new king of Northumbria, named Egfrid, and W. was deposed. He started on a journey to Rome, to make a personal appeal to the pope; but he was driven by a storm to the coast of Friesland, the inhabitants of which were still pagan. There, however, he was hospitably received by the king. To his arrival, the people attributed an excellent fishing-season and abundant harvest. He was asked to preach, and he did so in his own Anglo-Saxon tongue, which was perfectly intelligible to the Frisians. Such was the effect, that he baptized many thousands of the people, and all the princes.

The event is one of the most memorable in the history of Northern Germany and Scandinavia, for with it began the conversion of these countries to Christianity by Anglo-Saxon missionaries, and the introduction into them of the arts and knowledge inherited from ancient civilization (see BONIFACE; WILLIBROD). W. reached Rome, and the pope decided in his favor; but on his return to England, the king gave no heed to the decree, and committed him to prison. He escaped, however, to the Weald of Sussex, where he converted the pagan inhabitants. He was afterwards recalled to his see; and a proposal was made to elevate him to the primacy, but he was still opposed, as the leader

of the Roman party, and ultimately he was deposed, and excommunicated. He again went to Rome, remained there some years, returned to England in 705, and died at Oundle, in Northampton, in 709.

WILHELMSHAVEN, the chief naval port of Germany, is on the west side of the entrance of the bay or gulf of Jahde, about 45 miles north-west of Bremen. The town, first projected in 1856, has been regularly laid out on a strip of ground bought by Prussia from Oldenburg in 1864. It is now a fortress of the first rank, defended by outlying forts and an elaborate system of torpedoes; and with its moles, extensive basins, dry docks, vast stores for the navy, and workshops for all the requirements of a fleet, has been a very costly creation—the massive buildings being erected on soft and swampy ground, without any natural advantage save its situation. Water has been obtained by means of artesian wells. A harbor for commercial purposes has been made to the south of and connected with the naval one; but the mercantile importance of W. is yet in the future. Pop. (1875) 10,174; (1880) 13,131.

WI'LHELMSHOHE. See CASSEL.

WILKES, CHARLES, American naval officer and explorer, was born in New York in 1801, and entered the navy in 1816, becoming lieutenant in 1826. In 1838 he was made commander of an exploring expedition, by which the Samoan and Fiji Islands were carefully surveyed, and many other regions of the southern seas examined. In 1842 he published a *Narrative* of the expedition (5 vols. 1845), for which he received the gold medal of the Royal Geographical Society. In 1849 he published a volume on *Western America;* and in 1856, on the *Theory of the Winds*. As commander of the U.S. steamer *San Jacinto*, he in 1861 forcibly removed from the British mail-steamer *Trent*, Messrs Mason and Slidell, commissioners of the Confederate States to England and France, and conveyed them to Boston, receiving the thanks of Congress and the acclamations of the people; but at the demand of the British government, his act was disapproved, and the commissioners restored. In 1862, he was promoted to the rank of commodore, and in 1863 commanded a squadron in the West Indies. In 1866 he was commissioned as rear-admiral on the retired list. He died Feb. 8, 1877.

WILKES, JOHN, a celebrated public character, was born in London, October 17, 1727. His father a brewer or distiller at Clerkenwell, sent him when a lad to the university of Leyden, where he received an excellent education. On his return to England in 1749, he married a Miss Mead, an heiress, ten years his senior. His good manners, learning, ready wit, and open table secured him many friends, but extravagance and dissipation soon involved him in difficulties. He and his wife separated, and in a law suit which followed, facts came out most damaging to his character. He was nevertheless named High Sheriff of Buckinghamshire, and in 1757 returned to parliament as member for Aylesbury. In the House, he joined in the popular clamor against Lord Bute; and in June 1762, founded a paper entitled the *North Briton*, in which he denounced him with such vigor and success as to drive him from the ministry. He attacked with equal bitterness the next ministry, insinuating that although Mr. Greville was nominally at the head of affairs, Lord Bute still had the ear of the king.

In the 45th number of the *North Briton*, he charged the king with having uttered a falsehood from the throne, and in consequence, his house was entered, and his papers were seized. He was himself committed to the Tower, on a general warrant. But he was released by Chief-justice Pratt, on account of his privilege as a member of parliament. His paper was burned, by order of the House of Commons; but a riot ensued, showing that public sympathy went with Wilkes. A prosecution was next instituted against the Under-secretary of State by W. for the illegal seizure of his papers; and he obtained £1000 of damages—a declaration being at the same time made by the Chief-justice that general warrants are illegal. W. then went to France, on the plea of bad health, and was expelled from the House of Commons. In his absence, he was convicted of having printed privately an obscene poem, of which he was one of the authors. It was hoped that evidence of his immoral character would disgust the public with him. But the copy of the book on which the prosecution had been founded had been obtained surreptitiously from a printer employed; and this fact becoming known, the steps taken by the government, instead of injuring W., only added to the outcry against ministers. On the formation of a new ministry under the Duke of Grafton, W. returned to England, and becoming a candidate for Middlesex, harangued great crowds in London. After his election, he was arrested, in consequence of his outlawry; and on the way to prison he was rescued by a mob. He, however, after it had dispersed, voluntarily gave himself up to justice. When parliament met, a crowd assembled to convoy him to the House of Commons. A riot took place, and the military were ordered to fire on the mob in St. George's Fields. Many persons were wounded, and one was killed. The coroner's jury who sat on the body returned a verdict of murder against the magistrate who had given the order to fire; and he was tried for that crime, but acquitted.

W. secured a copy of a letter from Lord Weymouth to the chairman of the Lambeth Quarter Sessions, in which it was recommended that the military should be employed to suppress disturbances in London. It was published with a preface by W., in which he charged the Secretary of State with having planned 'the massacre in St. George's Fields.' The House declared the preface to contain a seditious libel, and W. was again expelled. He was after this re-elected several times as member for Middlesex; but the elections were declared void. Colonel Luttrell, who vacated his seat and opposed him, obtained only 300 votes; but he was declared to be duly elected, in defiance of a protest from the whole country. W., still in prison, was now recognized as the champion of public liberty, and became the most popular man in England. In 1769, he obtained a verdict against Lord Halifax in the Court of Common Pleas, with £4000 damages. He was shortly after discharged from prison on giving a bond for good behavior during seven years. In 1774, he was chosen Lord Mayor of London, and again returned for Middlesex, which he continued to represent for many years. In 1782, the resolution by which he had been declared incapable of re-election was expunged from the minutes of the House of Commons, as subversive of constitutional rights. The other resolutions relating to W. were at the same time expunged. Two years later, he withdrew from the House of Commons. He died 27th of December 1797.

WILKIE, SIR DAVID, a distinguished Scottish painter, was born in Fifeshire, at Cults, of which parish his father was minister, 18th November 1785. His boyish passion for art was too strong to be resisted by his father, who, with much reluctance, sent him, in 1799, to study in the Academy at Edinburgh. Here he greatly distinguished himself; and returning home, in 1804, he painted his 'Pitlessie Fair,' a piece in which already his peculiar genius is pronounced, and which brought him the sum of £25. The price seems paltry; but for the work of an unknown country stripling in an original walk of art, it was perhaps to be considered handsome.

Shortly after, W. proceeded to London, intending to return to Scotland after a year or two of study; but the great success of his picture, 'The Village Politicians,' determined him to settle in the metropolis. Not that, pecuniarily, he was very greatly benefited, £30 being all that the Earl of Mansfield could with difficulty be got to pay for the picture, though aware that, on a point of honorable scruple, the artist had refused repeated offers of £100; but the originality and humor of the work greatly captivated the public, and at once established the reputation of the painter, who had soon commissions in plenty, at greatly advanced prices. In 1809, his brethren of the Royal Academy ratified the favorable verdict of the public by electing him an Associate; and two years afterwards, he was advanced to the rank of Academician. In 1814, in company with his friend Haydon, he visited Paris, and inspected with great delight the art-treasures at the Louvre. Though his father had died some years before, and his mother and sister were now living with him at Kensington, in 1817 he made a run into Scotland, and while the guest of Scott at Abbotsford, painted his well-known picture of the great poet and his family. During these years, W. had been engaged on the series of pictures on which mainly his fame rests; pictures familiar by engraving to every one (The 'Blind Fiddler,' 'Card Players,' 'Rent Day,' 'Jew's Harp,' 'Village Festival,' 'Blind Man's Buff,' 'Distraining for Rent,' 'The Penny Wedding,' 'Reading of the Will,' &c.), in which the homely humors of humble life are expressed by a vehicle appropriately simple, and—though scarce in the higher sense to be called color—of charming purity and transparency. In this style, distinctively his own, his genius is commonly held to have culminated in 'The Chelsea Pensioners listening to the news of Waterloo,' which was painted during the years 1820—1821. This work was a commission from the Duke of Wellington, who paid the artist 1200 guineas for it. Subsequently, he changed his style, sought to emulate the depth and richness of coloring of the old masters, and deserting the homely life, which he could treat so exquisitely, chose elevated, and even heroic subjects, to the height of which he could never rightly raise himself.

The florid picture, painted in 1830, of 'George IV. entering Holyrood,' which, though not without its fine points, can delight no one but a flunkey, gave the first hint of the change; and no doubt a tour over nearly the whole continent, which he made for his health, in 1824, everywhere, of course, intent upon the grand old masterpieces, did something to stimulate the new and unwise ambition. By common consent, it has been adjudged unwise; and W. remains, and will remain, memorable, not for the quasi-high art of his later years, but for the simpler, truer, and in every right sense, higher art of his earlier time. He never, however, ceased to be popular, and honors continued to be showered upon

him. On the death of Sir Henry Raeburn, he succeeded him as Limner to His Majesty; in 1830, he was made Painter in Ordinary to His Majesty, in room of Sir Thomas Lawrence deceased; and in 1836, the honor of knighthood was conferred upon him. W. had never been robust, and his health now began to give way seriously. In 1840, seeking to re-establish it, he once more left England; but he did not find what he sought. Having visited Syria, Palestine, and Egypt, he died on his voyage home, off Gibraltar, and his body was committed to the deep.

As an illustrator of Scottish character and manners in humble life, W., in his best pictures, may take rank with Burns in poetry, and Scott in fiction. As a man, he was kindly, warm-hearted, and of essential generosity of disposition.—See *Life and Letters of W.* by Allan Cunningham (1843).

WILKINSON, Sir John Gardner, a distinguished traveler and archæologist, was the son of the late Rev. John Wilkinson, of Hardendale, in Westmoreland, and was born on the 5th of October 1797. Having lost both his parents at an early age, he was left under the guardianship of the Rev. Dr. Yates, by whom he was sent to Harrow School in 1813, and to Exeter College, Oxford, three years later. While a boy, young W. had a strong desire to enter the navy, principally with a view to seeing foreign countries. He also in early life showed a great fondness for architecture and sculpture. While at Harrow, he made sketches of all the churches within a radius of some miles from the school; and while at Oxford, often employed himself in drawing from the objects contained in the Arundel Collection. He still further cultivated his taste for architectural antiquities by trips on the continent made during his college vacations. On taking his B.A. degree, he resolved upon making a wider tour on the continent. While in Italy, he became acquainted with Sir W. Gell, who perceiving his taste for archæological research, strongly urged him to make an extensive survey of the remains of Egyptian civilization; and in October 1821, he set out for Alexandria, as a starting point for his explorations. He took up his abode at Cairo, where he learned Arabic, both to read and speak; he also studied Coptic. Making Cairo his headquarters, he now traveled through and investigated almost every part of Egypt and Lower Nubia. Twice he ascended the Nile as far as the Second Cataract, and several times as far as Thebes. At the latter famous site, he spent more than 12 months in making explorations; he also visited the deserts on either side of the river, and the Egyptian oases. During subsequent visits, he completed the exploration of those deserts, and, in fact, made a complete survey of Egypt, on a scale of about ten inches to a degree, which unfortunately, for the interests of science, has not yet been published. The same might have been the case with his *Survey of Thebes*, had not the author engraved and published it at his own expense. As a result of his first visit to Egypt, W. transmitted to the British Museum more than 300 antiquarian objects, besides numerous specimens of natural history.

W.'s first residence in Egypt extended over a period of twelve years, during which time he composed and published his first two works on Egyptian subjects—viz., *Materia Hieroglyphica; containing the Egyptian Pantheon and the Succession of the Pharaohs, from the Earliest Times to the Conquest by Alexander, and other Hieroglyphical Subjects: with Plates and Notes explanatory of the same.* The preface to this work is dated 'Pyramids of Geezeh, July 1828;' but it was printed and revised for the author at Malta in the same year. This work was followed by *Extracts from several Hieroglyphical Subjects, found at Thebes and other parts of Egypt, with remarks on the same*—also printed at Malta in 1830, but with a dedication to Sir W. Gell, dated 'Thebes, 1827.' In the same year (1830), he published his *Topographical Survey of Thebes, Tapé, Thaba, or Diospolis Magna*, in six sheets. In 1833, W., in consequence of ill health, was obliged to return to England. In 1835, he published *Topography of Thebes, and General Views of Egypt* (Lond. John Murray). This was followed in 1837 by *Manners and Customs of the Ancient Egyptians, including their Private Life, Government, Laws, Arts, Manufactures, Religion, and Early History; derived from a Comparison of the Paintings, Sculptures, and Monuments still exisitng with the Accounts of Ancient Authors: illustrated by Drawings of those Subjects* (3 vols. Lond.). This work at once obtained great popularity for its style as well as for its fulness and accuracy, and it obtained for him the honor of knighthood (1839). Many things of importance, were, however, omitted in it, which he afterwards published in *A Second Series of the Manners and Customs of the Ancient Egyptians, including their Religion, Agriculture, &c.* (2 vols. and a volume of plates, Lond. 1841). A new edition of the *Manners and Customs*, uniting both the original series, was given us by Dr. Birch in 1879 (3 vols. with illustrations). W. again visited Egypt in 1841 and in 1843. He also visited Syria, Constantinople, Tunis, and Sicily, returning to England after an absence of two years, by the Illyrian coast of the Adriatic.

During his two years' absence, he also visited Dalmatia and Montenegro, which gave occasion to the publication of his *Dalmatia and Montenegro, with a Journey to Mostar, in Herzegovina, and Remarks on the Slavonic Nations; the History of Dalmatia and Ragusa; the Uscoes, &c.* (2 vols., Lond. Murray). W.'s other works are—*Modern Egypt and Thebes; being a description of Egypt, including the Information required for Travelers in that Country; with Wood-cuts and a Map* (2 vols., Lond. Murray, 1843): *Handbook for Travelers in Egypt; new edition condensed of Modern Egypt and Thebes* (Lond. 1847, and again in 1858): *The Architecture of Ancient Egypt with a Large Volume of Plates Illustrative of the Subject* (Lond. 1850): *The Fragments of the Hieratic Papyrus at Turin, containing the Names of Egyptian Kings with the Hieratic Inscription at the Back* (Lond. 1851): *A Popular Account of the Ancient Egyptians, revised and abridged from his larger Work* (Lond 1854): *The Egyptians in the Time of the Pharaohs;* to which is added an *Introduction to the Study of Egyptian Hieroglyphs*, by S. Birch (Lond. 1857), published as a companion to the Crystal Palace guides: *On Color, and on the Necessity for a General Diffusion of Taste among all Classes; with Remarks on laying out Geometrical Gardens: illustrated by Colored Plates* (Lond. 1858). W. also contributed notes to the Rev. G. Rawlinson's edition of *Herodotus*. In 1848, he paid a fourth visit to Egypt, and a fifth in 1855, when, as he was drawing at Thebes under excessive heat, he received a *coup de soleil*, which compelled him to return home. There W. occupied himself in examining ancient British remains in England and Wales. In 1874, he presented to the governors of Harrow School his collection of coins, about 1000 in number, having previously given to the same body his large collection of Egyptian, Greek, and other antiquities, for the purpose of founding a museum at the school. His death took place in 1875.

WILL is, in English Law, a writing by which a person entitled to property declares what is to be done with such property after his death. Though, by the Wills Act, 1 Vict. c. 26, a writing is indispensable to a will, yet there is an exception in the case of soldiers or sailors who, from their occupation, and while in actual service, are allowed to make a verbal or nuncupative will; and this exception only extends to their personal estate, for they must make a written will, like other persons, in order to deal with their real estate. An infant, or person under 21 years of age, cannot, since 1838, make a will. A married woman can only make a will if she has separate property, or her husband assents to her will, or she makes the will by virtue of some power of appointment vested in her. As a general rule, it is absolutely necessary that the party making a will should have a free and disposing mind at the time; and hence, if he or she is a lunatic, or drunk, or acting under compulsion, fear, or undue influence, the will is invalid. There is no limit as to the time preceding death when a will may be made: it is enough that the testator was at the time capable and sensible, though he died immediately after. A will must be executed in presence of two witnesses, who see the testator sign the will, or at least hear him acknowledge it. But there is no particular form of words in which a will must be made for the purpose of disposing either of realty or personalty. The will must be in writing, but it need not be in ink or written continuously. The testator may sign by his mark or by an assumed name. Though a seal is not equivalent to signature, yet a person may have a stamp to sign papers with, and that will be sufficient for a will also. The testator need not sign the will if he authorize some one to do so for him in his presence. The signature must be at the foot or end of the will; but if it is placed so as to lead a court to the conclusion that it was intended to give effect to the will, that will be enough. Though the witnesses need not know it is a will, they must be present together when the testator signs it or acknowledges his signature. The witnesses must sign their names or make their marks.

A legatee, or the wife or husband of a legatee, may be an attesting witness, but by being so, he or she will forfeit any legacy left to him or her by the will. But one may be an executor though he attests the will. A will is revoked by the marriage of the testator or testatrix. The mere fact of making a subsequent will does not of itself operate to revoke a prior will, unless there is some inconsistency in whole or in part; and, as a general rule, no will will be revoked by any presumption of an intention on the ground of an alteration in circumstances. The usual way of revoking a will is to burn, tear, or destroy it with the intention of revoking the same; or by executing another will which expressly revokes the prior will. When a testator tears or cuts away that portion of his will containing the signature and attestations, the presumption is that he intended to revoke the whole. But merely cutting out a part of the will, or striking it through with a pen, does not amount to a revocation. It is to be borne in mind that, in order to revoke by tearing, &c., there must be an intention to revoke, so that a mere accidental tearing will prevent the act from having the force of revocation. When there are interlineations or alterations in a will, it is presumed these are made after signature, unless there is evidence to prove the contrary. A will which is in any manner revoked can only be revived by re-execution, or by a codicil showing an intention to revive it; but many nice questions

have arisen as to what causes a will to revive.—In Scotland, a will is used only to denote a testament affecting personal or movable property; while a will affecting real or heritable property can only be made by way of a deed having a present operation. A will or testament may be written in the hand-writing of the testator, and if signed by him, will not require witnesses, being then called a holograph will. In other respects, wills are subject to nearly the same rules which prevail in England with respect to revocation, &c. Wills of real property are called Dispositions or Deeds, and have a present operation, and the mode in which they are drawn up is that of conveying the property to the disponee, but reserving the testator's liferent. The effect of this is that the testator retains the property in his own hands while he lives; but the moment he dies, the disposition *mortis causa* comes into play, and the disponee then takes the property, subject to the deed. See DEED.

WILL. The Mind is divided into three distinct functions—Feeling (see EMOTION), Intellect or Thought (see INTELLECT), and Will or Volition. Under Will, is included the putting forth of active energy to move our own organs, or change something about us; but all energy is not voluntary energy. The peculiarity of action from Will, in contrast to other activities, as the powers of nature—wind, gravity, &c., is its being preceded or inspired by *feelings*, or by the pleasures and pains of an individual mind. Hence, Will is defined, *action prompted by feeling*. The feelings that prompt the will, called motives, are our pleasures and our pains; pleasure felt or imagined moves us to continue and increase the pleasurable state; pain urges us to work for the abatement of the pained condition.

In the maturity of the powers, a human being, or animal can perform a great variety of specific actions at the bidding of the various wants or desires. The sensation of thirst induces at once a series of complicated movements, ending in the relief of the painful feeling. But no man or animal is born with the ability to make a journey to a well, whenever thirst is felt; the human infant cannot even perform the voluntary act of lifting anything to its mouth. Our most ordinary voluntary movements are the result of an education; and the explanation of the volitional energies consists in ascertaining what are their beginnings or germs in the mental constitution and how they are brought to the finished state.

Three different facts of our nature appear to concur in forming the collective aptitudes of the Will.

I. The fact termed Spontaneous Activity, or the self-acting energy of the system, whereby movements arise without waiting the stimulus of the senses. Any actively disposed animal, after rest and nourishment, begins to move merely through a surplus of nervous power, and not because it is wakened out of dormancy by the solicitations of sensible objects. Without this tendency to commence movements in the first instance, there would be no apparent basis for the voluntary acquirements. See SPONTANEITY. In imitation with the voice, for example, we must begin by uttering sounds, and then discover by the ear their agreement or disagreement with the sounds heard.

II. The second fact is the tendency to abide by a movement giving pleasure, and to relax a movement coincident with pain. From the first moments of sentient life, every animal appears to possess this property. If a movement happens to coincide with an access of pleasurable warmth, the animal maintains, and possibly increases, the movement: if the warmth passes into pain, the movement ceases. The infant sucks so long as the feeling is pleasureable, and ceases when satiety comes on. This power may be an offshoot of the general law connecting pleasure with an increase, and pain with a diminution of vital energy. See EMOTION. However arising, the fact is unquestionable, and is exemplified all through life. Without our going through any process of deliberation or resolution, we sustain an activity that brings us agreeable sensation, and remit an activity ending in pain. We keep our eyes fixed on a cheerful flame, and withdraw them when the glare is overpowering: the process is self-acting and intuitive.

III. The third fact is the operation of the Retentive power of the mind, in joining together, by a permanent association, movements and feelings that have existed together for some time. This is a branch of the great law of Contiguous Association. See ASSOCIATION OF IDEAS. The Will is an educated function, and education supposes the plastic or fixing operation expressed by the above-named law.

But the chief nicety in explaining the growth of the Will consists in showing how the proper movements and feelings originally came together. This is the problem of the Development of Voluntary Power, which would demand an extended illustration. A brief indication of the process must suffice.

One of the easiest examples is the moving of the head to follow a light or other object pleasing to the gaze. This power is not possessed at the commencement of life, and the process of arriving at it is supposed to be as follows. The child has its eyes fixed on the light, and enjoys the luminous excitement. The light is moved to one side, and is therefore lost to the direct gaze, and there is no power to recover it. An accidental movement of the head, occurring by mere spontaneity, carries the eyes round to encounter the light again, or to follow it as it moves; the consequence is, that the recovered pleasure of the spectacle sustains the movement that brings it. Now, every such coincidence tends to become fixed, by the law of plastic association; and after a few repetitions of the accidental concurrence, there is a connection formed between the optical impression and the movement that is found to go along with and sustain it. Thus it is, that a movement of the object to the right hand, which leaves a characteristic trace on the visual organ, becomes associated with a movement of the eyes and the head to the right hand; and whenever the optical fact arises, the movement is apt to follow. This makes one distinct item in our volitional acquisitions; one instance of the power of definitely acting to a definite feeling.

Another example might be taken from the feelings of warmth and chillness—both very powerful sensations in all animals. One of the most obvious means of attaining comfortable warmth is to crouch and bring all the limbs close to the body. A very early experience would connect this posture, accidentally hit upon, with the comfortable sensation; and, by virtue of the primary law of the mind, connecting pleasure with exalted energy, the movement, once coinciding with the pleasure, would be sustained and adhered to, so long as it brought the pleasure; and in course of a few repetitions, a definite association would be formed between the state of chillness and this mode of relieving it. By a more lengthened and round-about process, more complicated associations would be formed, such as coming close to the warm body of a companion, running into shelter, approaching a fire, going into the sunshine, &c.; but, in all cases, the only mode of attainment that can be pointed out, is (1) the concurrence of spontaneous movements with feelings of pleasure, or relief from pain; (2) the maintenance of those movements by the first law of self-conservation; and (3) the forming of a link between the two by the force of plastic association.

The illustration may be varied by viewing the case from the side of pain. The immediate and direct result of pain, from the dawn of sentient life, is to lower active energy for the time, and therefore to arrest whatever movements are in progress: this is the general rule, although there is an important exception in the case of acute or pungent pains, which, in the first stage, stimulate and excite the active members. Hence, when a movement happens to coincide with a pain, it is liable to be arrested; a bitter morsel in the mouth makes one cease chewing, by reducing the active power for the moment. The primitive endowment of the system would lead to nothing further, until some chance movement of the mouth tended to get rid of it, which movement would be promoted and sustained by the pleasurable feeling of relief, which is the operation of the principle from the other side.

The growth of the Will is conspicuously shown in Imitation, which is an acquired aptitude, and a department of our voluntary power. In imitation, there must be (1) a spontaneous tendency to move the active organs concerned—the voice, the mouth, the hands, &.; (2) a sense of the effect, with a certain pleasure in attaining it; and (3) a cementing process, as already described. In learning to speak, the infant must first articulate something of its own accord; the resulting sound affects its own ear, and is discovered to coincide with a sound heard from others. The frequent repetition of the articulate effort leads to its being coupled in the mind with the sound that it gives; and when this association is mature, the sound heard will induce the articulating movement; and this is the power of imitation. But previous to the opportunity of associating the exertion of the mouth, throat, and lungs with the sound emitted, there does not appear to be any capability to imitate articulate sounds. The same would apply to imitation by the hands.

The Will in its full development includes not merely a series of associations of movements with the ordinary pleasures and pains, but also the power of performing actions to the word of Command, the Imitative faculty just discussed, and the power of acting from a mere Wish to perform a certain action, or to produce a certain effect upon things about us—as to open a window or stir the fire. It might be shown that all these various aptitudes grow, by successive stages, out of the three fundamental facts above described. The process involves many struggles and failures, from there being so much in it depending on accidental commencements; hence one reason of the slowness of the early education of human beings.—See Bain on *The Emotions and the Will*. See also FREE-WILL.

WILLEMS, JAN FRANZ, a distinguished Flemish philologist and writer, and noted as one of the originators of the great Flemish national movement, was born, in 1793, at the little village of Bonchont, near Antwerp. W., at the age of twelve, was sent to the town of Lierre, to learn singing and music, for which he had

early evinced considerable aptitude. At Lierre, which continued to be the seat of some of those ancient Belgian literary associations known as 'Rêderyk-Kamers,' or Chambers of Rhetoric, mysteries and other scenic representations were given from time to time in connection with these institutions; and during W.'s residence in the town he was frequently called upon to take part in these singular entertainments, a circumstance to which he ascribed his first impulse towards the study and cultivation of the old Flemish language and literature. The talents which he exhibited in his acting, and in the composition of satirical verses, attracted the notice of several influential persons at Lierre, through whose agency he was sent to Antwerp, to study in the office of a notary; and in 1811, he contended successfully for the prize awarded for the best poem on the battle of Friedland and the peace of Tilsit. From this period, his poetical and dramatic compositions followed each other in rapid succession. His ode *Aen de Belgen* (To the Belgians), which appeared in 1818, in which he exhorted his countrymen to resume the use of their native Flemish, and his clever treatise on *De Nederduytsche Tael en Letterkunde* (1819—1824), in which he traced the history of the Flemish and Dutch tongues from their common origin to their gradual but slight divergencies, marks an epoch in the literary history of Belgium.

The Dutch government showed their sense of his anti-French tendencies by giving him the post of Keeper of the Archives at Antwerp, while the Royal Institute at Amsterdam elected him a member of its learned corporation; but the Catholic party in Belgium resenting the attempt made by W. to refer the decline of Belgian national renown to the abandonment of the Flemish vernacular, looked upon his writings with mistrust; and in 1830, when Belgium was definitely separated from Holland, the dominant Belgian party deprived W. of his office, and left him for a time in obscurity and neglect. In 1835, chiefly through the influence of his old opponent, S. Van de Weyer, he was, however, promoted to the place of Keeper of the Archives at Ghent, where he continued to reside in the enjoyment of numerous literary successes and national honors, till the period of his death, which took place in 1846. W. had the satisfaction, during the latter years of his life, of seeing the gradual growth of the Flemish movement, which, since his death, has continued to advance with steady progress, and has resulted in the formation of many literary societies, the publication of numerous literary and historical remains of the old Flemish, and a more general cultivation of the vernacular. Among the numerous Flemish works published by W., special notice is due to his version of the medieval poem of *Reineke Vos*, or *Reynard the Fox*, for which he claims a Flemish origin; while, among the more important of his strictly national works, we may instance his editions of the rhymed chronicles of Jan de Klerk and Jan van Heelu, and his *Mengelingen van Vaderlandschen Inhond*.

WI'LLEMSTAD, a fortified town in North Brabant, on the Hollandsdiep, 19 miles north-west of Breda, erected by William I., Prince of Orange, to protect the traffic between Holland and Zeeland. There are 7 bastions, 2 forts, 2 inundation sluices, and a good haven. Pop. (1870) 1826; (1876) 2009. In 1793, Baron van Boetzelaar successfully defended W. against the French, under Dumouriez, who, after a heavy bombardment, were obliged to break up the siege. It was the birthplace of the naval hero, Callenberg, who, when De Ruyter fell in action with the French, succeeded to the command.

WI'LLEMSTADT, chief town of the island of Curaçao (q. v.).

WI'LLET (*Symphemia semipalmata*), a bird of the family *Scolopacidæ*, a native both of North and South America. It is about fifteen inches long; dark ash-color above; the rump, upper tail coverts, and under parts white, the tail grayish, the tail-feathers, all except the two middle feathers, spotted with dark-grayish brown; the secondaries of the wings white, with dark-brown spots. The bill is two inches and a half in length, very thick, compressed; the wings long; the legs long and strong, the tail short and nearly square; the toes partially webbed. This bird is found in summer as far north as the coasts of New England; in winter, it retreats to the Gulf States. The flesh is highly esteemed, and the eggs are reckoned a delicacy. Willets are usually seen in flocks, and generally near the sea. The name is derived from the note.

WILLIAM I., king of England, commonly called *William the Conqueror*, was the illegitimate son of Robert, surnamed *Le Diable*, Duke of Normandy. He was born in 1027, and succeeded to the dukedom on the death of his father, in 1035. Previous to his father's death, he had been intrusted to the care of Henry I. of France; but it was owing rather to the quarrels and jealousies of his own subjects than to the protection of Henry, that he was able to preserve his dominion intact until his arrival at manhood. In 1047, he gained a victory at Val de Dunes over a powerful competitor, Guido of Macon; and in 1054, he defeated another rival, Guillaume, Count of Arques, being aided in both contests by the French. His ambition now began to extend to England, where Edward the Confessor reigned at this time. On visiting England, W. found his hopes of succeeding Edward much strengthened by the dominance of Norman influence in the councils of that monarch. On Edward's death, however, the Witenagemöte (q.v.) chose Harold (q. v.) to fill the English throne; ignoring, according to the monkish chroniclers of Norman bias, in so doing, an alleged bequest of Edward in favor of William. The Norman asserted his pretended rights by a powerful invasion, and the result was his acquisition of the crown by the famous battle of Hastings, October 14, 1066.

Harold having been killed in the fight, the Saxons chose Edgar Atheling as his successor. Edgar was, however, soon obliged to yield, and W. was crowned king of England, December 25, 1066; from which day his reign is dated. Edgar remained for some time at his court, and his treatment of the conquered people was at first mild and conciliatory; but his savage suppression of a rebellion, which broke out in the north in 1070, laid the foundation of an irreconcilable antipathy between Saxon and Norman, which rendered a continuance of this policy impossible. Before long, W. began to rule like a true conqueror. Everywhere, the Saxons were reduced almost to a state of slavery. The higher classes were deprived of every office of church and state, while the people were ground down by new and oppressive taxes. Fortresses were erected over the country, and garrisoned to overawe the Saxon inhabitants. In 1072, the Saxons were so far reduced to submission, that W. found time to lead an army across the border into Scotland, in order to punish the king of that country, Malcolm Canmore, for having received and protected Edgar Atheling. The Conqueror marched as far north as the Tay, and received a nominal submission from Malcolm. In 1085, an attempt was made to overturn the power of the English king by Canute, king of Denmark. A great naval armament was got together for the purpose of invasion, but the enterprise was abandoned, its abandonment being caused partly by bad luck, and partly, it is supposed, by a skilful application of W.'s treasure. The tax called the *Danegel* (q. v.) was reimposed to meet the expense caused by the threatened war.

Disputes having arisen between W. and his son Robert respecting the duchy of Maine, which had come to W. through his marriage, November 2, 1053, with Matilda, daughter of Baldwin, 5th Earl of Flanders, father and son took up arms against one another. The dispute was ultimately adjusted, through the intercession of Queen Matilda. Most of the later part of W.'s life was spent in Normandy, the government of England being entrusted mainly to his half-brother, Odo, bishop of Bayeux. W. was of a corpulent habit of body, at which fact it seems that his brother-monarch, Philip I. of France, had pointed some sarcasm. W., in a fit of wrath, raised an army and invaded France. He took the city of Mantes, and set it on fire; but while in full enjoyment of the blaze, his horse, stumbling on some hot embers, threw him, and the injury he received proved fatal. He died September 9, 1087. Stern and ruthless as W. undoubtedly was, he yet knew how to govern a nation and protect it from foreign aggressions. For more than two centuries England had been harassed by the frequent descents of piratical hordes. He put an end to these. Never after W.'s time did a Norse rover venture to show face on the English coast. In the common administration of justice, he was royally impartial; many of his severities are even referrible in part to his thorough hatred of anarchy, while his attitude towards the church is admirable. He clearly defined the limits of ecclesiastical judicature, and when the formidable Hildebrand desired that the conqueror should do homage to him for the kingdom of England, the latter boldly refused.

WILLIAM II., king of England, surnamed *Rufus*, second son of William the Conqueror, was born in Normandy in 1056. He was educated by the celebrated Lanfranc, Archbishop of Canterbury. He was the favorite son of his father, who, on his deathbed, recommended him to the barons and prelates as his successor to the crown of England. W. was, at the time of his father's death, along with him in Normandy. But no sooner had the event taken place than he set out for England. Landing at Dover, he obtained possession of its castle and of several other fortresses. He then presented himself to Lanfranc, who proposed him to the nobles and prelates as their king. No opposition was offered, and W. was crowned on September 26, 1087. Meanwhile, his elder brother, Robert, had entered upon possession of the duchy of Normandy. The relative position of the brothers was such as, in these times, was sure to lead to war between them. Robert, at the instigation of Odo, Bishop of Bayeux, endeavored to excite an insurrection in England. This attempt having failed, W., in revenge, invaded Normandy in January 1091. An arrangement having been ultimately come to through the mediation of Philip I. of France, Robert and W. then turned their united arms against their third brother, Henry, who had purchased from Robert the district of Cotentin, comprising nearly

one-third of Normandy. The fortune of war went against Henry, who was driven into exile. Returning to England, W.'s next enterprise was an invasion of Scotland. The life of W. seems to have been a continual scene of strife. Returning from Scotland, he felt himself called upon to renew the contest with his brother, who had, meanwhile, strengthened himself by an alliance with Philip of France. A pecuniary payment, however, by W. to Philip soon dissolved the bond between him and Robert. W. would now, doubtless, have taken signal vengeance on his brother, had he not been recalled to England by disturbances in Wales and in the north.

In the year 1096, Robert, having resolved to go to Palestine, sold his duchy of Normandy to W., for £10,000. This transaction led to a contest between W. and a chieftain named Helie de la Flêche, who had all along disputed Robert's right to the Maine district of Normandy. Helie was not, however, able to withstand the English monarch, who now took the field against him. He was obliged to disband his forces and take to flight. This was the last warlike achievement of William Rufus. He was shot (it is said, accidentally, though there appears equally good reason to believe the act intentional) by an arrow, supposed to come from the bow of Sir Walter Tyrrel, while hunting in the New Forest, on August 2, 1100. His body was found by a poor charcoal-burner, who conveyed it in a cart to Winchester. W. inherited the courage, energy, and political talent of his father, but he was ruthless and unprincipled.

WILLIAM III., king of England, was the posthumous son of William II. of Orange, and Mary, eldest daughter of Charles I. of England. He was born in 1650. The alliance of his family with the Stuart's excited the jealousy of Oliver Cromwell, and by his influence, the young prince and his descendants were declared to be excluded from the Stadtholdership of the United Provinces. W. 'found himself,' says Macaulay, 'when first his mind began to open, the chief of a great but depressed and disheartened party, and the heir to vast and indefinite pretensions, which excited the dread and aversion of the oligarchy, then supreme in the United Provinces.' The restoration of the Stuarts, however, in England greatly improved his prospects; and on the murder of De Witt, W., then in his 22d year, was chosen Stadtholder. The republic was at this time carrying on an apparently hopeless war with its powerful neighbor, Louis XIV. of France; but by the wisdom and determination of the young Stadtholder, the contest, which lasted for nearly seven years, was in 1678 terminated by the treaty of Nimeguen, in a manner highly advantageous and honorable for the United Provinces. A few years before, their ruin had seemed inevitable; and the fame of W. became great over Europe.

Shortly before this event, he had married his cousin, the Princess Mary, eldest daughter of the Duke of York, afterwards James II. of England. This marriage, entered into solely from political considerations, did not at first prove a happy one. W. seems to have been jealous of his wife's position, and too reserved to give utterance to his feelings. According to Macaulay, a complete explanation and reconciliation were ultimately brought about by the agency of Bishop Burnet.

In 1686, W. became the head of a league formed among the Protestant princes of Germany, the kings of Spain, Sweden, and others, having for its object to curb the power of Louis XIV. The treaty by which the alliance was constituted was signed at Augsburg in July 1686. In England, the tyranny of James II. was now beginning to estrange from him the affections of every class of his subjects. The eyes of all were turning towards the Stadtholder as their only hope. Having formed his resolution, W. conducted his operations with great secrecy and skill. On the 5th November 1688, he landed at Torbay, with an army of 15,000, composed of English and Dutch. His success was rapid and bloodless. Men of influence of all parties gave him their presence and support; and on the 18th of December following, he entered London triumphantly as a national deliverer. The adherents of James held out for some time in Scotland and Ireland; but the death of Dundee ended their resistance in the former country; while in the latter it was ended in 1691, after a vigorous contest of two years, in which the Stuart party had, in most cases, the advantage. The object of W., in accepting the crown of England, was probably not so much to free the English nation from the tyranny of James, as to enlist its power on his side against that of France.

In spite of his sterling qualities, and of the debt which they owed to him, the English nation never really liked William III. The death of his wife, on whom the crown had been conferred jointly with himself, in 1695, materially injured his position. His schemes were thwarted by parliament; continual plots for his assassination were hatched by the adherents of James; and in his warfare with France, victory was almost always on the side of Louis, W. being in person repeatedly defeated by Luxembourg (q. v.); and it was not without a struggle and a pang that he agreed to the terms of the peace, eminently popular, however, which was concluded at Ryswick on 10th September 1697. The death of Charles II. of Spain in 1700, and the succession of Philip of Anjou, was another blow to his policy. He carried it on, however, with unflagging vigor till his death, which was occasioned by a fall from his horse, on 8th March 1702. The massacre of the Macdonalds of Glencoe (q. v.), and his conduct to the promoters of the Darien Scheme (q. v.), are two blots on W.'s reputation which his most thoroughgoing apologists have been unable to efface. However, he was undoubtedly a practical genius of the highest order, and the services which he rendered both to England and to his native country can hardly be overrated. During his reign the Bank of England had been founded, the modern system of finance introduced, ministerial responsibility recognized, the liberty of the press secured, and the British constitution established on a firm basis. In his domestic life, he committed the error of a too stern repression of all manifestation of kindly or genial feeling. His manner was wholly Dutch, and even his countrymen thought him blunt. 'In his intercourse with the world in general,' says Lord Macaulay, 'he appeared ignorant or negligent of those arts which double the value of a favor, and take away the sting of a refusal.' —See Macaulay's *History of England*.

WILLIAM IV., king of Great Britain and Ireland, third son of George III., was born on 21st August 1765. Until 1771, he remained, along with the Prince of Wales and Prince Frederick, under the care of Dr. Majendie. He was then sent to Kew, where, with Prince Edward, afterwards Duke of Kent, he was under the guardianship of Colonel Bude. On 15th June 1779, he entered the navy as midshipman on board the *Prince George*, then under Rear-admiral Digby. The *Prince George* then joined Admiral Rodney's squadron, on its way to Gibraltar. After seeing a considerable amount of service, Prince W. was made a lieutenant on 17th June 1785; and in the year following, he received his commission as captain. In 1789, he was created Duke of Clarence and St. Andrews, and Earl of Munster, with an allowance from parliament of £12,000 a year. Subsequent to this, several acts of insubordination rendered an actual continuance of his professional career impossible. He was, however, formally promoted through the successive ranks until he was made Admiral of the Fleet in 1801. Meanwhile, however, he had been living almost entirely ashore, along with Mrs. Jordan, a celebrated actress, with whom he had become connected in 1791. By her he had a family of five sons and five daughters who became known by the surname Fitzclarence, and were raised to titular dignities. On 11th July 1818, he married Adelaide, eldest daughter of the Duke of Saxe-Meiningen. The issue of this marriage was two daughters, both of whom died in infancy. By the death of the Duke of York in 1827, the Duke of Clarence became heir-presumptive to the throne, to which he succeeded, on the death of his brother, George IV., on 26th June 1830.

The great event of the reign of W. IV. was the passing of the Reform Bill. After a fierce and protracted struggle, the bill was read a third time in the House of Lords on 4th June 1832, and three days afterwards it received the royal assent. The first Reformed parliament met on 29th January 1833. The abolition of colonial slavery, the reform of the poor-laws, and of the Irish church, were the immediate results of the great constitutional change. King W. died, after a short illness, on 20th June 1837. He was succeeded by his niece, Queen Victoria.

WILLIAM THE LYON, one of the early kings of Scotland, succeeded his brother, Malcolm IV., in 1165. He is commonly called W. the Lion, but why he obtained that title is one of the mysteries of history. When heraldry long afterwards became a science, and was supposed to have been in use earlier than it really was, it was not unnaturally supposed that he was the first king who used, as a heraldic achievement, the lion, afterwards the chief feature in the arms of Scotland. His predecessors had long contested with the kings of England the sovereignty of Northumberland and other districts of what is now the north of England. Under Malcolm, these claims were virtually abandoned, and the king of Scots received, as a sort of equivalent for them, the earldom of Huntingdon and other valuable estates holding of the English crown. William had still, however, a hankering after the Northumbrian districts. He attended Henry of England in his continental wars, and is supposed, when doing so, to have pressed for a portion at least of the old disputed districts. In his disappointment, he invaded them, after the example of his ancestors. On the 13th July 1174, he fell, almost by accident, into the hands of an English party. For security, he was conveyed to Normandy, and there he consented, as the price of his liberation, to perform that homage for his kingdom which the English kings so long in vain attempted to exact from the government of Scotland. How far the Scots community would have admitted that he had a right to bind them to such a condition may be doubted. The treaty of Falaise, however, as the transaction was termed, from the place where it was adjusted, was revoked in the year 1189 by Richard I. of England, in consideration of a

payment of 10,000 marks, which he wanted for his celebrated expedition to Palestine. W. had several disputes with the church, but he was one of the early benefactors of the regular ecclesiastics, and founded, in 1178, the great abbey of Arbroath, which he dedicated to Thomas à Becket, who had been slain eight years earlier. King W. died in 1214.

WILLIAM, PRINCE OF ORANGE, and COUNT OF NASSAU, the founder of the independence of the Netherlands, was born at Dillenburg, April 16, 1533. His father, William, was the second son of Count John of Nassau-Dillenburg, and succeeded to the German possessions of the family; while his elder brother, Henry, obtained the extensive estates in Luxemburg, Brabant, Flanders, and Holland. The latter also by his marriage with Claudie of Chalons, added the charming and valuable little principality of Orange to his already extensive domains; but his son René dying without issue, left Orange along with the Low Countries' estates to W., in 1544. W. had hitherto lived at Dillenburg under the care of his father, who was a zealous Lutheran; but on his becoming the most powerful lord of the Low Countries, he was sent to the Queen Regent's court at Brussels, and brought up in the Catholic faith. At the age of 15, he became page to the Emperor Charles V., who took an almost paternal care of him, attentively watched the development of his character, and, satisfied with the result, took him into his inmost confidence, making him the safe repository of the most important secrets, employed him in various diplomatic offices, and in 1555, promoted him, over the heads of all his veteran officers, to the command of the imperial army on the French frontier. In all these various situations, W. acquitted himself completely to his patron's satisfaction; displaying acute intelligence, sound judgment, and a precocious knowledge of men, while bearing himself with a grace and dignity of manner that gained universal esteem. Charles, on his abdication, strongly recommended W. to his son Philip as a confidential adviser; and accordingly, we find him employed to draw up the treaty of Cateau-Cambresis, and selected as one of the four hostages to be given to France for its fulfilment. During W.'s residence in France, he was confidentially informed by Henry II. of a secret arrangement which was being formed between France and Spain for the complete extermination of heretics in both countries; and with admirable nerve, dissembling his horror of the project, he resolved in his own mind to oppose the execution of the scheme in the Netherlands to the uttermost of his power.

On returning to the Low Countries, he became the leader of the party which devoted itself to the maintenance of the chartered liberties of the country, agitated for the recall of the Spanish troops, opposed the augmentation of the number of bishoprics (a pet scheme of Philip's, for his opposition to which he first incurred the bitter dislike of his sovereign), and finally broke entirely with Cardinal Granvelle, the president of the council, and the willing agent of Philip's tyranny. Expostulations to the Regent Margaret of Parma, and directly to Philip himself, far from producing any good result, seemed only to hurry the bigoted monarch to more extreme measures; the cruel edicts against heretics were made still more stringent, and at the end of 1564, the inquisition was established. W., however, steadily refused to allow these oppressive enactments to take effect in his hereditary governments of Holland and Zeeland; and though he did not join in the famous protest known as the 'Compromise' which was presented to the regent by the 'Beggars,' he supported their proposals at court, seeing that, though maintained with somewhat too much violence, their aims were the same as his own. For the next few years, he was unremitting in his exertions to impress both the rulers and the people with the desirableness of moderation, and on several occasions succeeded by his personal influence in repressing religious dissension. Hitherto, he had labored conjointly with Counts Hoorn and Egmont, but failing to convince his two associates of the rank duplicity of the king, of which he himself was assured by means of the spies in his pay at the Spanish court, and of his perfidious designs against them, he was compelled to leave them to their fate, and retired to his German estates. Hoorn and Egmont were seized and executed; W., cited as a rebel (January 1568), and, on the ground of being a knight of the Golden Fleece and a sovereign prince, refusing to appear, had his estates confiscated, and the Duke of Alva arrived at Brussels, to reduce the provinces to submission.

W. had hitherto lived in a most luxurious and extravagant manner, the splendor of his household far exceeding that of his royal master; but now he effected a thorough retrenchment, and disposed of his valuables, to equip four armies for the invasion of the Low Countries. Two of the armies failed completely; the third, under his chivalrous brother Louis, was destroyed at Jemmingen by Alva; and the fourth, 30,000 strong, under his own immediate command, lay in Brabant, unable to force Alva's army to a conflict, till want of the means of paying his soldiers forced him to retreat. His next attempt was made in 1572, and though as unsuccessful on land as before, he succeeded in exciting Holland, Zeeland, Gelders, Overyssel, and the bishopric of Utrecht, to rise for their liberties; and was proclaimed by these provinces as their stadtholder for the king, whose authority he and they still acknowledged. Meantime, his coadjutors, the 'Reggars of the Sea,' had taken Brill and Flushing, and had committed heavy depredations on Spanish commerce. But ere long the fortune of the Spaniards on land was again in the ascendant; fortress after fortress fell into their hands, despite W.'s utmost efforts to relieve them; and though Holland and Zeeland still remained faithful to the cause of liberty, he found it impossible to raise an army which could fairly cope with the enemy. He succeeded, however, by breaking the dykes, in saving Leyden, though Antwerp and Haarlem experienced all the horrors of a siege and capture. It was at this period that W. openly professed himself a Calvinist, though, with his usual moderation, he utterly disclaimed the bigoted fanaticism which characterised his co-religionists, and in which they went near to equal their adversaries the Catholics. Success still attended the patriot fleet, and though the gallant Louis, with his brother Henry, was defeated and slain at Mookerheide (14th April 1574), the ruinous condition of the Spanish finances, and the general detestation in which the soldiers of Philip were justly held, helped W. to hold his ground.

In March 1575, conferences were opened at Breda between the belligerents, but Philip obstinately refusing to yield an iota, they were broken off; and in October of that year, the provinces of Holland and Zeeland pronounced Philip's deposition, and gave power to W. to choose the country under whose protectorate they were to be placed. Meantime, the rapacity of the Spanish soldiery had roused the fifteen provinces which still remained loyal to Philip, and the league, known as the *Pacification of Ghent* (October 1576), the object of which was to drive out the foreign troops, and establish, at least for a time, toleration in religion, was the consequence. This was a brilliant success for W.; and though Don John of Austria, the new governor, tried to dissolve it by the 'Perpetual Edict' (12th February 1577), in which he granted nearly all demands, W. succeeded, by skillful policy, in foiling the attempt. War was accordingly resumed, and the patriots were defeated at Gembloux (31st January 1578), though their spirits were from time to time buoyed up by an occasional success. The next governor, Alexander Farnese, succeeded, however, in detaching the Walloon provinces from the league, though, to compensate for this, W. obtained the signature of the *Union of Utrecht* (23d January 1579), the first foundation of the Dutch Republic. In the following year, his two faithful provinces, Holland and Zeeland, after having been nominally under the sway of the Archduke Matthias of Austria, and of the Duke of Anjou, proclaimed W. their sole ruler, the Duke of Anjou being still acknowledged as sovereign of the others. W., however, after his long and desperate struggle for his country's freedom, was not destined long to enjoy the honors of sovereignty, for, on 15th March 1580, Philip had, by Granvelle's advice, put a prize of 25,000 gold crowns on his head, and the incitement of this magnificent bribe produced various attempts to assassinate him, the last of which, by Balthasar Gerard, was successful at Delft, 10th July 1584. W. was four times married, and left by his first wife, Anne of Egmont, Philip-William, Prince of Orange; by his second, Anne of Saxony, the famous Maurice (q. v.); and by his fourth, Louise de Coligny, Frederick-Henry, who succeeded Maurice as stadtholder of Holland.

WILLIAM I. (Ger. FRIEDRICH-LUDWIG WILHELM), king of Prussia, and, since 1871, emperor of Germany, is the second son of Frederick-William III., and was born 22d March 1797. He joined the army at an early age, and was engaged in the campaigns of 1813—1814 against France. On the accession of his elder brother, Frederick-William IV. (q. v.), to the throne in 1840, W. became governor of Pomerania, and afterwards sat in the Prussian diet, and vigorously supported the absolutist party. In consequence, he was so much disliked by the people, that on the outbreak of the revolution of 1848 he had to flee to England; though he returned some months after, and was elected to the National Assembly. However, from this time he interfered little in the quarrels between the Constitutionalists and Absolutists, though he gladly accepted the command of the troops despatched to put down the rising in Baden; and in October 1857, the king having become incapacitated for business, W. was commissioned to act as regent, a commission renewed from time to time till his permanent installation in October 1858. At this time he was very popular in Prussia, owing to his supposed opposition to some of the obnoxious measures of the king's ministers, and to his vigorous advocacy of conjoint action with Britain and France in the war of 1854; and his election as regent was consequently opposed by the aristocratic and pietistic parties, who were, on his elevation, dismissed from power, and a more liberal ministry formed. On January 2, 1861, W. ascended the throne; and on the occasion of his coronation at Königsberg on 18th October following, he himself put the crown on his head, declaring that he 'ruled by the favor of God, and of no

one else.' The result of the elections to the Chamber of Deputies, which were being carried on at the same time, being much in favor of the liberal party, W., who was quite astonished at the fact of the party whom he looked upon as the opponents of the crown having a majority, attributed it to the intrigues of secret enemies; and in his address at the opening of the Chambers, saying that he 'never could permit the progressive development of our inner political life to question or to endanger the rights of the crown and the power of Prussia,' disclosed the principle of his policy, a policy which, with all the unflagging perseverance and unconquerable obstinacy which characterize men, like him, of thorough honesty, unflinching firmness, and considerable narrow-mindedness, he has since unremittingly pursued.

The first chamber which sat after his coronation was dissolved, despite the protest of a large majority of the members; but the succeeding elections further increased the liberal majority; and though some popular measures were brought forward, and some obnoxious taxes abolished, the new chamber proved as refractory as its predecessor, and refused its consent to the extensive changes in the Prussian military system (the king's pet scheme), and to the raising of money by loan, to be applied for that and other ministerial projects, till its constitutional powers were fully acknowledged. On September 22, 1862, Herr von Bismark-Schönhausen, formerly the ambassador at Paris, was made prime minister; and the deputies having not only rejected the ministerial budget, but resolved that the expenditure of moneys not sanctioned by them was a breach of the constitution, the chamber was dissolved, October 14, the king declaring by message, that as the three estates could not agree, he should continue to do his duty to his people, without regard to 'these pieces of paper called constitutions,' in which he had no faith. The number of the liberals was further increased in the following year, and the contest continued; the deputies displaying the same firmness and extreme moderation as before; while the king and his ministers made it plainly understood, that if the lower chamber did what the government asked it to do, all would be well; but if not, the king would 'do his duty' without its aid. However, this strife between the old feudal and the modern liberal doctines was shelved at the close of 1863, by the able strategy of Bismark, who revived the old dispute with Denmark regarding its government of Slesvig and Holstein, and by forcing Austria to conjoint action, contrived to make the question one of 'German' interest. See SLESVIG. Then came the war (see GERMANY) between Prussia and Austria. W. became the head of the North German Confederation in 1867. At Ems, in July 1870, took place the memorable interviews between W. and the French ambassador, Benedetti, which ended in the war of 1870—1871. W. accompanied the army, and commanded at the decisive battles of Gravelotte and of Sedan.

On January 18, 1871, W. was proclaimed emperor of Germany in the palace of the French kings at Versailles; and now, as if completely to re-habilitate the old imperial title, the ancient enmity between pope and emperor has been fully revived by the recent education measures of the German government. In May 1878 the emperor was twice shot at, being seriously wounded the second time. These attempts were attributed, directly or indirectly, to Socialist influence, and have led to legislation tending to repress Socialism. W. married, 11th June 1829, Maria Louisa of Saxe-Weimar, by whom he has issue Frederick-William (q. v.), the Crown Prince of Prussia; and Louisa, the present Grand-duchess of Baden.

WILLIAM II. (FREDERICK GEORGE LEWIS), King of the Netherlands, son of William I., was born at the Hague, 6th December 1792. In 1795 his father sought an asylum in England, and a few years later went to settle at Berlin. The young prince studied at Berlin and Oxford; and in 1811, joining the army in Portugal, he served on the staff of Lord Wellington, to whom he became adjutant, and speedily obtained the rank of colonel. His bravery was conspicuous at Fuentes de Onoro and Ciudad Rodrigo. At Badajoz, the storming column having been repulsed, the young prince met and rallied the retiring troops, leading them anew to the attack, and was the first to spring into the breach. He took an active part at Salamanca, Vittori, and the battles of the Pyrenees. On the return of the Orange family to the Netherlands, William I. made him commander of the army. The last campaign of Napoleon brought the prince again into active service, and he gained fresh laurels at Quatre Bras and Waterloo, where he was wounded.

The Prince of Orange married, 26th February 1816, Anna Paulowna, youngest sister of the Emperor Alexander I. of Russia. When the Belgian revolution began in 1830, he was called again into public life; and, as governor of the loyal districts, tried by concessions to allay the storm, but the provisional government at Brussells was not to be satisfied, and having over-stepped the limits of his commission, the prince was recalled. In July, he took command of the army, and pushed to the center of Belgium; when at Louvain, his victorious course was interrupted by French intervention, and the Dutch army retired to the north. Having more liberal views than were then common, the prince took little share in state affairs, and spent his life chiefly at Tilburg, as commander of the army of observation. On the abdication of William I. (see NETHERLANDS), the Prince of Orange assumed the reins of government (1840) as William II. The political movements of 1848 were felt in the Netherlands, as in other countries; and the ministerial plans of reform not having satisfied the party of progress, the king announced his willingness to sanction whatever changes in the constitution were thought necessary, and the storm was averted. The new constitution was proclaimed 3d November 1848. W. died on the 17th March 1849, regretted by all ranks. He was Marshal in the British army, and held a multitude of European orders.—See *Het Leven van Willem II.*, door J. J. Abbink; also the same by Bosscha.

WILLIAM III. (ALEXANDER PAUL FREDERICK LEWIS), reigning king of the Netherlands, was born 19th February 1817, and succeeded to the throne on the death of his father, William II., in 1849. The kingdom has since enjoyed uninterrupted peace, material prosperity has increased, and the public debt has been considerably reduced. W.'s reign has been chiefly distinguished for undertakings which contribute to the true greatness of a nation. The drainage of the Haarlem Lake (q. v.) was completed in 1852, removing an ever-enlarging enemy, and adding nearly 50,000 acres to the wealth-producing power of the country. In 1863, the slaves in the Dutch West Indian colonies were emancipated, under wise restrictions. Railways have been extensively constructed; the water-way to Rotterdam has been improved; and the Isthmus of Holland has been cut by a canal, which is continued through the Ij. Parliamentary institutions have been greatly developed. In 1866, Luxemburg and Lumburg were withdrawn from the German Confederation, the latter being incorporated with the Netherlands. By his first wife, a Würtemberg princess, W. had two sons, of whom one, Alexander, Prince of Orange (born 1851), survives; by his second wife, a daughter of the Prince of Waldeck, a daughter (born 1880).

WILLIAM AND MARY COLLEGE, next to Harvard College, the oldest institution of learning in America, was established at Williamsburg, Virginia, 1693, and endowed with lands, and placed under the patronage of the king and queen of Great Britain. The trustees of the Hon. R. Boyle, the English philosopher, who left his personal estate for 'charitable and pious uses,' presented a great part of it to this college for the education of Indians. At the Revolution it lost most of its possessions, half the students entered the army, and the French troops occupied its buildings as a hospital. Here were educated Presidents Jefferson, Madison and Monroe, Chief-justice Marshall, and General Scott. Its students were enthusiastic supporters of the revolution of 1776. In its collegiate departments there are 6 instructors and about 40 students.

WILLIAMS, JOHN, a celebrated missionary, was born at Tottenham, London, 29th June 1796. At the age of 14, he was apprenticed to an ironmonger, and during his apprenticeship, displayed a great taste for mechanics, and acquired a knowledge of mechanical arts, which he afterwards turned to great account. Having become deeply religious, he offered himself to the London Missionary Society as a missionary to the South Seas. He was ordained in 1816, and sent to Eimeo, one of the Society Islands. Two months after his arrival, he was able to preach to the people in their native tongue. From Eimeo, he soon went to Huaheine, and afterwards to Raiatea, the largest of the Society group. His labors here were attended with great success; the island became Christian, and the arts and habits of civilization were introduced along with Christianity. Wherever W. went, he not only preached the gospel, but instructed the people in the arts, so as to elevate them from their state of barbarism. At Raiatea, he heard of Raratonga, the chief of the Hervey Islands, and thither he went in 1823. The mission which he founded there was eminently successful; not only Raratonga but the whole group of the Hervey Islands being soon Christianized. In his missionary work, W. made great use of native teachers, trained by himself. He translated the New Testament into the Raratongan language, and prepared books for the schools which he established. After spending some time in Raratonga, he wished to return to Raiatea; but the island in which he lived lay out of the way of vessels, and he resolved to build one. He made all the necessary tools, and in about 15 weeks completed the vessel itself, a boat 60 feet long, and 18 wide, the sails of native matting, the cordage of the bark of the *Hibiscus*, the oakum of cocoa-nut husks and banana stumps. In this vessel, during the next four years, he visited many of the South Sea Islands, extending his missionary labors to the Samoa Islands. In 1834, he came to England, where he remained for nearly four years, during which he procured the publication of his Raratongan New Testament by the Bible Society, and raised £4000 for the purchase and outfit of a missionary-ship for Polynesia.

In 1838, he returned to the chosen sphere of his labors, visited many of the islands, and finally the New Hebrides, where he hoped to plant a mission, but was killed, 20th November 1839, and most of his body eaten by the savage natives of Erromanga, on the shores of which he had landed. His death was the occasion of great lamentation in the islands which owed to him their Christianization and civilization. W. was remarkably successful as a missionary, not only by his own preaching, but through the instrumentality of natives whom he trained. He possessed in an extraordinary degree the power of organizing. His mechanical skill and genius were also of great service, and no other missionary has ever been so successful in making the progress of civilization attend upon the progress of Christianity.

WILLIAMS, ROGER, founder of the state of Rhode Island, U. S., was born at Conwyl Cayo, Wales, in the year 1606. In his youth, he came to London, and attracted the attention of Sir Edward Coke by his short-hand notes of sermons, and speeches in the Star Chamber; and was sent by him to Sutton's Hospital, now the Charterhouse School, in 1621; and on April 30, 1624, he entered Jesus College, Oxford, where he obtained an exhibition. He studied Latin, Greek, Hebrew, French, and Dutch, and was ordained a clergyman of the Church of England, but soon became an extreme Puritan, and emigrated to New England, arriving at Boston, February 5, 1631, 'a young minister, godly and zealous, with his wife Mary.' He refused to join the congregation at Boston, because the people would not make public declaration of their repentance for having been in communion with the Church of England; he therefore went to Salem, as assistant-preacher, but was soon in trouble for denying the right of magistrates to punish Sabbath-breaking and other religious offences, as belonging to the first table of the Law. For his opposition to the New England theocracy, he was driven from Salem, and took refuge at Plymouth, where he studied Indian dialects.

Two years later, he returned to Salem, only to meet renewed persecution and banishment from the colony, for denying the right to take the Indians' lands without purchase, and the right to impose faith and worship. He held that it was not lawful to require a wicked person to swear or pray, which were both forms of worship; and that the power of the civil magistrate extends only to the bodies, goods, and outward state of men, and not to their souls and consciences. Banished from the colony in 1635, and threatened to be sent back to England in order to prevent the infection of his new doctrines from spreading, he escaped in midwinter to the shores of Narraganset Bay, accompanied by a few adherents, where he purchased lands of the Indian chiefs, founded the city of Providence, and established a government of pure democracy. Having adopted the belief in adult baptism of believers by immersion, W. was baptised by a layman, and then baptised him and ten others, and founded the first Baptist church in America. Later, he doubted the validity of this baptism, and withdrew from the church he had founded. In 1642, he came to England to procure a charter for his colony, and published a *Key to the Languages of America*, and *The Bloudy Tenent of Persecution for Cause of Conscience Discussed*, &c.—his chief work on the nature and sphere of civil government. After returning to Rhode Island, he came a second time to England on business of the colony in 1651, when he published *Experiments of Spiritual Life and Health, and their Preservations*, dedicated to his friend, Lady Vane, and written, as he says, 'in the thickest of the native Indians of America, in their very wild houses, and by their barbarous fires;' also, *The Hireling Ministry none of Christ's*, and *The Bloudy Tenent yet more bloudy by Mr Cotton's Endeavour to wash it White in the Blood of the Lamb*. At this period, he engaged in an experiment of teaching languages by conversation, and made the acquaintance of Milton. He returned to Rhode Island in 1654, and was elected President of the colony; refused to persecute Quakers, but held a controversy with them, and published *George Fox digged out of his Borrowes*.

By his constant friendship with the Indians, he was of great service to the other colonies; but they refused to remove their ban, or to admit Rhode Island into their league. He died in 1683.—See Memoirs, by James D. Knowles (Boston, 1833); William Gammell (Boston, 1846); Romeo Elton (London, 1852).

WILLIAMSBURG, a city of Virginia, U. S., between York and James rivers, 60 miles south-east of Richmond, the site of William and Mary College (q. v.), and the Eastern State Lunatic Asylum. W. was founded in 1632, is the oldest incorporated town in the state, and was the colonial and state capital till 1779. A battle was fought here between General M'Clellan and the Confederates, May 5, 1862. Pop. in 1870, 1392.

WILLIAMS COLLEGE, an institution of learning in Williamstown, Massachusetts, U. S., founded by a bequest of Colonel Ephraim Williams in 1755; incorporated in 1793, with further endowments of state grant, and the privilege of raising money by a lottery. In 1836, it was provided with an astronomical and magnetic observatory, the first in America. It has since been liberally endowed by Amos Lawrence, Nathan Jackson, the government, &c., and had in 1880, 12 instructors, 206 students, 2544 alumni, and a library of 19,000 vols.

WILLIAMSPORT, a city of northern Pennsylvania, U. S., on the West Branch of the Susquehanna. It is on the West Branch Canal, and the intersection of three railways, and is one of the three great lumber marts of the Union. It has 35 saw-mills, 13 planing-mills, 5 iron-foundries, and numerous factories. There are 32 churches, 7 banks, 2 daily and 7 other newspapers, 1 high school, and 8 public-schools. Pop. (1870) 16,030; (1880) 18,934.

WILLIBROD, or WILBRORD, ST., first Bishop of Utrecht, and 'apostle of the Frisians,' claims notice as being one of that meritorious band of British and Irish missionaries by whom Christianity was established in Northern Germany. He was born about the year 658, in the kingdom of Northumbria; and, although educated in the monastery of Ripon, where he received the tonsure, was sent, for final instruction, like most of the monks of that age, to the schools of Ireland. After a sojourn of thirteen years in that country, he resolved to devote himself to the conversion of Friesland, in which some of his fellow-monks had already engaged with little success. In 690, he sailed with twelve companions, and passing up the Rhine, arrived at Ultrajectum, the present Utrecht, soon after the victory of Pepin over the Frisians. By Pepin, they were warmly received; and W. having established the first beginnings of his mission, went to Rome in 692, whence he returned, with the sanction of the pope, Sergius I., and continued his labor till 695, when he again visited Rome, and received episcopal consecration, together with the Pallium of an archbishop. Fixing his see at Utrecht, he converted a large number of the inhabitants, and extended his missionary colonies from that center as far as the Danish provinces; and, although he received some check upon the death of Pepin in 714, yet the successes of Charles Martel enabled him soon afterwards to resume, under similar favorable auspices, the work which, after many alternations, ended in the successful establishment of Christianity. W. died at a very advanced age in 738, at the monastery which he had founded at Echternach, near Treves. His festival is the 7th of November.—See Bede's *Ecclesiastical History*, chaps. 10 and 11.

WILLIS, NATHANIEL PARKER, American author, was born at Portland, Maine, January 20, 1807. His father became the publisher of the *Boston Recorder*, said to be the first religious newspaper ever permanently established. Educated at Yale College, he obtained in 1828 a prize for *Scriptural Poems*. On the completion of his college course, he established the *American Monthly Magazine*, afterwards merged in the *New York Mirror*, in which he was associated with George P. Morris. In 1830, he visited Europe, and contributed to the *Mirror* his *Pencilings by the Way*. Appointed *attaché* to the American legation at Paris, he had favorable opportunities for observing European society; and after a visit to Greece and Turkey, returned to England in 1835, and was married to a daughter of a British officer, General Stace. While in England, on account of some personalities in his writings, more consonant to American than English manners, he became involved in a quarrel with Captain Marryat, which led to a duel. He contributed to the London *New Monthly* his *Inklings of Adventure*, also published in three vols.; and in 1839, returned to New York, and published a literary paper, *The Corsair*, and *Letters from under a Bridge*, written at a beautiful country-seat, named, in compliment to his wife, Glenmary. He wrote also at this period *Tortesa the Usurer* and *Bianca Visconti*, dramas, and the descriptions of scenery illustrated in Bartlett's *United States and Canada*. In 1844, he engaged with General Morris in editing the *Daily Mirror*. His wife died, and he revisited Europe, and published *Dashes at Life with a Free Pencil*, 1845; returned to New York in 1846, he was married to a daughter of the Hon. Joseph Grinnell, of Massachusetts, and with his former partner established the *Home Journal*; to which he contributed most of the following works, also published in a collected form: in 1850, *People I have Met*, and *Life Here and There;* 1851, *Hurrygraphs, Memoranda of a Life of Jenny Lind;* 1853, *Fun Jottings, A Health-trip to the Tropics. A Summer Cruise in the Mediterranean;* 1854, *Famous Persons and Places. Outdoors at Idle Wild;* 1855, *The Rag-bag;* 1856, *Paul Fane, or Parts of a Life else Untold;* 1860, *The Convalescent*. Much of this work was done during a long, brave struggle with what appeared to be consumptive disease.

Mr. W. was an observant and thoughtful writer, discursive, fragmentary, picturesque, sprightly, quaint, and graceful, full of elaborate ease, and ingenious spontaneity. He edited the *Home Journal* (General Morris having died in 1864), and resided at his romantic highland retreat of Idle Wild, until his death, January 21, 1867.—His sister is a popular writer, under the *nom de plume* of 'Fanny Fern;' and his brother, Richard Willis, is a musician and musical critic.

WILLOW (*Salix*), a genus of trees and shrubs of the natural order *Salicaceæ*, otherwise regarded as a sub-order of *Amentaceæ*. This order or sub-order, to which the Poplar (q. v.) also belongs,

is distinguished by having the flowers naked or with a cup-like perianth; numerous ovules; a naked, leathery, one-celled, two-valved fruit; seeds with long hairs; leaves with stipules. In the willows, the flowers are absolutely naked, the stamens from one to five in number, the leaves simple and deciduous. There are many species, but their precise number is not likely to be soon determined, as they are very difficult to distinguish botanically, and varieties are very numerous. They are mostly natives of the colder temperate regions of the northern hemisphere, although some are found in warm countries, as *Salix tetrasperma* in the hottest parts of India, and another species abundantly on the banks of the Senegal. Most of them are shrubs, and some are of very humble growth, particularly those of arctic and alpine regions. Thus, *S. herbacea*, which is common on the mountains of Scotland, seldom rises more than an inch from the ground. *S. arctica* and *S. polaris* are the most northern woody plants. Other small species are also found to the very limits of perpetual snow in different countries, as *S. Lindleyana* on the Himalaya. Some of the species have already been noticed in the articles OSIER and SALLOW. Some of those which more generally receive the popular name W., are trees of large size, and remarkably rapid growth. The wood of some of them, as the WHITE W., or HUNTINGDON W. (*S. alba*), and the CRACK W. (*S. fragilis*), is used for many purposes, being remarkably durable, especially in damp situations, although light and soft. It was anciently used for shields.

Cork-cutters and others employ it for whetting sharp-edged implements. It is very tough. It is used for making paddles of steam-boats, because it wears better in water than any other kind of wood. Willows are often planted as ornamental trees, especially near streams and in moist grounds. Many kinds are also planted on the banks of rivers, to retain the soil in its place, and restrain the encroachments of the river. They are the better adapted for this purpose that they grow readily by cuttings; and willow-stakes driven into a moist soil strike root, and soon become luxuriant. The twigs of most of the willows are very tough and flexible, and are used by coopers for making hoops, and by gardeners for tying espalier trees, and for many similar purposes. They are much used for basket-making and other kinds of wicker-work. See OSIER. Willow withes were probably amongst the first ropes used by man. But the young shoots of many of the kinds with ovate or little elongated leaves are comparatively brittle, and ill adapted for wicker-work. Willow trees are sometimes treated as pollards, and the lop used for fuel and other purposes. They are also often grown as coppice-wood, yielding a great bulk of hoops, poles, fuel, &c. The leaves and young shoots are in some countries used as food for cattle, and even dried and stacked for that use. A fragrant water is distilled in the north of India from the catkins of the EGYPTIAN or CALIPH W. (*S. Egyptiaca*). A principle called *Salicine* exists in the bark of willows, which has been found efficacious in intermittent fevers, and is sometimes used as a substitute for quinine. It is crystalline and intensely bitter.—The flowers of the W., which in many species appear before the leaves, are much sought after by bees. The male catkins of many species are very beautiful, the prominent anthers being of a fine yellow color, or as in *S. purpurea*, of a rich purple. The WEEPING W. (*S. Babylonica*), of which an illustration is given under WEEPING TREES, is a very ornamental species, a native of the East, now much planted in Britain, and on the continent of Europe, on account of its beautiful pendent twigs. What is called NAPOLEON'S W. is a variety of it.—The White W., or Huntingdon W., is by far the largest species known in Britain. It attains a height of eighty feet, and grows so rapidly that a cutting has been known to become a tree of thirty feet in ten years. Its head is much branched and spreading, its leaves narrow elliptical-lanceolate, silky beneath, and sometimes also above.

WILLOW-MOTH (*Caradrina cubicularis*), a species of moth, of



Willow-moth (*Caradrina cubicularis*):
a, caterpillar; *b*, pupa in its cocoon; *c*, willow-moth at rest; *d*, insect with wings expanded.

which the caterpillars feed upon the grain of wheat, often doing very much mischief. The perfect insect is of a mouse color, and its wings are closed flat upon its back when it is at rest. On the upper wings are three transverse wavy lines, and some black dots. The under wings are pearly white, with a slight tinge of brown near the fringe, and brownish nervures. The body is slender, the antennæ thread-like. The whole length, without the antennæ, is rather more than half an inch. The caterpillar varies in color from dull ochreous red to dirty green, with a blackish head, two brown spots on the first segment, a wavy line on each side edged with black. The chrysalis is bright brown. This moth is often abundant in summer, in hayfields, gardens, and barn-yards. The caterpillar feeds on grain through the winter, and draws the corn together with a thin silken web in February or March, when about to assume the chrysalis state.

WI'LMINGTON, a city and port of Delaware, U. S., on Christiana Creek, near its junction with the river Brandywine, 28 m. S.W. of Philadelphia. It is a handsome, regular town, commanding fine water-views, and has 46 churches, a town-hall, large hospital, St. Mary's Roman Catholic College, 6 banks, 13 newspapers, and manufactories of steam-engines and iron-work, flour-mills, &c. The most important manufacture is now that of iron steamships. Pop. of W., which is the only large town in the state, (1870) 30,841; (1880) 42,499.

WILMINGTON, a city and port of North Carolina, U.S., on the left bank of the north-east branch of Cape Fear River, 20 miles from the sea. It has a good harbor, with extensive internal navigation, and railway connections, and large exports of lumber, tar, rosin, turpentine, shingles, cotton, &c. During the war of 1861—1865, it was one of the chief ports of the Confederacy, and was frequented by blockade-runners, until it surrendered to General Terry in 1865. Pop. (1870) 13,446; (1880) 17,361.

WILNA. See VILNO.

WILSON, ALEXANDER, American ornithologist, was born at Paisley, Scotland, July 6, 1766. He was the son of a weaver, and was apprenticed to the weaving-trade, at which he worked seven years, amusing himself at the same time by writing verses. As soon as he was free he gratified a roving disposition by mounting a pedler's pack, and went to Edinburgh to take part in a discussion, in which he maintained the poetic claims of Fergusson against Allan Ramsay, and, in the same cause, wrote *The Laurel Disputed, a Poem*. The piece by which he is best remembered, is a droll poem in the Scottish dialect, styled *Watty and Meg*. He also contributed to *The Bee*, and made the acquaintance of Burns. He was prosecuted for a lampoon upon a resident of Paisley, and condemned to a short imprisonment, and to burn the libel with his own hand at the Paisley cross. Determined to leave a country where his genius was unappreciated, he sailed from Belfast for America, and landed at Newcastle, Delaware, July 14, 1794, with a few borrowed shillings in his pocket, and no acquaintances. He got work with a copper-plate printer in Philadelphia, then with a weaver; traveled as a pedler in New Jersey, where the brilliant plumage of the birds attracted his attention; then engaged as a school-teacher in Pennsylvania, and then walked 800 miles to visit a nephew in New York. Teaching a school once more in New Jersey, he lived near the botanic garden of William Bertram, who was well acquainted with birds, and, stimulated and encouraged in his studies of nature, W. resolved to make a collection of all the birds that were to be found in America.

In October 1804 he set out on his first excursion, in which he traveled to Niagara Falls, and wrote *The Foresters, a Poem*. In 1805, he learned etching of a Mr. Lawson, from whom he had already learned to draw; and was employed on the American edition of *Rees's Cyclopœdia*. He soon prevailed upon the publisher, Bradford, to undertake an American Ornithology. In September 1808, he brought out the first volume, but in a style too costly for the tastes and fortunes of the period, so that he obtained only 41 subscribers in the eastern states, and had no better success in the southern. The second volume was, notwithstanding, brought out in 1810. In 1811 he made a canoe voyage down the Ohio, and traveled overland through the Lower Mississippi Valley, from Nashville to New Orleans, collecting specimens for his third volume. In his eager pursuit of a rare species of bird of which he long wanted a specimen, he swam across a river, and caught cold, which ended in his death, at Philadelphia, Aug. 23, 1813, when he had nearly completed his work—the 8th and 9th volumes being published after his death. It was continued by Charles Lucien Bonaparte, in 4 vols. (1825—1833). A monument was erected to his memory in Paisley Abbey churchyard in 1874.—See Grosart's *Poems and Miscellaneous Prose of Alexander Wilson* (1876).

WILSON, DANIEL, LL.D., a distinguished writer on archæological subjects, was born at Edinburgh in 1816. He was educated at the university of his native city, and was early attracted by antiquarian studies. He had been for some time secretary to the Scottish Society of Antiquaries, when he was appointed professor of History and English Literature in the university of Toronto—an institution of which he has done much to increase the prosperity and usefulness. Amongst his works are *Memorials*

of Edinburgh in the Olden Time (1848; new ed. 1878); *Oliver Cromwell* (1843); *Archæology and Pre-historic Annals of Scotland* (1851; 2d ed. 1863); *Pre-historic Man: Researches into the Origin of Civilization in the Old World and the New* (2 vols. 1862; enlarged and re-written, 3d ed. 1876); *Chatterton* (1869); *Caliban: the Missing Link* (1873); a volume of poems called *Spring Flowers* (1875). He edited for some years the journal of the Canadian Institute, of which in 1859 and 1860 he was president.

WILSON, GEORGE, M.D., F.R.S.E., chemist, brother of the above, was born at Edinburgh in 1818. In 1840, after studying in various laboratories, and graduating in medicine at Edinburgh, he received a license as lecturer on chemistry from the Royal College of Surgeons in that metropolis. He subsequently became lecturer on chemistry in the School of Arts, and in the Veterinary College; and in 1855 he was appointed Professor of Technology in Edinburgh University. In conjunction with this office he held the curatorship of the Industrial Museum, an institution which owes much of its completeness and order to this knowledge and skill. Professor W., who had long struggled with ill-health, died in 1859. Among his scientific works mention may be made of his *Text-book on Chemistry* in Chamber's *Educational Course*, *Researches in Color-blindness*, and *The Five Gateways of Knowledge*. Other works are the *Life of Cavendish* (1851); the *Life of Dr. John Reid* (1852); and, along with Mr. Geikie, the *Memoir of Edward Forbes* (1861). There are also several poems from his pen. A memoir of W., illustrating his singularly attractive character, was published by his sister (Mrs. Sime) in 1860.

WILSON, HORACE HAYMAN, a distinguished Sanscrit scholar, was born in London in the year 1786, and was educated for the medical profession. In 1808 he went to India as assistant-surgeon on the Bengal establishment, and in a short time afterwards, on account of his proficiency in chemistry, obtained an appointment in the Calcutta mint as assistant to Dr. Leyden. He now applied himself diligently to the study of Sanscrit, and in a few years obtained so high a reputation for his scholarship, that, upon the decease of Dr. Hunter in 1811, W. was appointed to succeed him as secretary of the Asiatic Society of Bengal, on the recommendation of Mr. H. T. Colebrooke. In 1813, W. published his first work, viz., *The Mégha Dúta, or Cloud Messenger, a Poem in the Sanscrit Language, by Kálidása; translated into English Verse, with Notes and Illustrations, by H. H. Wilson*. This work, originally published at Calcutta in 1813, was reprinted in London in the following year.

His next publication was *A Dictionary, Sanscrit and English, translated, amended, and enlarged from an original Compilation prepared by Learned Natives* (Calcutta, 1819—1840). This work proved to be of great advantage to students of Sanscrit, and added considerably to W.'s reputation. His works have been published in a collective edition of 12 vols. (1864—1870). Amongst them as written, edited, or translated by him are: *Select Specimens of the Theater of the Hindus, translated from the Original Sanscrit*, 3 vols. (Calcutta, 1827); *The Raghu Vansa, or Race of Raghu, a Historical Poem by Kálidása, with a Prose Interpretation of the Text by Pundits of the Sanscrit College of Calcutta* (1832), edited by W.; *The Vishn'u-Purán'a, a system of Hindu Mythology translated, from the Original Sanscrit, and illustrated by Notes* (Lond. 1840); *An Introduction to the Grammar of the Sanscrit Language* (Lond. 1841); *Ariana Antiqua, a Descriptive Account of the Antiquities and Coins of Afghanistan* (Lond. 1841); *History of British India from* 1805 *to* 1835 (1848); *Rig-Veda-Sanhita, a Collection of Ancient Hindu Hymns, translated from the Original Sanscrit* (1850); *A Glossary of Judicial and Revenue Terms from the Arabic, Persian, Hindustani, &c.* (1855); *Principles of Hindu and Mohammedan Law, republished from the Principles and Precedents of the same, by the late Sir William Hay Macnaghten, and edited by H. H. Wilson* (Lond. 1860). Many of these works were produced while W. held the office of Assay-master and Secretary of the Mint at Calcutta. In his official capacity, he often received the thanks of the government of India for reforms in the coinage and other services. He was for many years secretary to the Public Instruction Committee at Calcutta, and took great trouble in directing the studies of the Hindu College. He was at the same time noted for his musical skill, and his talents as an amateur actor. In 1833, the Boden Professorship of Sanscrit was founded in the university of Oxford, and W. was elected to that lucrative post, not without strong competition. Soon after his arrival in England, he was appointed Librarian at the East India House, in succession to Sir C. Wilkins. This appointment he held in conjunction with the professorship until his death, which occurred on May 8, 1860. He was married to a grand-daughter of the celebrated Mrs. Siddons, by whom he had several children. W., as an orientalist, takes rank with Sir W. Jones and H. T. Colebrooke. Many of his researches are embodied in papers contributed to the *Journal of the Asiatic Society of Bengal*, and other periodicals.

WILSON, JOHN, famous as Professor Wilson, and the Christopher North of *Blackwood's Magazine*, was born on May 18, 1785, at Paisley, where his father was a wealthy manufacturer. His earlier education he received in the house of Dr. M'Letchie, minister of the parish of Mearns, a wild moorland district in Renfrewshire, his boyish residence in which he long afterwards commemorated in some of his most charming essays. After having been transferred for a time to the care of the Rev. Joseph Macintyre of Glenorchy, in the Highlands, the love of which became for him a lifelong passion, he was sent to the university of Glasgow, where he remained for four years, distinguished as on the whole a diligent and successful, though somewhat fitful and irregular student. In 1803, he went to Magdalen College, Oxford, where he became notable at once for the splendor of his intellectual gifts, and for his supremacy in the various athletic sports—boxing, rowing, running, &c.—which have always formed a not inconsiderable part of the education bestowed at the English universities. In 1806, he signalized himself by his Newdigate prize poem, *On the Study of Greek and Roman Architecture;* and the year after, he took his degree of B.A., that of M.A. following in 1810. Meantime, he had left Oxford, and settled himself in Cumberland, attracted partly by the beauty of the Lake Country, and partly by a desire to cultivate the intimacy of Wordsworth, of whose genius he was already a devout admirer. He purchased the lovely little property of Elleray, where, for some years, he resided almost constantly. Besides Wordsworth, there were available in the district for intellectual converse De Quincey, Southey, and Coleridge (to whose *Friend* he contributed some essays). With all of them, he became intimate; and when he wearied a little of 'celestial colloquy divine' with them, he sought a variety to life in measuring his strength against that of the far-famed Cumberland wrestlers, the very sturdiest of whom has left it on express record that he found him 'a vera bad un to lick.'

In 1810, he married a Miss Jane Penny, a Liverpool lady, of great personal attractions and much amiability of character, in his union with whom he found the main happiness of his life. He now seriously devoted himself to poetry; and in 1812, published his *Isle of Palms*, which attracted considerable attention, and was followed in 1816 by *The City of the Plague*. This work showed a marked increase of power; but it is questionable, despite the grace, music, and tender feeling of much of his verse, whether, as a poet, W. would ever have succeeded in developing the real force of his genius. His true field, however, was found on the starting, in 1817, of *Blackwood's Magazine*. Some years previously, a pecuniary disaster had befallen him; the fortune of £30,000 left him by his father being so seriously curtailed by the misconduct of a relative as to necessitate the breaking up of his establishment at Elleray. On this, he transferred himself to Edinburgh, where, in 1815, he was called to the Scottish bar; but it does not appear that he had any opportunity of practice. As one of the briefless, with plenty of spare time on his hands, along with his friend Lockhart, then in similar case, he lost no time in proffering his aid to Mr. Blackwood. The astute publisher was at no loss to estimate the value of their alliance; and it is not too much to say that during its earlier years, Lockhart and W. were the soul of the success of the magazine. Presently, Lockhart was withdrawn to succeed Gifford as editor of the *Quarterly Review* in London; and W., though never in any strict sense its editor—Blackwood himself throughout exercising a severe control—became, in the eye of the public, more and more identified with the Magazine; in a certain modified, yet very real sense, to all intents for many years he *was* editor of the Magazine, and under his famous pseudonym of Kit North, swayed it before the world. In 1820, he was appointed to succeed Dr. Brown, deceased, as Professor of Moral Philosophy in the university of Edinburgh, his friend, Sir W. Hamilton, being one of the defeated candidates.

His real claims to such a post, though not to be compared with those of Hamilton—who, at that time, however, had given little or no proof before the public of his consummate accomplishment and ability—have been somewhat unduly depreciated. They were not so by Hamilton himself, whose opinion it was, as reported by Mr. De Quincey, that 'Wilson's philosophic subtlety of intellect was not the least wonderful of his many wonderful gifts.' Thus much is certain, that as a professor, though somewhat desultory in his methods, he had an almost unexampled power of stimulating the enthusiasm of his students. Out of his class-room, however, it must be admitted he but indifferently succeeded in attaining the staid ideal proper to the learned and respectable class of men with whom he was thus somewhat oddly associated. He was the most 'muscular' of 'Christians;' and on more than one occasion, the singular spectacle was exhibited of a Scotch professor of moral science taking off his coat in a public market-place, to inflict personal chastisement on some ruffian, whose obnoxious proceedings had done outrage to his nicer sense of the fitness of things. Though sedulous and strict in his discharge of his duties as a professor, W. was loyal in his adhesion to Blackwood, and his contributions to the Magazine, in their mere amount enormous, continued to form the main part of his activity. In 1840, he suffered an irreparable loss in the death of his wife. His grief for a while

nearly prostrated him, and seems to have flung something of a shadow over what of life remained to him. He continued, however, to contribute to *Blackwood*, though now somewhat more intermittently; and in 1842, he published, as *The Recreations of Christopher North*, a selection, in two volumes, from the mass of his essays furnished to it. During the session 1852—1853, he was smitten by an attack of paralysis, which permanently incapacitated him for the discharge of professorial duty; and in Edinburgh, on April 3, 1854, he died.

During his last years he enjoyed a pension of £200 a year from government, in acknowledgment of his literary services. Besides his poetry and periodical writings, he published in 1822 a volume of sketches, entitled *Lights and Shadows of Scottish Life*, which was followed the year after by his tale of *Margaret Lyndsay*. In these, as in his poems, the robuster side of his mind is scarcely, if at all, represented; but the tender idyllic grace and charm by which they are pervaded, secured for them an extensive popularity, some portion of which they have since continued to retain. In his miscellaneous prose essays, critical and descriptive, and most especially in the celebrated series of dialogues entitled *Noctes Ambrosianæ*, the true power of his genius is revealed. Of the genius, there can be little question; though as to whether it has succeeded in embodying itself in forms which are likely to be permanent, there may reasonably be difference of opinion. The materials for judgment are before the world in the collected (or rather selected) edition of his Miscellanies, published since his death by his son-in-law, Professor Ferrier. As a magnificent *potentiality*, it is scarcely exaggeration to speak of W. along with Burns and Scott as a member of the trinity (so to speak) of Scottish literary genius. Certain it is, that nearly as effectually as they did, he stormed the heart of the Scottish people, and became, in his later years—the Great Novelist being gone—their idol and accepted literary representative. If he has left behind him no work sacred as his literary *monument*, thus much was almost involved in the conditions under which he wrote. Writing as he did from month to month for the instant purpose of the hour, wise and steady concentration of his energies became more and more difficult for him. Not the less, when all reasonable deduction is made, he holds his place as one of the most notable literary figures in the earlier half of this century. His *range* of power is extraordinary: from the nicest subtleties of feminine tenderness, he passes at will to the wildest animal riot and the most daring grotesqueries of humor; and in what he terms 'numerous prose,' the prose poem or rhapsody—a questionable and perilous, though, within wise limits, a legitimate form of art—he may be held, in his finer passages, to be at this day unrivaled. See the affectionate and felicitous *Memoir* by his daughter, Mrs. Gordon (1863). A selection from the *Noctes Ambrosianæ—Comedy of the Noctes Ambrosianæ*—by J. Skelton, appeared in 1876.

WILSON, Rev. John, D.D., F.R.S., missionary, orientalist, and for many years one of the most influential Englishmen in Bombay, was born at Lauder, in Berwickshire, 11th Dec. 1804. Educated at Edinburgh University, he went in 1828 to Bombay as a missionary; and as a missionary—from 1843 onwards in connection with the Free Church of Scotland—he continued to labor zealously till his death, 1st Dec. 1875. But his early and thorough mastery of the languages of Western India, his vast and scholarly command of the literature, the history, the faiths, and the social usages of the races of India, combined with his indomitable energy, practical sense and insight into and sympathy with native feeling, enabled W. soon and long to exercise a wide and powerful influence usually denied to the missionary. He organized and extended the Scottish missions in Western India; he promoted education, legal reform, the spread of toleration, and philanthropic movements of every kind; and was repeatedly trusted as a valued political adviser of the Governor and Governor-general, especially during the crisis of 1857. His linguistic labors, especially in Zend, were very memorable; and as a man W. was loved by all classes and races in the community. He was twice president of the Bombay branch of the Asiatic Society, was vice-chancellor of the Bombay University, and a F.R.S. Amongst his writings other than those connected with his missionary work may be mentioned *The Parsi Religion* (1842); *The Lands of the Bible* (1847); and *India Three Thousand Years Ago*.

WILSON, Richard, an English landscape painter of eminence, was born in 1713 at Pinegas in Montgomeryshire. He at first devoted himself to portrait-painting; but while studying in Italy in 1749 was advised to forsake portrait for landscape. To landscape painting he now exclusively devoted himself; and before returning to England in 1755, he had succeeded at Rome in establishing a considerable reputation. In London, in 1760 he exhibited his great picture, the 'Niobe,' and at once secured rank as one of the first painters of his time. Another celebrated work was his 'View of Rome from the Villa Madama.' Failing, however, to hit the general taste, he fell into the hands of the picture-dealers; and so straitened did he frequently find himself, that in 1770 he was happy to obtain the appointment of Librarian of the Royal Academy. By the death of a brother, who left him a handsome sum of money, he was rescued from indigence, and retiring to Llamberris in Denbighshire, he died there some few years after in 1782. Of his numerous pictures, now much prized, many are familiar to the public by engravings; in the National Gallery, three very fine specimens of him may be found; and several others form part of the well-known Vernon Collection.

WILSON, General Sir Robert Thomas, was born in the year 1777 in London, where his father was a painter. He was educated at Westminster, and afterwards at Winchester, and when scarcely 17, he joined the 15th Light Dragoons, then serving under the Duke of York in Belgium, and took part in some sharp service, in which the regiment greatly distinguished itself. Shortly after his return to England, he was married to a lady of great beauty and some fortune, to whom, through life, he seems to have been ardently attached. In 1798, he was engaged in Ireland in the suppression of the rebellion; and the year after, he served in the unfortunate campaign of the Helder, and was present with his old regiment at the battle of Egmont-op-Zee. That in everything he proved himself a capable officer, may be inferred from his appointment soon after to command the small force of cavalry which served under Sir Ralph Abercromby in Egypt. Here he formed a warm friendship with General, afterwards Lord Hutchinson, who succeeded to the command of the army after the death of Abercromby.

His next service was at the conquest of the Cape of Good Hope in January 1806, where again he commanded a small cavalry force. In the latter part of that year he went abroad on the staff of his friend, Lord Hutchinson, who was sent on a mission to the king of Prussia, then a fugitive from his capital, and awaiting the result of the conflict pending between Napoleon and his allies, the Russians. W. had now, for the first time, an opportunity of seeing war on a really gigantic scale, being present at the desperate battle of Eylau (q. v.). The peace of Tilsit ensued, and W. thereupon returned to England. The struggle in the Peninsula had now commenced, and W. was sent to take part in it; he was active in the embodiment and training of the Portuguese army, and subsequently, under Wellington, he commanded a Spanish brigade at the battle of Talavera. From this field of action he was, however, withdrawn; and in 1812, he was attached to the Russian army, as English military commissioner. During the tremendous struggle which resulted in the capture of Moscow, and the operations which followed in pursuit of the doomed French army, he rendered important service both in council and in the battle-field; and he seems to have won the especial regard and confidence of the Emperor Alexander. Throughout the subsequent campaigns in Germany, and those which followed in France, ending with the capture of Paris in 1814, he was present in a similar capacity in the camp of the allies. At Lützen, he took command of the Prussian reserve, and at a particular crisis of the battle, succeeded in severely checking the enemy. At Bantzen, he also distinguished himself; and a day or two after, the Emperor of Russia presented to him publicly the cross of the Order of St. George, saying that he gave it 'as a memorial of his esteem for his courage, zeal, talent, and fidelity to my service.' His services during this period will be found noted in every military History of the time; and they amply prove him to have been a most gallant and accomplished soldier.

After the peace, he became involved in the unfortunate matter of Queen Caroline; and for his censure of the course pursued by government he was dismissed the army. He was afterwards, however, reinstated. In 1841, he attained the rank of general; and from 1842 to 1849, he held the post of governor of Gibraltar. In 1818, he had been returned to parliament in the Liberal interest for Southwark, and he retained his seat till 1831. On 9th May 1849, having just returned from Gibraltar, he died suddenly in London. During his life, he published several works; in 1804, *An Inquiry into the Military Force of the British Empire;* in 1811, *Campaigns in Poland, with Remarks on the Russian Army;* and in 1817, a *Sketch of the Military Power of Russia*. During his foreign campaigns, he kept copious private diaries; and of these, two most interesting volumes, 'edited by his nephew and son-in-law, the Rev. Herbert Randolph, M.A.,' were some years since published by Murray of London. A *Life* of him has likewise been published by Murray, under the same superintendence.

WILTON, a market-town and parliamentary borough in Wiltshire, at the junction of the Nadder and Wily, affluents of the Avon, 3½ miles west-north-west of Salisbury. The New Church, a magnificent Romanesque edifice, decorated in the richest and most tasteful manner, was erected in 1844 by the Right Hon. Sidney Herbert, at a cost of £20,000. The principal industry of the town is the manufacture of carpets, especially Axminsters, and the carpets called Saxony, made of short staple wool. The burgh returns one member to the House of Commons. It is a station on

the Salisbury branch of the Great Western Railway. Pop. of parliamentary borough (1871) 8865; (1881) 8639.

W., a very ancient, and at one time important town, was the capital of the Anglo-Saxon kingdom of Wessex, and gave name to Wiltshire. From the 9th c. to the year 1244, it was a busy and prosperous place; but in that year, the Great Western Road, which had formerly passed through it on its way from Old Sarum, was diverted, and the prosperity of the town came to a close. The town stands near the site of a monastery given to Sir William Herbert, first Earl of Pembroke, by Henry VIII.; and the locality is rich in associations connected with the Herbert family. Here Sir Philip Sidney wrote part of his *Arcadia*. The present mansion is noted for its collection of statues, and for its pictures, including several excellent Van Dycks.

WI'LTSHIRE, or WILTS (called by the Anglo-Saxons *Wiltonshire*, from their capital town, Wilton, q. v.), one of the south-western counties of England, bounded on the W. and N. by Somerset and Gloucester, and on the E. and S. by Berks, Hants, and Dorsetshire. Area 859,303 acres; pop. (1871) 257,177; (1881) 258,967. The county is divided into two unequal parts—the plains in the north, and the hill district, which comprehends the greater part of South W.; and the separation between these two parts is very nearly that of the main line of the Great Western Railway, the course of which across the county is from north-east to south-west. The plains incline north to the basin of the Thames, which forms in part the northern boundary, and are noted for their agricultural capabilities. The surface of this district is checkered with corn-fields and rich pastures, and here the cheeses for which W. is favorably known are produced. The hill district (on the chalk) presents ranges of bleak downs, with deep valleys, and is thinly peopled, much of it consisting of solitary sheep-walks, on which it is estimated 700,000 sheep are pastured. Inkpen Beacon, 1011 feet high, at the junction of W., Hampshire, and Berkshire, is the nucleus whence proceed the North and South Downs of Surrey and Sussex, and the hills which, running south through this county, become the North and South Downs of Dorsetshire. Agriculture is carried on with the assistance of modern improvements; many swine are reared, and W. bacon is famous. Portland stone is quarried at Swindon, Tisbury, and in other localities; a fine oolite, known as Bath stone, is extensively worked at Box and the neighborhood; and a stone called Forest Marble yields coarse tiles and flagstones, and often retains in perfect preservation 'the ripple-marks of waves and the foot-prints of crustaceans.' The manufacture of woven goods, carpets and other woollen goods, silks and linens, is carried on at Trowbridge, Wilton, Bradford, Devizes, Westbury, &c. There are iron mines and blast-furnaces at Westbury and Seend, and Swindon is one of the greatest railway workshops in the kingdom. The principal rivers are the Thames, with its tributary, the Kennet; the Bristol Avon (which communicates with the Thames and Severn by the Wilts and Berks Canal, and again with the former by the Kennet and Avon Canal), and the Salisbury Avon, with four tributaries spreading over the whole of South W. The county sends four members to the House of Commons, and the boroughs 14 more. Before 1832, W. had 34 members. Cap., Salisbury; but the assizes are held alternately there and at Devizes.

W. abounds in early and interesting antiquities. Among these may be mentioned its Druidical temples (see AVEBURY and STONEHENGE), British entrenchments, roads, and villages, barrows (in which beads, rude axes of stone, arrow-heads of flint, and sometimes articles in gold, brass, or iron, have been found along with the relics of mortality), Saxon camps, Roman roads, and Norman castles.

WIMBLEDON, a village 8 miles west of London, on the edge of *W. Common*. The common is an open, gorse-covered heath of 1000 acres. Here, in July, is the annual meeting of the National Rifle Association; and shooting at the butts is practised all the year round. Pop. (1871) 9087; (1881) 15,947.

WI'NCHESTER, a famous historical city, chief town of Hampshire, stands in the middle of the county, on the Itchen, 60 miles S.W. of London. It consists of one main street, crossed by a number of streets running at right angles to it, and was in early times surrounded by a wall, of which remains exist. The houses for the most part spread over a hill rising from the valley of the Itchen; but the cathedral, and some of the older and more interesting portions of the city, stand on level ground close to the river-bank. The Castle-hill is the site of the old castle or royal palace, built in the 13th c. by Henry III., and of a magnificent hall, of which the only remaining portion is used as the County Court. About a mile from the town is the famous hospital of St. Cross, founded in 1136 by a bishop of W., Henry de Blois, for 13 poor men, 'decayed and past their strength.' It was munificently endowed; but its sources of income have been narrowed, and its ancient charters and grants were destroyed during the 13th century. Its income is above £1000 per annum, and it supports 13 poor brethren, affords relief to a number of external poor, and distributes general doles on the eves of great festivals. The hospital is entered by a gateway, after passing which a pleasing view is obtained of the buildings, which occupy three sides of a quadrangle, the fourth side being occupied by a neat, picturesque, ancient church in Transition Norman, which formed part of the institution. There is a city library and a museum; the latter contains some very interesting local antiquities. Charles II. commenced a palace here, but the part completed is now used as barracks. The city cross in the High Street, dating from the 15th c., is very beautiful in design.

The college of W., called originally 'Seinte Marie College of Wynchestre,' now Saint Mary's or Winchester College, was founded by William of Wykeham, bishop of W., in 1387, and the buildings were completed in 1393. The buildings are, for the most part, of the age of the founder, and consist of two quadrangles and a cloister, together with recently erected houses for the commoners. The famous *Dulce domum* is sung by all the boys in the courts of the college before the breaking up of the school at the long vacation. The foundation consisted originally of a warden, 10 Fellows, 70 scholars, a head-master (*informator*), an usher (*ostiarius*), or second master, 3 chaplains, 3 clerks or singing-men, and 16 choristers. By an ordinance of the Oxford University Commission, which took effect in 1857, the number of Fellowships has been reduced, as vacancies occurred, to six, the number of scholars being increased to 76, and 8 exhibitions have been founded. The charter of the school, which is in existence, was granted by Richard II. in 1396, and confirmed by all the subsequent sovereigns, Mary excepted, down to Charles II. The visitor is the Bishop of W., and the warden and two Fellows of New College, Oxford, hold an annual 'scrutiny,' which, however, is generally merely formal. The endowment, which amounts at present to about £15,500 annually, consists of landed property and funded stock; and of this about £2600 goes to expenses of management. The warden and Fellows are the governing body of the college. The pupils of the school are of two classes—foundation scholars and commoners. The scholars are elected, between 12 and 14 years of age, by competitive examination; the average annual number of vacancies being 12, and the number of candidates 100. The scholars are well boarded, lodged, and educated, at the expense of the foundation; having to pay, for some incidental charges, books, medical attendance, &c., about £30 per annum; but tradition exercises a powerful influence at W., and many of the quaint old customs of the school, such as dining off wooden trenchers, &c., are still retained.

The number of the commoners has fluctuated much; but owing to the better position in which they were placed by the new regulations of 1857, they have averaged 300 annually for some years; they generally enter between 12 and 15 years of age, and stay 3—4 years, and not being foundation-boys are boarded in the houses of the head and other masters, at a total annual cost of about £135 (including expense of tuition, pocket-money, and cost of traveling). W. possesses 15 Fellowships and 30 scholarships at New College, Oxford (also founded by William of Wykeham), open to scholars and commoners alike, and tenable for five years, besides numerous other prizes. Fagging is permitted to the 18 chief boys, who are called 'prefects.' The monitorial system was first established in this college.

A church is said to have been built at W. in the year 169; to have been destroyed in 266, restored in 293, and converted into a 'temple of Dagon' (by whom we are to understand Wodin) by the Saxons under Cerdic in 495. In 635, the polluted church was pulled down, and a new one commenced, under the superintendence of Birinus, the first apostle of Wessex; and King Kynegils granted the whole of the land for the space of seven miles round the city for the support of the episcopal seat and the re-established monks. From the year 674, the succession of bishops of W., of which the celebrated St. Swithin (see SWITHIN, ST.) was one, continues unbroken. Of Birinus's cathedral, however, in which most of the Saxon kings of Wessex (see HEPTARCHY) were interred, and on the altar of which, according to tradition, King Canute hung up his crown after the well-known scene on the sea-shore, no portion remains, and a new cathedral—the present one—was built 'from the foundations' by Bishop Walkelin (1070—1097); and after its completion, and the removal into it of the precious relics of Birinus's cathedral, that old edifice was pulled down. William of Wykeham was bishop of W. from 1367 to 1404, and has more closely than any other bishop associated his name with his episcopal city and its cathedral. He greatly enlarged and beautified the building, and he began the remarkable transformation of the nave from Norman to Perpendicular.

The cathedral is 520 feet long, longer than any other English cathedral, with the exception of those of Ely (560 feet), and Canterbury (525 feet). Its breadth at the transepts is 208 feet, the length of its nave is 351 feet, its height 86 feet, and a low central Norman tower 150 feet high. The exterior is somewhat disappointing, owing to its unusual want of decoration, and to the low-

ness of the tower; but the interior is magnificent, and contains many objects of the highest interest—as the tomb of William Rufus; bronze figures of Charles I. and James I.; mortuary chests which contained the ashes of a number of West Saxon kings and bishops, but which were rifled during the Civil War; the golden shrine of St. Swithin, with some excellent specimens of sculpture, both ancient and recent; the tomb of Edmund, the son of King Alfred, and the tomb of Izaak Walton. The various architectural styles to be noted in the cathedral are: Early Norman in the crypt and transepts; Early English in the eastern aisles and chapels behind the presbytery; Decorated in the piers and arches of the presbytery; and Perpendicular in the nave, which, for beauty and grandeur, is only rivaled by York. After the cathedral, there are some churches of interest in the Transition, Norman, and Perpendicular styles; and there are many other buildings of a religious and educational kind. The industries of W. are unimportant. Pop. of municipal and parliamentary borough (1871) 16,366; (1881) 17,469, represented by two members.

W., the Roman *Venta Belgarum*, was the site of a British city before the arrival of the Romans in Britain, *Caer-Gwent* (*Gwent*= champaign or down). It afterwards became a Roman station, and, as such, was a place of considerable importance, and contained temples of Apollo and Concord. When taken by the Saxons in 495, it is said to have contained at least one Christian church. The Saxons called the town Wintanceaster. As the capital of Wessex, W. became the capital of England, and even after the Norman Conquest was long a chief royal residence. In 1265, during the baron's war, W. was sacked, and it never again recovered its commercial prosperity. From the time of Charles II., the town has gradually declined—its chief sources of life and movement being the cathedral and the college.

WINCHESTER, a city of Virginia, U. S., in the valley of the Shenandoah, 150 miles north-north-west of Richmond, 67 west-by-north from Washington; 32 miles by railway to Harper's Ferry. It has 15 churches, an academy, two newspapers, manufactures of shoes, gloves, furniture, soap, &c. March 12, 1862, it was occupied by the Federal General Banks, and was during the war the scene of frequent conflicts, and occupied in turns by the Federal and Confederate armies. Pop. in 1870, 4477.

WI'NCING MACHINE, the wheel used by dyers for winding out of their dye-vats long pieces of cloth. The vat is often divided by a partition, and the wincing-machine is generally so placed that it will wind the piece of cloth from one compartment to the other, according to the direction given to the handle.

WINCKELMANN, JOHANN JOACHIM, well known as the critical expounder, and historian of ancient classical art, was born of poor parents in the year 1717, at Stendal, in Prussia. He very early showed an eager desire for knowledge, and being sent to the free school of the place, became so special a favorite with the rector of it, that he was taken into the rector's house as a companion, when age and blindness made some assistance necessary to him. After studying for a time in Berlin, he went, in 1738, to the university of Halle, where he remained two years engaged in the study of theology, which, however, he found so distasteful that, at the end of that time, he relinquished it, accepting a situation as tutor in a private family at Osterburg. In 1743, he became a schoolmaster at Seehausen—a wretched position, from which he was rescued by the Count von Bünau, who employed him as secretary in his library at Nothenitz. Here he remained some years. Being in the vicinity of Dresden, he had frequent opportunities of inspecting the famous treasures of art accumulated there. He also made the acquaintance of some artists of eminence, among others, the well-known Oeser; and the enthusiasm was awakened which determined his subsequent career. To the theory and history of art he now resolved to devote himself; and on being thrown into the society of the pope's nuncio, Cardinal Archinto, he was induced, after some hesitation, to become a Roman Catholic, on a promise of a pension being procured for him, to enable him to proceed to Rome.

Thither he repaired in 1755, having previously published at Dresden a treatise, entitled *Gedanken über die Nachahmung der Griech. Werke*, &c. (Reflections on the Imitation of the Antique, 1754). Of this work he issued, in 1756, a new and enlarged edition. At Rome, he prosecuted his studies with the utmost ardor, and every facility was afforded him. In 1758, he visited Naples, to examine the celebrated remains of Herculaneum, Pompeii, and Pæstum; and went also to Florence, for the purpose of cataloguing the famous collection of antique gems belonging to Baron de Stosch, a labor which occupied him for nine months. Soon after, the Cardinal Albani appointed him his librarian, and the salary attached to this post, with the pension continued from Dresden, in itself a somewhat meagre pittance, enabled him to prosecute his studies in comfort. The first-fruit of these appeared in his treatise, entitled *Anmerkungen über die Baukunst der Alten* (Remarks on the Architecture of the Ancients), which was printed in Germany in 1762; and two years afterward, the great work of his life, on which he had been long engaged, the celebrated *Geschichte der Kunst des Alterthums* (History of Ancient Art), was issued from the press of Dresden. In 1767, a supplement to it was added. He also gave to the world the result of his researches at Herculaneum; and in 1766, his *Monumenti Antichi Inediti*, an elaborate work with plates.

In 1768, W., by this time famous throughout Europe, set out to revisit Germany. His destination was Berlin; but on the way, a strange yearning seized him for the Italy he had left; on his reaching Munich, it was no longer to be resisted; and he started thence on his return to Rome. He went to Vienna, where the most flattering attentions were paid him; proceeding thence to Trieste, where he came by his tragic end at the hands of a fellow-traveler, by name Francesco Arcangeli, who murdered him in order to plunder his effects. In this he did not succeed, being scared almost in the act, and presently caught and executed.

W. was the forerunner of a great movement; and his influence has been deeply felt in all the subsequent literature of the subject to which he devoted himself. Even at this day, when a good deal of it is regarded as obsolete, his great *History* remains as a work not to be neglected by any one seriously concerning himself with the study of this branch of æsthetics. The most complete edition of W.'s works is Fernow, Meyer, and Schultz's (8 vols. new ed. 1828). See the life of W. by Justi (1866–73).

WIND is air in motion. The force of the wind is measured by Anemometers (q. v.), of which some measure the velocity, and others the pressure. The following are a few velocities of wind, translated into popular language: 7 miles an hour is a gentle air; 14 miles, a light breeze; 21 miles, a good steady breeze; 40 miles, a gale; 60 miles, a heavy storm; and 80 to 150 miles, a hurricane sweeping everything before it. We also add a few comparisons of velocity and pressure: 5 miles an hour is a pressure of 2 oz. on the square foot; 10 miles, ½ lb.; 20 miles, 2 lbs.; 30 miles, 4½ lbs.; 40 miles, 8 lbs.; 51 miles, 13 lbs.; 60 miles, 18 lbs.; 70 miles, 24 lbs.; 80 miles, 32 lbs.; and 100 miles, 50 lbs. During the severe storm which passed over London, on February 6, 1867, the pressure was 35 lbs. to the square foot, corresponding to a velocity of 83 miles an hour. A pressure of at least 70 lbs. to the square foot has since been recorded at the Liverpool Observatory. Wind is most frequently measured by estimation.

Seamen require more than landsmen to pay attention to every variation in the strength of the wind, as well as its direction, and to adopt such phrases as will render that strength generally intelligible. The *Anemometer* (q. v.), which is used on land for this purpose, is unsuited to the wants of seamen. They have found it convenient to divide winds into twelve kinds, in relation to strength, designated thus: *Faint air, light air, light breeze, gentle breeze, fresh breeze, gentle gale, moderate gale, brisk gale, fresh gale, strong gale, hard gale*, and *storm*. This classification was determined in 1806 by Beaufort according to the amount and kind of sail which one of Her Majesty's ships could safely carry at the moment. The estimate of the wind's force by the scale 0 to 12, means that 0 represents a calm, and 12 a hurricane. If such estimations be divided by 2, and the quotient squared, the result will be the pressure in pounds, approximately.

All wind is caused, directly or indirectly, by changes of temperature. Suppose the temperature of two adjacent regions to become from any cause, unequal, the air of the warmer, being lighter, will ascend and flow over on the other, whilst the heavier air of the colder region will flow in below to supply its place. Thus, then, a difference in the temperature of the two regions gives rise to two currents of air—one blowing from the colder to the warmer along the surface of the earth, and the other from the warmer to the colder, in the upper strata of the atmosphere; and these currents will continue to blow till the equilibrium be restored.

Winds are classed into *Constant*, *Periodical*, and *Variable Winds*.

CONSTANT WINDS. *The Trade-winds.*—When the surface heated is, roughly speaking, a whole zone, as in the case of the tropics, a surface-wind will set in towards the heated tropical zone from both sides, and uniting will ascend, and then separating, flow as upper currents in opposite directions. Hence, a surface-current will flow from the higher latitudes towards the equator, and an upper current towards the poles. If, then, the earth were at rest, a north wind would prevail in the northern half of the globe, and a south wind in the southern half. But these directions are modified by the rotation of the earth on its axis from west to east. In virtue of this rotation, objects on the earth's surface at the equator are carried round toward the east, at the rate of 17 miles a minute. But as we recede from the equator, this velocity is continually diminished; at lat. 60°, it is only 8½ miles a minute, or half of the velocity at the equator; and at the poles it is nothing. A wind, therefore, blowing along the earth's surface to the equator, is constantly arriving at places which have a greater velocity than itself. Hence, the wind will

lag behind, that is, will come up against places towards which it blows, or become an *east* wind. Since, then, the wind north of the equator is under the influence of two forces—one drawing it south, the other drawing it west—it will, by the law of the composition of forces, flow in an intermediate direction, that is, from north-east to south-west. Similarly, in the southern tropic, the wind will blow from south-east to north-west. All observation confirms this reasoning. From the great service these winds render to navigation, they have been called the Trade-winds. It is only in the Pacific and Atlantic Oceans that the trade-winds have their full scope.

In other parts of the trades' zone, such as Southern Asia and intertropical Africa and America, they are more or less diverted from their course by the unequal distribution of land and sea (on which see MONSOON). It is generally stated that in the Atlantic the *North Trades* prevail between lat. 9° and 30°, and in the Pacific, between lat. 9° and 26°; and the *South Trades*, in the Atlantic, between lat. 4° N. and 22° S., and in the Pacific, between lat. 4° N. and 23½° S. These limits, however, are not stationary, but follow the sun, advancing northward from January to June, and southward from July to December.

Region of Calms.—This is a belt, 4° or 5° broad, stretching across the Atlantic and Pacific, parallel to the equator. It marks the meeting-line of the north and south trades, where they mutually neutralize each other. Here also occur heavy rains, and thunderstorms almost daily. This belt varies its position with the trades, reaching its most northern limit in July, and its most southern in January. When the belt of calms nears the African coast, in the Gulf of Guinea, the copious rainfall gives rise to the strong steady-blowing gales of that coast, called *Tornadoes*.

PERIODICAL WINDS. *Land and Sea Breezes.*—These are the most general, as well as most easily explained, of the periodical winds. On the coast, within the tropics, a breeze sets in from the sea in the morning, at first a mere breathing on the land, but gradually it increases to a stiff breeze in the heat of the day, after which it sinks to a calm towards evening. Soon after, a contrary breeze springs up from the land, blows strongly seaward during the night, and dies away in the morning, giving place to the sea-breeze as before. These winds are caused during the day, by the land getting more heated than the sea, consequently the air over it ascends, and the cool air from the sea flows over on the land to supply its place; and during night, by the temperature of the land falling below that of the sea, and the air becoming thereby heavier and denser, flows over the sea as a land-breeze. It is within the tropics where sea-breezes are most marked and constant, because there the sun's heat is greatest, and atmospheric pressure is practically uniform, except in those rare instances where it is disturbed by hurricanes.

But in countries such as Great Britain, where atmospheric pressure is most commonly, to some extent, greater or less than that of surrounding regions, the strength of the wind blowing from the high to the low barometer is far stronger than that which would result from the disturbance caused by the unequal heating of land and water; and consequently the sea-breeze is not felt. In the warm months, however, when barometers are nearly uniform over Northern and Western Europe, there is a gentle sea-breeze all round Great Britain during the heat of the day, and a land-breeze during night. Thus on the coast of Berwickshire, during fine settled summer weather, when the temperature of the land is much warmer than that of the sea during the day, in the morning the wind is N.W. till about 10 A.M., when it veers to N., falling all the time till finally it sinks to a calm. A little before noon it springs up from N.E. or E., veers to S.E. from 2 to 3 P.M., where it continues till 7 P.M., when it veers to S. and S.W., and gradually sinks to a calm. About sunset it springs up from W. and veers to N.W. during the night, where it continues till next morning. On the other hand, on the west coast of Scotland, N.W. winds diminish in force toward sunset, giving rise to the weather saying, 'The W. wind is a gentleman and goes to bed.' Quite analogous to the land and sea breezes are the Monsoons (q. v.), which are only the north trades drawn out of their course in summer by the heated regions of Southern Asia—the S.W. monsoon being only a vast sea-breeze blowing on Southern Asia, and continuing several months of the year.

VARIABLE WINDS.—These winds depend on purely local or temporary causes, such as the nature of the ground, covered with vegetation or bare; the physical configuration of the surface, level or mountainous; the vicinity of the sea or lakes; and the passage of storms. Within the tropics, all except the last of these is borne down, or all but borne down, by the great atmospheric currents, which prevail there in all their force. But in higher latitudes this is not the case; these, therefore, are the regions where variable winds prevail. The most noted of these winds are the Simoom (q. v.), Sirocco, Solano, and Harmattan (q. v.).

The *Bora* is a cold tempestuous wind, blowing from the Alps down on the Adriatic; and the *Gregale* is a peculiarly cold, parching, and unhealthy wind, which at certain seasons descends on Malta from Greece. The *Puna Winds* prevail for four months in the year in a high barren table-land in Peru called the Puna; as they are part of the south-east trade-wind, after having crossed the Andes they are drained of their moisture, and are consequently the most dry and parching winds that occur anywhere on the globe. In traveling over the Puna it is necessary to protect the face with a mask from the glare and heat of the day, and from the intense cold of the night. The *East Winds* which prevail in the British Islands in spring are part of the great northern current which at that season generally descends over Europe through Russia. Their origin explains their dryness and unhealthiness. It is a prevalent notion that the east winds in this country are damp. It is quite true that many easterly winds are peculiarly damp; all that prevail in the front part of Storms (q. v.) are very damp and rainy, they being simply an indraught of the air towards the low barometer which is advancing from the west at the time; and it is owing to this circumstance that in the east of Scotland the greater part of the annual rainfall falls with easterly winds. All of these damp easterly winds, however, soon shift round to some westerly point. By the genuine east wind, which is the dread of the nervous and of invalids, does not shift to the west, and is specially and intolerably dry. In the third week of May 1866 this character was strongly marked, when at many places in Scotland the humidity was only 40, and on some occasions as low as 29; the degree of this dryness will be appreciated when it is stated that the dryest month during eleven years ending with 1866, showed a humidity only of 73, saturation being 100. While this wind lasted, the daily range of temperature was double the usual amount, the soil was parched, and the leaves of trees and plants were blackened and destroyed. Deaths from brain diseases and consumption reach the maximum in Great Britain during the prevalence of east winds.

The *Etesian Winds* are northerly winds which prevail in summer on the Mediterranean. They are probably caused by the great heat of North Africa at this season, and consist in a general flow of the air of the cooler Mediterranean to the south, to take the place of the heated air which rises from the sandy deserts. The *Mistral* is a steady, violent north-west wind, felt particularly at Marseille and the south-east of France, blowing down on the Gulf of Lyons. The *Pampero* blows in the summer season from the Andes across the pampas of Buenos Ayres to the sea-coast. It is thus a north-west, or part of the anti-trade of the southern hemisphere, and so far analogous to the stormy winds which sweep over Europe from the south-west. But since it comes from the Andes over the South American continent, it is a dry wind, frequently darkening the sky with clouds of dust, and drying up vegetation.

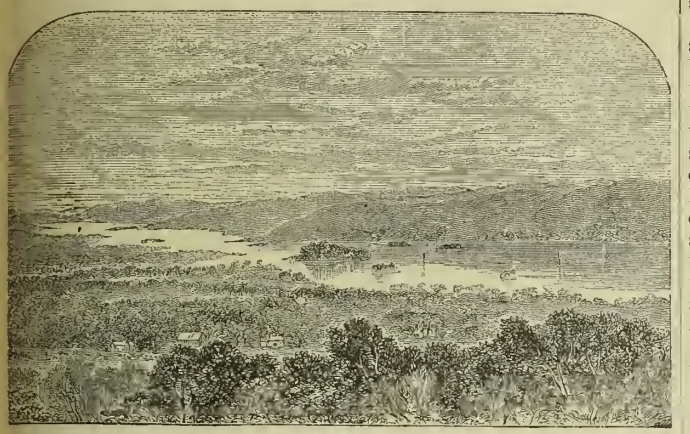
Lord Bacon remarked that the wind most frequently veers with the sun's motion, or passes round the compass in the direction of N., N.E., E., S.E., S., S.W., W., and N.W., to N. This is from the fact that by far the greater proportion of the storms of North-western Europe follow their course to eastward along paths lying to the north of the British Islands. The Late Professor Dove of Berlin first propounded the *Law of the Rotation of the Winds*, and proved that the whole system of atmospheric currents—constant, periodical, and variable winds—obey the influence of the earth's rotation.

WI'NDAGE, in a Gun, the difference in diameter between the bore of the piece and the projectile with which it is loaded. Formerly, a considerable windage was allowed; but this only served to diminish the force of the explosion, and to give an irregular motion to the shot. In the present rifled artillery, it is sought to reduce the windage to a minimum, as ·01 of an inch. Some windage is indispensable, or the shot would jam either going in or coming out.

WINDAGE (from cannon-balls), or WIND CONTUSIONS. Military surgeons so often meet with cases in which serious internal mischief (as, for instance, the rupture of the liver, concussion of the brain, or even a comminuted fracture of a bone) has been inflicted, without any external marks of violence to indicate its having resulted from the stroke of a cannon-ball, that they were led to the conclusion that solid objects projected with great velocity through the air might inflict such injuries indirectly by aërial percussion; the hurt being inflicted either directly by the force with which the air is driven against the part, or indirectly by the rush of air to refill the momentary vacuum created by the rapid passage of the ball. So many observations have, however, been made of cannon-balls passing close to the body (even shaving part of the head, tearing away portions of uniform, or carrying off the external ear or the end of the nose, without further mischief), that this hypothesis is totally untenable, and is now generally rejected. The true explanation of the cases formerly attributed to the windage of cannon-balls appears to rest, according to recent views, 'in the peculiar direction, the degree of obliquity with which the missile impinges on the elastic skin, together with the situation of the structures injured beneath the surface, rela-

tively to the weight and momentum of the ball on one side, and hard resisting substances on the other.' See Longmore's article on 'Gun-shot Wounds' in Holmes's *System of Surgery*, vol. ii., pp. 18—20, where the subject is fully discussed.

WI'NDERMERE, WINANDERMERE, or LAKE WINDER, the largest lake in England, called, on account of the supposed



Lake Windermere, from Elleray.

superiority of its shores, in point of natural beauty, over those of the other lakes of North-western England, the 'Queen of the Lakes,' is partly in the county of Lancaster, and partly divides that county from Westmoreland. It is 11 miles long, and about 1 mile in extreme breadth, is fed by the Brathay and the Rothay, the waters of which become united before entering the lake, and by the streams which drain the neighboring lakelets of Esthwaite, Troutbeck, and Blelham, and discharges its surplus waters southward into Morecambe Bay by the Leven. Next to Wast Water, W. is the deepest of all the English lakes, its greatest depth being 240 feet, while Wast Water it 270 feet deep. It contains a number of islands, the largest being 28 acres in superficial extent, and the chief of which are Rough Holm, House Holm, Lady Holm, and Curwen's or Belle Isle. Soft rich beauty is the principal characteristic of the islands of the lake, of the wooded shores, and of the scenery around; there being a total absence of that wildness and sublimity which characterizes some of the other lakes, except at the north end, where Langdale Pikes, Harrison Stickle, Sea Fell, and Bow Fell stand forward prominently in the landscape. The east and west shores are bounded by gentle eminences exuberantly wooded, and numerous villas and cottages peeping out of the woods give an aspect of quiet domesticity to the landscape. About a mile from Waterhead, at the north extremity of the lake, is the town of Ambleside, 1½ miles north-west of which is Rydal, the residence of the poet Wordsworth; in the vicinity of Waterhead is Dove's Nest, the cottage at one time occupied by Mrs. Hemans; further down the east shore is Elleray, famous as the residence of 'Christopher North;' and half-way down the lake, on the eastern shore, is Bowness.

WI'NDGALLS, are puffy swellings about the joints of animals, particularly of horses, correspond to the ganglions of human surgery, and result from irritation and inflammation being set up within the delicate synovial cavities, which thus secrete an unusual quantity of thickened synovia. Rest, moderate work, wet bandages, and occasional blisters reduce the swellings, but with fast roadwork they are apt to reappear, especially in old horses.

WINDHAM, RIGHT HON. WILLIAM, English statesman, born, 1750, in Golden Square, London, was son of Colonel Windham of Felbrigg Hall, Norfolk, in which county the family had been settled since the 12th century. He was educated at Eton, and was afterwards sent to Glasgow University, where he studied mathematics with success. In 1761, he entered at University College, Oxford. After the usual course of travel, he began to acquire notoriety as an opponent of the administration of Lord North. His oratorical exercises were interrupted by a design of visiting the North Pole, and he accompanied the expedition in which Nelson, then a youth, took part. He found the sea-sickness intolerable, was put on shore in Norway, and returned home in a Greenland whaler. In 1781, he was returned to parliament for Norwich, and took his seat among the Whigs. In 1783, on the formation of the Portland ministry, remarkable for the coalition of Lord North and Mr. Fox, he became principal secretary to Lord Northington, then lord-lieutenant of Ireland. Before leaving England he called upon his friend Dr. Johnson, and lamented that his situation would compel him to sanction practices he could not approve. 'Don't be afraid, sir,' replied the doctor, 'you will soon make a very pretty rascal.' Ill-health, or, perhaps, conscientious scruples, soon caused him to resign his secretaryship. In 1784, he seconded Burke's motion for a representation to the throne on the state of the nation. There is an admirable and characteristic sketch of W. in Macaulay's description of the trial of Warren Hastings: 'There, with eyes momentarily fixed on Burke, appeared the first gentleman of the age, his form developed by every manly exercise, his face beaming with intelligence and spirit—the ingenious, the chivalrous, the high-souled Windham.'

Abandoning his old friends the Whigs, he followed Mr. Burke, and ranged himself on the side of Mr. Pitt in opposing the speculative doctrines of the French Revolution, and supporting the war with France. In 1794, he became secretary-at-war under Mr. Pitt, with a seat in the cabinet. He now attacked his former friends with the utmost acerbity. He went out with Pitt in 1801, and sided with the Grenvilles in stigmatizing the peace of Amiens, concluded by the Addington administration in 1801. This lost him his seat for Norwich, but he was elected for St. Mawes, and on the return of the Greenville party to power, he became colonial secretary. In 1806, he brought forward his plan of limited service in the army, proposing that the infantry should be enlisted for seven years only, with liberty to renew their services for another seven years, receiving an increase of pay; cavalry and artillery to be enlisted for ten years, the second period six, and the third five years. He also proposed to increase the pay and pensions of officers and men, and generally to better the condition of the soldier. The plan was strenuously opposed, but passed into a law. He went out of office in 1807, when the Portland administration was formed (having previously declined the offer of a peerage), and strongly denounced the expedition against Copenhagen, and afterwards the disastrious Walcheren Expedition. In 1808, a clause was introduced by Lord Castlereagh (who had succeeded W. in office) into the Mutiny Act, permitting men to enlist for life, contrary to W.'s scheme of limited service, which was, however, re-adopted in 1847. In May, he underwent a surgical operation for extracting a tumor from his hip, from the effects of which he died June 3, 1810.

W. was an excellent speaker, and one of the most effective and skillful debaters of his time, as will appear from his speeches collected by Mr. Amyott, his secretary, and published, with a Life prefixed, in 3 vols. 8vo. Fox said he had never met a meditating man with so much activity, or a reading man with so much practical knowledge. Pitt declared that his speeches were the finest productions possible of a warm imagination and fancy. Canning described his eloquence as, if not the most commanding, at least the most insinuating that was ever heard in the House of Commons. Dr. Johnson, who was much attached to him, declared that, in the regions of literature, W. was *inter stellas luna minores*. He possessed brilliant conversational powers. Yet, notwithstanding his great talents and rare gifts, he appears in the page of history as the mere shadow of a man. In his lifetime, he gained the disparaging nickname of 'the weather-cock.' He was fond of paradox, and once defended bull-baiting in the House of Commons with great vivacity and ingenuity. Although a man of refinement and sensitiveness, he had a passion for pugilism, and was a regular attendant upon prize-fights. The publication of his *Diary from* 1784 *to* 1810, by Mrs. Henry Baring (1866) discloses the secret of his weakness. Morbidly self-conscious, he was always watching himself, pulling himself to pieces, and recording the doubts that haunted him as to his mental capacity. Acknowledged by his contemporaries to be one of the manliest of mankind, he succeeded in infusing into his mind doubts with respect to his own courage. He got rid of this delusion by going under fire in the trenches at the siege of Valenciennes; but no sooner was he convinced that he was not a coward than he began to be afraid he was discreditably insensible to the scenes which were passing around him! With brilliant faculties, he was in fact an intellectual hypochondriac incapable of achieving anything great.

WIND-INSTRUMENTS, musical instruments of which the sounds are produced by the agitation of an enclosed column of air. They are generally classified into *wood instruments* and *brass instruments* (both of which are played by the breath), and the *organ*.

The name wood instruments is applied to musical instruments constructed either of wood or of ivory, of which the principal are the flute, piccolo, clarionet, flageolet, basset-horn, oboe, and bassoon. They are generally characterized by a soft, smooth, aërial tone, resembling the human voice. By the use of holes and keys, considerable compass is given to them; they are capable of producing only one sound at a time, but with considerable command of piano and forte. Of brass instruments the chief are the horn, trumpet, trombone, cornet-a-piston, euphonium, bombardon, and ophicleide. They are generally more powerful, and their quality more piercing than wood instruments; the ophicleide, however, approaching more than the rest to wood instruments in capabilities and tone. In a full orchestra there are generally two flutes, two oboes, two clarionets, two or four

horns, and two bassoons, frequently with the addition of two basset-horns, one or two piccolos, and one or two ophicleides or trombones. Each part, except when there is an unusually large number of bow-instruments, is single.

The organ is a combination of a large number of wind-instruments, sounded, not by the breath, but by the admission of air into the wind-chest, by means of keys pressed down by the performer.

WI'NDLASS is that modification of the wheel and axle which is employed in raising weights, such as bucketsful of water from a well, coals from a pit, &c. Its simplest form is that of an axle supported by pivots on two strong upright pieces, and pierced near one end with four or six square holes, into which handles, known as *handspikes*, are inserted. In other forms, a winch at each end is substituted for the handspikes. If the weight (say a bucket of water) is to be lifted a considerable distance, the length

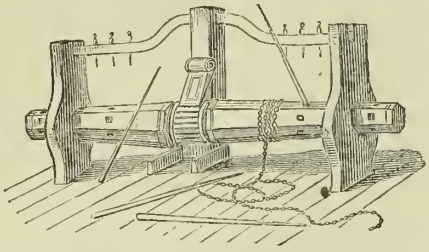


Fig. 1.—Ship's Windlass.

of the rope which attaches it to the axle largely increases the weight, and thus aids the power when descending, and counteracts it when ascending. This difficulty is partially got over by employing a double rope with two buckets, one of which ascends while the other descends; but this modification, though partially effective for the end in view, lends aid to the power when aid is least, and hinders it when aid is most, required.

A more efficacious plan is to form the axle not cylindrical, but of a barrel-shape, like two truncated cones placed base to base, and to fasten two ropes, one to each end, so that when coiled up round the barrel they approach the middle; in this case, when one rope is fully uncoiled, and winding-up commences, the gross weight, which is then at its maximum, acts at the minimum leverage of the end, and as the progress in winding up diminishes the weight, its leverage so increases that the momentum is preserved uniform. On the other hand, the empty bucket, when commencing its descent, acts at its greatest leverage, and as the unwinding of the rope adds to the weight, its leverage becomes smaller, so that the momentum of the descending weight always remains the same; and thus the strain on the power is preserved uniform. The ratio of the weight to the power it is sometimes found necessary to increase greatly; but with the ordinary windlass this could only be effected by similarly increasing the ratio between the leverage of the handle and the radius of the axle—an object attained by a great increase of the former, rendering the machine too cumbrous, or by greatly diminishing the latter, and so weakening it.

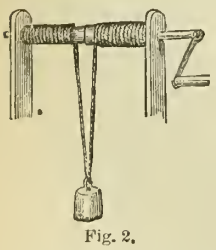


Fig. 2.

The desired result is attained, however, in a manner not liable to these objections, by the use of the *differential axle* (fig. 2), an axle of which one half is of greater diameter than the other, and the single rope, after being coiled round the whole axle from end to end, is fastened at each end of the axle, and the weight is hung by a pulley, which is supported in a bulge in the center of the rope. As the portion of the rope on one half of the axle is unwound, that on the other half is wound up; but since the rates of winding and unwinding are different, the bulge of the rope increases when the rope is wound *on* the smaller end of the axle, and decreases when it is wound *off* the smaller end. The more nearly equal the two radii of the axle are, the greater is the weight which can be raised by the power—the ratio between the two being $\frac{W}{P} = \frac{\text{radius of circle described by power}}{\text{difference of radii of the portions of the axle}}$; so that if the radius of the power is 18 inches, and the radii of the axle 5 and 4 inches, the power balances a weight = 18 times itself; while the strength of the axle requires to be only equal to that of one of the ordinary kind, in which the power can only balance a weight = 4½ times itself. The same principle is applied to the Screw (q. v.). For a very accurate estimate of the mechanical advantage of the windlass, the thickness of the rope must be taken into account, by adding half of its diameter to the radius of the axle.

WI'NDMILL is a mill for grinding corn, sawing wood, or performing any other species of work for which fixed machinery can be employed, the motive-power being the force of the wind acting on a set of sails in a manner similar to that of a current of water impinging obliquely on the float-boards of a water-wheel. The structure is a conical or pyramidal tower of considerable height, and covered over at the top with a species of dome, *aaa* (fig. 1), which is so fastened as to revolve upon it round the upper

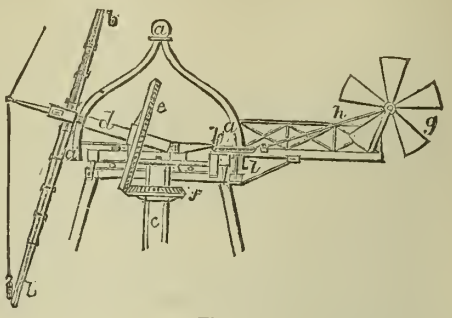


Fig. 1.

extremity of the shaft *c*, as a center, the motion being aided by the interposition of 'castors' between the wooden rings which form respectively the base of the dome and the top of the tower; the sails *b*, *b*, are attached to the extremity of the axis *d*, so as to revolve in a plane at right angles to it, and the motion they communicate to the axis is transferred by the bevelled wheels *e* and *f* to the upright shaft *c*, by which it is in turn conveyed to the working machinery at the bottom of the tower. The axis *d* of the sails, which is inclined at an angle of about 10° to the horizontal, is fixed at one end to a projection from the top of the shaft *c*, and at the other to a circular orifice in the side of the dome, so that it revolves with the latter, carrying the sails along with it. This arrangement is adopted for the purpose of enabling the plane of rotation of the sails to be placed always at right angles to the direction of the wind. This transference of the plane of rotation was at one time effected by manual labor applied to a winch at the bottom of the tower, the rotation being communicated, by an endless band and wheel-work above, to the dome, the outer circumference of the base of which was, for this purpose, furnished with a circle of rack-work. But this clumsy arrangement was superseded in English windmills by an ingenious contrivance due to Sir William Cubitt, by which the wind itself was made to turn the sails into their proper position.

The apparatus by which this is effected consists of a revolving *flyer* or fan, *g*, projecting from a gallery fastened to the dome on the side opposite to the sails; *h*, a long thin shaft to which a revolving motion is communicated by a toothed wheel on its outer extremity, from a corresponding wheel on the axis of the flyer (these wheels are not seen in the fig., being behind the flyer); a pinion at the other end of the shaft acts upon the cog-wheel *k*, which carries, on the lower extremity of its axis, a pinion *l*; and this last can, at pleasure, be put into gearing with the rack-work or cog-circle on the lower edge of the dome. The construction of the sails, which are four in number, is shown in fig. 2. Each sail consists of a *whip* or radius of from 33 to 40 feet in length, firmly fastened at right-angles to the sail-axle, and pierced at from ⅛th or ¼th of its length from the axle to its extremity with about 20 holes, into each of which is inserted a cross-bar of 5—6 feet in length; and this framework, strengthened generally by light rods connecting the ends of the cross-bars, is then covered with canvas. The cross-bars, however, are not, as in the figure, set in the plane of revolution of the whips, for, in that case, the wind, acting in a direction coinciding with that of the sail-axle, would impinge perpendicularly on the sails, and no rotatory motion would result; the bars, therefore, are set at an angle to this perpendicular direction, yet not all at the same angle, for the velocity of each point of the sail increasing with its distance from the sail-axle, the inclination must vary from the first cross-bar to the outer extremity. It is found that a variation of the angle from 18°, at the first cross-bar, to 7° at the extremity, is a very effective form. The amount of sail that a windmill can carry with advantage is limited, according to Mr. Smeaton (q. v.), one of the great authorities on this subject, to ⅛ths of the area of the circle described by one whip; the velocities of a sail, when unconnected with, and when producing its maximum effect on the machinery below, are as 3 to 2; also, the increase of useful effect varies with the square of the wind's velocity, and is proportional to the cube of the length of the whip, in sails of similar form. A windmill with sails of 40 feet radius is equivalent to 65,000 foot-pounds per minute.

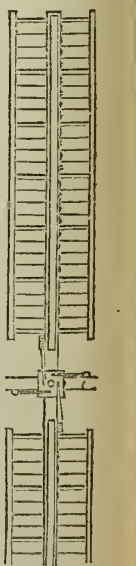


Fig. 2.

Another species of windmill, known as a horizontal windmill, is a large circular frame of wood which rotates on a vertical axis, and carries a set of sails which revolve in a horizontal plane. This form is, however, not nearly so effective as the other, it being evident that the wind can only act effectively on one sail at a time. According to Sir David Brewster, the power of a horizontal mill is only about one-third or one-fourth of that of a vertical mill, the number and size of the sails being equal in each. An ingenious form of horizontal windmill was patented by Mr. Girandat of New York in 1861. The peculiarity is in the sails, which are hinged in such a way that the force of the wind acting on one face of them preserves their perpendicularity to it, and secures a maximum effect, but when, after a further semi-revolution, the other side is presented to the wind, they are raised to a horizontal position. Most of the recent improvements in windmills have had for their object the regulation of the sail-area exposed to the wind to counterbalance the variations in the latter's force, and so produce uniformity of motion; but these are too numerous to be here noticed. We may mention, however, that the inventions, with this object, of Mr. Bywater in England, M. Berton in France, and Mr. Henry Glover of Massachusetts, are both ingenious and effective. Windmills were introduced into Europe from the Saracens, and were formerly much more extensivaly used in England than now. They are, however, still common in the midland and southern districts; on the continent, especially in Holland and France; and in the United States.

WINDOW (connected with *wind*, as Lat. *fenestra* with *ventus*) is an opening in the wall of a building for the admission of light and air. In the East, from time immemorial, windows open not upon the street, but upon the court, and are usually provided with lattices or jalousies. The Chinese use, instead of window-glass, a thin stuff varnished with shining lac, polished oyster shells, and thin plates of horn. Among the Romans, windows were originally closed with shutters; afterwards they were made of a transparent stone, *lapis specularis*, which, from the description, can be nothing else than mica; and in the 2d c. after Christ, of horn. According to some, there are traces of glass windows having been used in Pompeii; but the matter is doubtful. The first indisputable mention of glass windows is made by Gregory of Tours in the 4th c. of our era, who speaks of church windows of colored glass. Wilfrid (q. v.), on succeeding to the archbishopric of York in 669, filled the vacant windows of the cathedral with glass. In 674, Abbot Benedict Biscop brought artists from France to glaze the windows of the Abbey of Weremouth; and the Bishop of Worcester did the same in 726. Leo III., in the end of the 8th c., put glass windows into the church of the Lateran. Glass began to be used in windows of private houses in England as early as 1180; in France in the 14th century. As late as 1458, it struck Æneas Sylvius very much that in Vienna most of the windows were glazed. See GLASS.

In ancient temple architecture, windows were unknown—the light being obtained from openings in the roof. In Gothic architecture, however, the window is one of the most important features, giving, by the infinite variety of its outline, and the graceful forms of its tracery, as much character and beauty to the Gothic edifices, as the styles and colonnades of ancient art gave to the classic temples.

In the early Gothic or Norman style, the windows were small and comparatively stunted—they were either simple openings with semicircular head, or two such grouped together with a larger arch over both, and with the usual mouldings and ornaments of the style (fig 1). The inside has generally a deep splay, and simple mould-

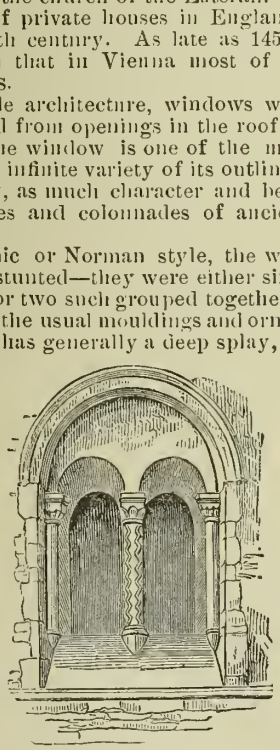


Fig. 1.—Bucknell, Oxford.

ing on the outside. Small circular windows sometimes occur in Norman work.

In the early English style, the windows were more elongated, and had pointed arches. They are frequently grouped in twos or threes, and placed so close, that the wall between becomes a mullion. The wall over the group contained within the enclosing arch, then becomes perforated with a quatrefoil or other ornamental opening, and thus the simpler forms of tracery become introduced. The interior arches are splayed off, and are frequently very elaborately decorated with shafts and arch mouldings. The lancet window (so called from its shape) is common in this style. Circular windows are also used with tracery formed by little radiating shafts with small arches. The triangular window, on a small scale, is also occasionally to be met with.

It is in the Decorated style that the windows become enlarged and filled with mullions and tracery. This is at first simple, and composed of geometric figures such as the origin and progress of Tracery (q. v.) naturally led to. As the style advanced, more flowing forms were introduced, until, in the 15th c., the tracery passed into the Perpendicular Style (q. v.) in England, and into the Flamboyant (q. v.) in France. The heads of the lights, and the apertures in the tracery, are usually foiled, and the inner jambs are splayed and ornamented with mouldings, shafts, &c. (fig. 2). In elaborately traceried windows, the jamb and arch

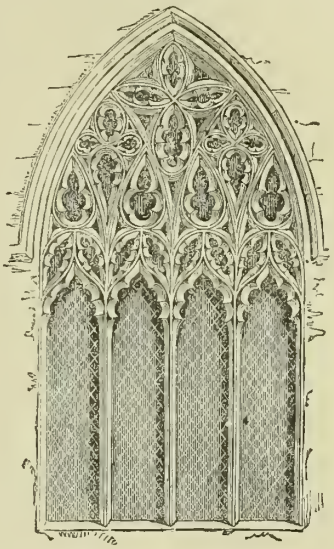


Fig. 2.—Little St. Mary, Cambridge, *circa* 1350.

mouldings are occasionally very small, but they are usually bold and deep.

In the later Tudor style, the window-heads became flattened into the four-center arch; and in the time of Elizabeth and James I., the arch gave place altogether to the flat lintel with the opening divided by mullions into rectangular lights, sometimes foiled at top. Circular windows, with elaborate tracery, are chiefly found in the Decorated period.

In domestic buildings, the windows are similar to the above, but square-headed windows occur more frequently to suit the height of the floors; and the space between the sill and the floor is recessed and fitted with seats. Transoms are also of common occurrence. The Bow or Bay Window (q. v.) is also a frequent and very elegant feature in the later Gothic buildings.

In the revived Classic styles, the windows are almost invariably plain rectangular openings, with either a flat lintel or semicircular arch-head. They have sometimes architraves round the jambs and lintel, or are ornamented with pillars supporting an entablature or pediment above. The architraves are frequently carved, and the cornices carried on trusses at each side.

The style of shop-fronts has been much modified, and the windows enlarged, in consequence of the facilities afforded by the use of plate-glass.

WI'NDSOR, properly called NEW WINDSOR, a municipal and parliamentary borough of Berkshire, beautifully situated on the right bank of the Thames, 23 miles west-south-west of London. W. and Eton in reality form one town. The town is chiefly interesting on account of its being the scene of *The Merry Wives of Windsor*, and the antiquity of its castle and parks, which have been a favorite residence of English monarchs, especially since the time of William the Conqueror. The elevated plateau of natural chalk upon which it stands marked it out, no doubt, as a naturally strong place from the earliest dates, but the deficiency of water which such a position entailed, was a serious objection to its being adopted as a permanent residence for many years. The older palace of the English kings was at *Old* Windsor, about two miles distant, and considerable doubt seems to exist among antiquaries and historians as to the first English king who built solid work of masonry at Windsor Castle.

In the time of Edward the Confessor it was probably a wooden structure, as stone was difficult to be had, and wood was abundant. William the Conqueror probably built the first substantial stone buildings, and regularly fortified the place; but the absence of water, except what was carried to it from the Thames, must have for a long time been a serious drawback to its importance as a military station. The history of the existing fabric begins in the reign of Henry III. The buildings may be said to be grouped in three portions—the Middle Ward containing the Round Tower; the Lower Ward, on the west, containing St. George's Chapel, the houses of the Military Knights, cloisters, &c.; and the Upper Ward, on the east, containing the sovereign's private apartments. The unfinished chapel, which was begun by Henry III., was completed by Edward III., rebuilt by Henry VII., and added to by Cardinal Wolsey. Under this chapel is the burial vault of the present royal family. The Round Tower, formerly believed to be Norman, but in which there is not a single yard of Norman masonry, was built in the 18th year of Edward III. to receive the Round Table of the knights of the newly founded order of the Garter. Pop. (1881) 12,273. The park and forest immediately adjoining are 13,000 acres in extent, and contain many historic trees, such as Elizabeth's Oak; Shakspeare's Oak; the Long Walk, made in the reign of Charles II.; and Queen Anne's Ride of Elms, three miles long. Herne's Oak, rendered so famous by Shakspeare, was blown down in Sept. 1863, and a stone and young tree now mark the spot. The oldest planted timber in England, viz., that of the reign of Elizabeth, is also in Windsor Park, and there are many oaks of which it is well established the age must be 1000 years.—See Tighe's *Annals of Windsor;* Menzies' *History of Windsor Forest;* Hepworth Dixon's *Royal Windsor.*

WINDWARD ISLANDS. See ANTILLES.

WINE, CHEMISTRY AND MANUFACTURE OF. Before entering into the chemistry of this subject, it is necessary that the composition of the grape, from whose juice it is derived, should be understood; and as there is an immense variety of vines yielding grapes of corresponding variety, and as the same variety* will, under different external influences, produce very different grapes, it is obvious that our researches must be confined to the most typical form of grapes. The principal component of the juice of ripe grapes is water, in which are various substances, either held in solution or very minutely divided. The juice as obtained by pressure, is thick, and exposure to the heat of the sun rapidly changes it into a fermented liquid. As principal components held in solution in the water, Professor Mulder mentions 'sugar (both grape-sugar and fruit-sugar), gelatine or pectine; gum, fat, wax, vegetable albumen, vegetable gluten, and some other substances of the nature of extractive matters, which are not, however, accurately determined; tartaric acid, both free and combined with potash (as cream of tartar), partly also combined with lime; in some cases, we find also racemic acid, malic acid, partly quite free, partly combined with lime, and, according to some, tartrate of potash and alumina; further, oxide of manganese and oxide of iron, sulphate of potash, common salt, phosphate of lime, magnesia, and silicic acid may also exist.'—*Chemistry of Wine,* p. 5. Although no other ingredients have as yet been discovered in grape-juice, others, which only appear during fermentation, and impart not only the vinous smell common to all wines, but the aroma (bouquet) and the flavor peculiar to each wine, must exist in it in small quantities. In those cases where the skins are allowed, as in the preparation of red wine, to ferment with the juice, the constituents imparting odor and flavor may be drawn from them. Coloring matter and tannic acid are undoubtedly found in the skin, and are thus imparted to red wines. Moreover, the grape-stones, which are left with the skins, yield tannic acid freely during fermentation.

The different proportions in which the inorganic matters—the potash, soda, lime, magnesia, iron, manganese, sulphuric acid, phosphoric acid, and chlorine—exist in grape-juice, exert a very great influence upon the quality of the wine, both in relation to its color and its taste. A relative excess of phosphoric acid, or of lime, or of soda, will induce changes sufficiently obvious to the chemist, but which we have not space to discuss. With regard to the acids of grape-juice, or *must*, as it is technically called, Professor Mulder observes that, as a general rule, the three—viz., tartaric, malic, and citric—are rarely found together in one fruit, and he doubts whether the presence of citric acid has been fully proved. Malic acid exists in unripe, and tartaric acid in ripe grapes; and while no malic acid exists in wine made from perfectly ripe grapes, a small quantity is present in most wines. In the article TARTARIC ACID, it is shown that a nearly allied acid, *racemic acid*, exists in exceptional cases in grapes. The quality of wine is only affected if this acid be largely present, because less lime than usual will be found in it, racemate of lime being less soluble than tartrate of lime, and further, because cream of tartar is more soluble than biracemate of potash. Such wines are consequently sweeter, and—if red wines—darker colored, than wines containing only tartaric acid. The quantity of sugar varies extremely. In the juice of very ripe grapes, it may reach 40 per cent. According to Fontenelle, the juice produced in the south of France contains from 30 to 18 per cent.; while in the neighborhood of Stuttgart, Reuss determines it at from 25 to 13 per cent. In the low and variable temperature of Holland, the juice of the best grapes yields only 10 or 12 per cent. of sugar. The composition of the albuminous matter is not clearly determined. In an analysis of the must of the Riessling grapes of Grumbach, Beltz found that the gluten (no albumen was found) was thirty times less abundant than the sugar. It probably varies at from 1 to ½ per cent. The only other ingredient requiring notice is fat, which is chiefly but not entirely derived from the grape-stones, in which it is an abundant ingredient. It occurs in wine, in minute quantity, in the form of a fatty acid.

On the subject of the fermentation of the grape-juice we shall only offer a few remarks. It has been already stated that the saccharine contents of grape-juice range from 13 to 30 per cent. If we regard all this sugar as grape-sugar, $C_{12}H_{12}O_{12}$, with an equivalent of 180, then each atom may be resolved into 2 atoms of alcohol, $C_4H_6O_2$, with an equivalent of 46, and 4 of carbonic acid gas, CO_2, with an equivalent of 22, according to the equation—

Grape-sugar. Alcohol. Carbonic Acid.

$$C_{12}H_{12}O_{12} = 2(C_4H_6O_2) + 4(CO_2),$$

provided that there is no loss; or under the most favorable conditions of fermentation, 180 parts (by weight) of anhydrous grape-sugar, or 198 of the hydrated sugar (with the formula, $C_{12}H_{14}O_{14}$), may yield 92 parts of alcohol; or, roughly speaking, 2 parts of sugar yield 1 of alcohol. 'According to this,' says Mulder, 'the juice of French and German grapes gives, when analysed, as a maximum, from 7 to 15 per cent. of alcohol by weight. But some of the sugar remains undissolved, and, during fermentation, more alcohol is evaporated than water; therefore, for such grape-juice, or rather for the wine to be produced from it, the alcoholic contents must be under 15 per cent. as maximum, and 7 per cent. as minimum.—*Op. cit.*, pp. 49, 50. According to Mulder, sugar is found in all wine,* and its quantity depends to a considerable extent upon the treatment to which the grapes are subjected before pressure. Tokay wine, for example, is prepared from grapes which have been allowed not only to get over-ripe, but partly to dry on the vines; *vin de paille* is obtained from grapes dried on straw exposed to the sun; and in both these cases, water is evaporated, and the concentrated juice yields a wine of extra strength. The strong heavy wines used by the ancients were thus prepared. When the grapes are dried on the vine, the wine is called *vin sec;* and when the juice has been evaporated by the aid of heat, the wine is called *vin cotti.*

In consequence of the close connection which exists between the amount of sugar in the grape-juice and the excellence of the wine which it yields, attempts are often made, especially in bad seasons (want of heat and light, and excess of rain), to introduce extraneous sugar into the juice; or, as it is technically called, to *doctor* it. For this purpose, a cheap fermentable sugar is added to the sour juice, an adulteration which cannot subsequently be detected by chemistry, although it may be suspected, from the absence of the proper aroma from the wine. Similarly, sugar is often added to good grape-juice, in order to obtain a stronger wine than the natural product. Many imitations of Port wine are thus manufactured. The character of the wine is much influenced by the extent to which the process of fermentation is allowed to proceed. If it goes on till all the sugar is converted into alcohol, a *dry* wine is produced; when it is checked before the change is completed, a rich *fruity* wine is produced; and when the wine is bottled whilst the fermentation is still in progress, effervescent wine is formed.

Shortly after the must has passed from the wine-press, symptoms of fermentation appear; the juice becomes more turbid, bubbles rise to the surface, and a froth soon settles there. This process in a moderate climate usually reaches its highest point in three or four days; and before it is quite finished, the whole liquid mass is stirred up so as to re-excite the process. For this purpose, in many districts, a naked man used (we do not know if the custom generally still exists) to go into the wine-tub, who both accomplished the necessary stirring, and promoted fermentation by his animal heat. Several persons have been killed in this way by suffocation from the atmosphere of carbonic acid gas. In two or three weeks, the fluid becomes comparatively clear, and a precipi-

* A certain variety of grape, when grown upon the Rhine, furnishes a species of Hock; the same grape, when raised in the valley of the Tagus, yields Bucellas; whilst in the island of Madeira it produces the wine known as Sercial, which has a flavor quite different from either of the others. See Miller's *Organic Chemistry,* 3d ed. p. 187.

* Dr. Bence Jones, in the Appendix to his translation of Mulder's work, declares, on the other hand, that while Port, Sherry (except in two instances), Madeira, and Champagne always contain sugar; Claret, Burgundy, Rhine, and Moselle wine (excepting one sample of Sauterne) are always free from every kind of sugar.

tate forms at the bottom. The wine is now removed from the sediment into another vessel, and a slow form of fermentation—*after-fermentation*, as it is termed—goes on for several months, sugar being constantly converted into alcohol and carbonic acid, and a fresh precipitate forming at the bottom. Several similar changes into other vessels are made, to get rid of the sediment, till it is fit for transferring into casks.

That the process of fermentation may go on satisfactorily, not only must water, sugar, and a nitrogenous matter in a state of actual change be present, but there must be a certain temperature and a certain amount of atmospheric air present. 'Although,' says Mulder, 'there is a wide interval between the extremes of temperature at which fermentation is possible, the boundary is very narrow which limits good and active fermentation in every kind of wine. The grapes of each country ripened under different degrees of summer warmth, and very unequally rich in constituents, require very different temperatures during fermentation; and different temperatures are also required for grapes which are the product of a warmer or a colder summer. But on these points we have little accurate knowledge. All we know is, that a high temperature during autumn promotes fermentation, and a low one is detrimental to it; and that inequality of temperature during fermentation is extremely injurious, and not unfrequently spoils the wine altogether.'—*Op. cit.*, p. 61. To what extent it is expedient to admit atmospheric air to the must, so that the fermentation may go on most favorably, is a point regarding which there has been much discussion, and which is not definitely settled. While some have asserted that no air is necessary to the development of fermentation, others have maintained that the wine is improved by the free admission of air during fermentation. Gay-Lussac proved experimentally that air is essential to initiate fermentation, which would then be continued without any fresh supply; and for many years wine was made in France with an almost total exclusion of air from the fluid by an arrangement intended to prevent the escape of alcohol by evaporation; but when the same chemist proved that by the use of open vats scarcely $\frac{1}{200}$th part of the alcohol was lost, this arrangement fell into disuse.

Judging from the method of preparing Bavarian beer, in which air is allowed to enter freely, Liebig recommended the same in the case of wine, and suggested that a large opening should be made in the casks in which fermentation takes place. This method has been tried on a large scale by Von Babo, Crasso, and others, with red wine, which was found to be of a better quality than that which underwent the same process in a cask which was closed, and only provided with a glass tube for the escape of the carbonic acid. But in other experiments made with white wine, the wine in open casks appeared to lose in aroma; and hence the solution of this question apparently depends on the kind of wine. Liebig's opinion has been very fiercely, and, as Mulder thinks, unfairly attacked; the probability is, that wines containing much sugar may be allowed with advantage to ferment in closed vessels, while those less rich in that substance may be left in open casks, provided the temperature be low and equable. When the main object is to increase the quantity of alcohol, the admission of much air is injurious, since it promotes the formation of acetic acid, and causes a corresponding loss of alcohol.

The actual substance—*ferment*—which causes the breaking-up of sugar into alcohol and carbonic acid, has been submitted to careful chemical and microscopical examination. One hundred parts of sugar require about 1·5 parts of ferment reckoned in the dry state; and as the analysis of ferment shows that about half of it consists of albuminous matter, it follows that $\frac{3}{4}$ of a part of albuminous matter are required for the conversion of 100 parts of sugar into alcohol and carbonic acid. Ferment consists of cells or globules of *Torula* (q. v.), which are precisely the same in the production of wine and beer. It is the contents of these cells which contain the active albuminous matter; while the cell-wall, consisting of cellulose, $C_{12}H_{10}O_{10}$, and produced from gum or vegetable mucus, is inert.

The leading points in which the constituents of grape-juice and those of wine differ from one another in consequence of fermentation, are, that in the wine there is a diminution (1) of the mucilaginous and saccharine matters, in consequence of the formation of ferment and alcohol; (2) of those substances which are insoluble in common water, but are held in solution in the viscid must, as, for example, phosphate and sulphate of lime; and (3) of cream of tartar, tartrate of magnesia, and sulphate of potash, which, being less soluble in spirit than in water, fall as the formation of alcohol increases. Red wines lose a portion of coloring matter and of the tannin, which is withdrawn by these salts, and hence become of a lighter color and less astringent. Before noticing the alcoholic strength of different wines, we shall briefly describe the concluding steps necessary for rendering wine fit for use. The process of *clearing* is undertaken with the view of removing all the sediment in which albuminous matters may still occur, and of diminishing the coloring matter and tannin of red wines. Amongst the substances used for these purposes may be mentioned albumen, isinglass, gum, milk, lime, gypsum, &c. In warm countries, gum is preferable to albumen or isinglass. The addition of lime throws down a precipitate of salts of lime, which carries down, in the case of red wine, a considerable quantity of coloring matter; its addition gives a sweeter and less astringent taste to the wine, and an appearance of age. As a general rule, clearing increases the durability of wine. *Sulphurizing* is a process which is especially applied to sweet white wines, which possess an excess of sugar and albuminous matter, and little tannic acid, and thus become easily decomposed. Its object is to check undue fermentation, and to prevent the formation of mould, which afterwards imparts a musty taste to the wine. The process is effected by burning sulphur in bottles or casks, and instantly pouring in the wine, which absorbs the sulphurous acid. Wine intended for exportation to warm climates is usually strongly sulphurized. Of course, great care must be taken that the sulphur is free from its common impurity, arsenic. In place of sulphurizing, another method of hindering the fermentation of sweet wine is adopted in some parts of France; it consists in putting $\frac{1}{1000}$th part of powdered mustard into the wine; but how it acts is unknown.

Having traced the chemical history of wine from its original state of grape-juice to the time when, having been clarified, and poured into casks and bottles, it is fit for use, we ought, in order to complete the sketch, to notice the subsequent changes which, in the course of time, it undergoes in the cellar. The ages at which different wines attain their perfection are, as is well known, extremely different. 'As a general rule,' says Mulder, 'wines which have retained a considerable portion of albuminous matter, and possess but little tannic acid, cannot resist the influence of time; they become acid, or undergo some other change. This occurs in the case of Rhine wines, which contain but little alcohol; and all those wines which contain much sugar, or but little tannic acid, cannot be kept long. Wines which can be *cellared* are those which improve; or, to speak more correctly, those wines are stored which improve with age. In these, odoriferous substances are formed, and the wine becomes less acid and better tasted. Such wine as is colored often deposits a considerable amount of sediment; and if it be stored in casks, there is a constant increase of alcohol.'—*Op. cit.*, pp. 105, 106. Wine is improved by being kept in wooden casks, as water escapes by evaporation, and the other constituents are relatively increased. The vinous constituents being thus concentrated, exert a stronger chemical action upon each other, and render the wine not only stronger, but better flavored. The change, however, does not stop here. The loss of water must be replaced by the addition of wine, otherwise the action of the air would turn the wine sour, and convert the alcohol into acetic acid; and the diminution of water, which is thus replaced by wine, causes a constant increase of tartaric acid. Wines which are poor in sugar may thus soon become too sour; and consequently, all wines cannot undergo this process. The popular idea, that wine which has grown old in bottles has therefore become richer in alcohol, is altogether false, and is doubtless founded on the fact, that it is only the strongest wines that can be preserved. The color, however, of bottled wine is materially affected by age: liqueur-wines and red wines containing no large amount of tannic acid, becoming darker, while wines which are rich in tannic acid, as Port, for example, deposit a sediment, and become lighter.

Old bottled wines contain odoriferous constituents—ethers of various organic acids—which are not found in new wine. For an explanation of the mode of formation of these compounds, to which wine owes its *aroma*, we must refer to the chapter on 'The Odoriferous Constituents of Wine,' in Mulder's work; we will here merely remark, that diminution of the free acids is necessarily associated with the formation of these compounds, and that this diminution can only occur by the acids being either decomposed or combined with non-acid substances, both of which operations here take place as the result of a very slow chemical process. This effect of time may, however, be imitated by art; and if bottles corked, but not quite filled with wine, are placed for two hours in warm water at a temperature of 185°, and after cooling, are filled, their contents possess the flavor and aroma of wine that has been bottled several years. This result was originally obtained by Appert; but Pasteur and others have, during the last few years, again brought the subject before the French Academy. Wines which have been long in bottle sometimes acquire a peculiar flavor, which is incorrectly referred to the cork. It is in reality due to the peculiar mould which grows from the outside of the cork inwards; and should it reach the inner surface, it imparts to the contents of the bottle a peculiar taste; and this wine is said to be *corked*. Very similar to this is what is known as 'the taste of the cask,' a peculiar flavor sometimes acquired by wine before bottling. This flavor is regarded as dependent on the development of a peculiar essential oil, during the growth of 'mould' on the surface of the wine. It can be removed by the addition to each pipe of about a quart of olive oil, which dissolves the unpleasant flavoring matter, and carries it to the surface.

In submitting matured wines to chemical analysis it is found that they differ materially from one another in their composition; and especially as the wine is, or is not, red. In white wine, no special coloring matters are found, and only a trace of tannic acid; while in red wine, both are present. In wine generally, the principal ingredients are alcohol and water; then sugar, gum, extractive and albuminous matters; then free organic acids, such as tartaric, racemic, malic, and acetic acid; and salts, such as the tartrates of potash, of lime, and of magnesia, sulphate of potash, chloride of sodium, and traces of phosphate of lime; also, especially in old wines, substances imparting aroma, as œnanthic and acetic ethers, and other volatile odoriferous matters (amongst which Mulder mentions butyric and caprylic ethers, each having a pine-apple odor, caproic, pelargonic, capric, and propionic ethers, amylic alcohol, and many of its ethers and other compounds, aldehyde, acetal, and probably racemic, citric, and malic ethers). In red wines, and in many others, a little iron, and possibly some alumina, may be found; and lastly, the best wines contain, according to Fauré, a peculiar matter, which he terms *œnanthin*, and to which he ascribes the substance or body of the wine; but which seems to other chemists scarcely to differ from gum or dextrine. These ingredients, as Mulder observes, vary exceedingly in proportion. The quantity of some is so small that the substance almost disappears during analysis; others can just be determined by a delicate balance; while others, again, are freely present. Putting aside taste and smell as standards of comparison, most of the essential dietetic and therapeutic properties of wine depend upon the *alcohol*, *sugar*, and *free acids*, especially *tartaric acid*, contained in it. In his chapter on 'The Amount of Alcohol in Wine,' Mulder gives a large number of analyses of different wines in which the percentage of alcohol is determined.

We shall here only give the abstract of the analyses made by his translator, Dr. Bence Jones, who found that the alcohol varies in

		Per Cent.		Per Cent.
Port	from	20·7	to	23·2
Madeira	"	19·0	"	19·7
Sherry	"	15·4	"	24·7
Champagne	"	14·1	"	14·8
Burgundy	"	10·1	"	13·2
Rhine Wine	"	9·5	"	13·0
Claret	"	9·1	"	11·1
Moselle	"	8·7	"	9·4

while in

Brandy	there was	50·4	"	53·8
Rum	"	72·0	"	77·1
Geneva	"	49·4		
Bitter Ale	"	6·6	"	12·3
Porter	"	6·5	"	7·9
Cider	"	5·4	"	7·5

Sugar is found in all wines,* although in certain kinds very little exists. According to Fresenius, the sugar in four kinds of Rhine wine amounts to exactly six-sevenths of the extract remaining after evaporation, the seventh part consisting of the salts and non-volatile unfermentable matter. In red Bordeaux, on the other hand, very little sugar is found; red Sauterne contains less than 1 per cent. of extract, and Hermitage 1·7; hence the quantity of sugar must be very minute; while some kinds of Muscat yield 24·5 of an extract, containing about 22 per cent. of sugar. Small as is the quantity of sugar in some wines, it is of great importance in diminishing the sharp taste of the free acids, and in imparting an agreeable flavor to the wine. Good red wines should contain at least one-half per cent. of sugar, and the quantity is sometimes larger. Some of the sweet wines contain nearly one-fourth of their weight of saccharine matter.

The following results were yielded by the experiments of Dr. Bence Jones:

Sherry (18 samples), sugar in 1 oz. varied from	4	to	18	grains.
Madeira (9 samples)	"	"	6 to 20	"
Champagne (4 samples)	"	"	6 to 28	"
Port (8 samples)	"	"	16 to 34	"
Malmsey Madeira	"	"	56 to 66	"
Tokay	"	"	74	"
Cyprus	"	"	102	"

Under the term 'free acids' are included the acid tartrate of potash, known as cream of tartar, and other soluble bitartrates found in wine, besides such acids as are quite uncombined, such as tartaric, malic, and acetic acid, and a trace of free tannic acid. Sugar has so much power in concealing the free acids, that their amount cannot be estimated with any certainty by the flavor of the wine, and must be estimated chemically by ascertaining how much of an alkaline solution of given strength must be used in order to render a given quantity of wine perfectly neutral to test-paper. Volatile acids, as, for example, acetic acid, may either be determined separately, or included with the others; and, excepting this acid, all the other acids occurring in wine may practically be calculated as tartaric acid. Mulder found that acetic acid was present in 20 different kinds of wine which he examined, the amount of the anhydrous acid ranging from 1·75 thousandth parts in Madeira to 0·25 thousandth parts in Tavella. In the same 20 kinds of wines, the free tartaric acid ranged from 2 to 7 parts in 1000 of wine, Tavella having the largest, and Bordeaux Sauterne the smallest quantity. With regard to the tannic acid, traces of it may be found in all white wines, but in no white wine is it sufficiently abundant to be of the slightest importance in a medical or dietetic point of view. On the other hand, it is abundant in Port and heavily loaded Bordeaux wines, especially when new. In the course of time, this tannic acid becomes oxidized into a sparingly soluble compound, which is called by Berzelius the *apothema*, or precipitate of tannic acid—a process which is facilitated by the exposure of the wine in bottles to full daylight. There is no doubt that this acid, by combining with the albuminous matters, tends to increase the durability of these wines.

Dr. Bence Jones, in his Appendix to Mulder's treatise, gives numerous results of experiments made regarding the acidity of wines by Prout, Liebig, Fresenius, and himself. His general conclusions are, that, 'proceeding from the least acid wine to the most acid, we have Sherry, Port, Champagne, Claret, Madeira, Burgundy, Rhine wine, Moselle. The least acid fluids examined were Geneva and whisky; then rum, brandy, ale, porter, stout: the wines were all more acid than the malt liquids. See also Dr. Druitt's work on *Cheap Wines*.

The recent decline in French vintages by reason of the Phylloxera, has developed a new wine-making industry in France. Enormous quantities of dried raisins are imported mainly from Smyrna and the East, are soaked in water for 40 or 50 hours, and then treated as fresh grapes. Every 100 kilogrammes of raisins so treated, yield 325 litres of white or straw-colored wine, now recognized by the authorities as harmless; 30 million kilogrammes of raisins and currents were used in 1880 in this way. The most important of the diseases of wine are:

1. *The Turning of Wine.*—This disease is incidental to young wine, and seems to occur under special conditions of the weather. The color becomes darker, and the taste first disappears, and if the disease goes on, becomes disagreeable; the wine becomes turbid and acid. This disease is caused by a decomposition of tartar.

2. *The Ropiness of Wine.*—This disease consists in the formation of vegetable mucus from the sugar of the wine, and is known as mucous fermentation. The wines liable to this change are those which are deficient in tannic acid.

3. *The Bitterness of Wine*—to which Burgundy wines are especially exposed—seems due to a second fermentation, inasmuch as a large amount of carbonic acid is evolved. It has been ascribed, whether correctly or not, we cannot say, to the formation of citric ether, which is very bitter. The disease is caused by the sediment, and often ceases on being drawn off into other casks.

4. *The Acidifying of the Wine* depends upon the conversion of the alcohol into acetic acid, and may be stopped at its commencement by adding alkaline carbonates, which, however, destroy the color, and affect the taste of the wine.

5. *The Mouldiness of Wine* is a disease in which mould-plants are produced on the surface of the wine. How or under what conditions the mould is formed, is not known, except that the admission of air is favorable to the disease.

For further information on this subject, we may refer, *inter alia*, to Henderson's *History of Ancient and Modern Wines*, Bence Jones's translation of Mulder's *Chemistry of Wine*, and to the recent works of Shaw and Denman, in English; to those of Julien, Chaptal, Fauré (1844), and Batilliat, in French; and to those of Ritter, Balling, Von Babo, Bronner, &c., in German; also to the chief works on technological chemistry in all languages.

Manufacture.—The mode of manufacturing wine varies in its details in different countries. Pagnierre, in his treatise *On the Wines of Bordeaux*, gives the following description of the manufacture of the superior Clarets. The grapes, after being gathered, are picked; all that are likely to injure the quality of the wine being carefully removed. A principal vat of the best fruit, which is called the mother-cask (*cuve-mère*), is then made, into which, after picking, the workmen continue to put the best grapes, without their stalks, and without treading them, till they are from 15 to 20 inches deep; after which they throw about two gallons of old Cognac or Armagnac upon them, and then another bed of picked grapes, followed by two gallons more of brandy, and so on till the vat is full. Spirit of wine is then added, about four gallons being used for a wine-vat of from 30 to 36 tons. The amount of brandy and spirits that is added varies with the quality of the vintage, the better vintages requiring the less spirit. When

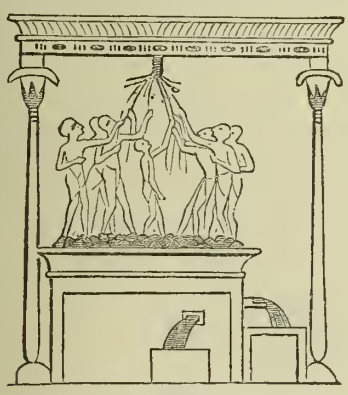
* In the preceding foot-note we have mentioned that Dr. Bence Jones denies the accuracy of this statement.

there is a deficiency of saccharine matter in the grapes, starch-sugar is sometimes added.

The *cuve-mère*, when filled, is closed and well covered with blankets to prevent the entrance of air, and is left in this state for about a month. A small cock or tap is placed in the side of the vat at about a third of its depth from the bottom, in order to allow of the progress of fermentation being observed; and to enable the manufacturer to know when the wine, having become cool and sufficiently clear, may be racked off and put into casks, previously prepared by scalding and rinsing with a little spirit. While the *cuve-mère* is at work, the ordinary vintage goes on as follows: The grapes are trodden or acted on by machinery in the press, and put with their stalks into the vats, when the fermentation takes place naturally. About a foot of the upper part of the vat is not filled, in order to leave space for the fermentation, which in very mature vintages sometimes occasions an overflow of these limits. The term *chapeau* is applied to the floating mass of stalks, seeds, and skins on the surface. The vats are lightly covered, and in from a week to a fortnight the wine is ready for being drawn off; for if it is left upon the lees (*marre*), or in contact with its crust (*chapeau*), it would take the disagreeable taste of the stalks. The barrels in which it is then placed are filled to about two-thirds or three-fourths, after which the *cuve-mère* is emptied, and its wine is poured in equal portions into these casks so as to fill them; and the remainder is used to replace every week what is lost by evaporation, or may have leaked away. All proprietors have not the means of making a *cuve-mère;* but in its absence, and with the employment of small vessels, wine of an inferior character is produced. The casks being full, are left unbunged for about a week, the bung-hole being in the meantime covered with a brick or piece of wood. They are filled up every two days, and after bunging, at least once a week, till the wine is in a state to allow the cask to rest with the bung-hole at the side, which is not till after a year and a half.

White wines are made in a somewhat different manner. The grapes are not, as in making red wine, put into the vat to ferment, but after the removal of the stalks, they are trodden, and when taken from the press, the juice, skins, and seeds are put into casks, in which the fermentation takes place, and wine is formed. When the fermentation has ceased, the wine is racked off from the barrels into smaller casks; and any loss that subsequently occurs from evaporation must be replaced once or twice a week.

The nature of the wine-press possesses many modifications. The wine-presses of the Jews consisted of two receptacles, or vats, placed at different elevations, in the upper one of which the grapes were trodden, while the lower one received the expressed juice or must (see Joel iii. 13). These vats were usually hewn out of the solid rock (Isa. v. 2, margin, and Matt. xxi. 33). In Wilkinson's *Ancient Egyptians*, vol. i. p. 46, there is a figure of a wine-press



Ancient Egyptian Wine-press.

thus composed of two vats or receptacles. The process of treading, which seems to have prevailed from the earliest ages, is shown in our copy of that figure, the treaders being assisted by ropes fixed to the roof of the press. A certain amount of juice was allowed to exude from the ripe fruit by its own pressure before the treading began. This was kept separate from the rest of the juice, and formed the *gleucos*, or 'sweet wine' noticed in Acts ii. 13. The first drops that reached the lower vat were called the *dema*, or tear, and formed the first-fruits of the vintage, which were to be presented to Jehovah (Ex. xxii. 29). Although the ancient system of treading the grapes still prevails in many countries, it is being gradually displaced by various mechanical appliances. In some parts of France, two wooden cylinders turning in opposite directions are employed to crush the fruit; and the reader will find accounts of more complicated presses in the various works on wine by Cyrus Redding and later authors.

Commerce.—The manufacture of wine has been carried on in all countries where the grape could be successfully cultivated, from the very earliest periods of history; and during the present century, it has followed the footsteps of man, and become established in the American and Australian continents, and promises to become, especially in the latter, a most important introduction. The vine, like most cultivated plants, is capable of producing very numerous varieties, and these, of course, give rise to different qualities of wine; but far more influence is exerted upon the quality of the wine by climate, soil, and the position of the vineyard as to the sun's influence; so that we not only have wines peculiar to particular countries, but of those, again, we have usually very numerous varieties, produced by special causes within those countries; and in addition to all these, again, we have other differences, produced by the degrees of skill in the manufacture. The earliest wines of which we have any account were made in Asia, but of these we know very little. Later on, we find abundant evidence of the high esteem in which wine was held by the Greeks, Romans, and other civilized contemporary nations; and the name of one of the choicest Roman wines has continued in use till the present time, viz., the Falernian. From what we learn from Pliny and other writers regarding the extraneous additions made by the Romans to their grape juice, and the treatment of the interior of their casks, we should much doubt whether even Falernian would be appreciated by the English palate. See the article 'Vinum' in Smith's *Dictionary of Antiquities*. The medieval history of wine is involved in much obscurity; but we find such abundant mention of Sack and Canary, that although we are not quite clear as to the exact history of those wines, we are not left in doubt as to the high appreciation felt for them by the priesthood and nobility of those times. The Greek islands seem to have furnished a large portion of the wine then consumed in Europe, and the merchantships of Venice in the days of her glory appear to have been largely engaged in carrying Greek and Italian wines. The Malmsey of those times was not the produce of Madeira, but of the islands of Tenedos, Lesbos, Chio, and Candia.

Burgundy is the oldest wine-producing country of Central Europe, and centuries ago the wine of this province was the choicest to be found on the tables of the rich and noble. Much of the Burgundy of the present day has excellent qualities—being of good body, velvety, and of delicate bouquet. A few scarce kinds, such as the Romanée-Conti, are really splendid wines. Claret or red wine, for the English market, is chiefly the produce of the Medoc district. It begins below Bordeaux, on the left bank of the Gironde, and stretches almost to the Bay of Biscay. White wine, or Sauterne, is also produced in the same neighborhood. The general character of the Bordeaux wines, which are of all qualities, is crispness, elegance, and fine bouquet, and they improve by keeping. Sparkling wine of great renown is produced in the Champagne, the finest qualities of which sell at exorbitant prices; but it would appear that in no other corner of the earth can wine of the same high character be obtained. See BORDEAUX, BURGUNDY, CHAMPAGNE.

Germany produces fine white but very few red wines. They are best known in the British market as Hocks and Moselles, and are made both still and sparkling. They have much elegance and a racy flavor, but many wine-merchants think they have scarcely the value claimed for them; nevertheless their high price shows that they are much in demand. At the Vienna Exhibition of 1873, the jurors on the wine section had before them a sample of Rhine wine made in 1706, the year in which Marlborough gained the battle of Ramillies, another coeval with the war of American Independence, and another of the year of the battle of Jena. But all these and others made in the early part of the century, before the days of 'fortifying,' had lost their characteristic taste and flavor, and were but the phantoms of what they had been. See HOCHHEIM, MOSELLE, and RHINE WINE.

The vineyards of Austria are extensive, and produce a great variety of wines, which are mostly consumed in the country itself, the red Vöslauer being the kind principally exported. Hungary is still more a vine-growing country, producing considerably more than it consumes, and is the home of the renowned Tokay (q. v.), which boasts a high antiquity, and commands a more fabulous price than any other wine in the world. Méneser-Ausbruch, Carlowitz, Ruster, Somlauer, and one or two others, are also favorably known. Hungarian wines are finding their way to English and other markets, but the long land-carriage operates as a serious check on the trade with England.

Perhaps the wines best known in Great Britain are the sherries of Spain and the ports of Portugal. The best kinds of the former are those technically called *dry*—that is, free from sweetness. Manzanillo is said to be the purest, but Montilla, Amontillado and Vino de Pasto are also famous kinds of sherry. This wine is chiefly shipped at Cadiz, near which it is made. The Malaga wines, both sweet and dry, are widely known, and from Catalonia come what are known in England as the Spanish Reds. Port wine (q. v.) is mostly brought from Oporto, and its consumption in Great Britain has, as a rule, continued to increase for nearly two hundred years. The shipments of it had, however, fallen in 1858

to two million gallons; but from that time they gradually rose to the large annual total of seven million gallons in 1877, threefourths of which were to England. For the ten years ending 1876, the average annual shipments of sherry from Spain amounted to nearly eight million gallons. Nearly all wines passing under the names of port and sherry are fortified, that is, dosed with brandy; but these form only a small portion of the wines produced in the Peninsula. Madeira, where twenty-five years ago the vineyards were almost totally destroyed by the oidium fungus, is now rapidly increasing the yield of its highly-prized wine.

Italy, with great natural advantages, is behind several other nations in the production of fine and especially of sparkling wines; but the Barolo of Piedmont, the Chianti of Tuscany, the Orvieto of the Roman States, the Lacryma Christi of Naples, and other special growths, have a high reputation. The celebrated Marsala, a wine with a sherry-like flavor, comes from Sicily. Not much Italian wine is exported, but the acreage occupied by the vineyards must be very large. The lesser wine-growing countries of Europe are Switzerland, Russia, Turkey, and Greece, which continues as in ancient times to put resin in what is required for home consumption. Australia can already astonish the best French judges by the excellence of her wines, and the Cape continues to yield her luscious Constantia and other growths of fine quality. The following table gives the annual yield of the more important wine-producing countries, but the great destruction caused in many districts since 1865 by the *Phylloxera* (q. v.), impairs the value of such a table :

	Gallons.
France, average from 1863 to 1873	1,176,000,000
Spain, mean of two estimates for 1873	450,000,000
Portugal, 1873	111,000,000
Germany	76,317,000
Austria, 1870	84,700,000
Hungary, 1873	221,214,000
Italy, 1873	750,000,000

The value of a full vintage in France, including the spirit distilled from the husks and stalks of the grape, amounts to the enormous sum of £76,000,000. The commercial treaty of 1860 (which expired in 1882) led to the import duty being fixed at one shilling per gallon on wines containing less than 26 per cent. of proof spirit. Thereafter the consumption of French wines in Great Britain greatly increased, nearly 7,000,000 gallons having been imported in 1880. But how little a wine-drinking people we still are is shown by the fact that the annual consumpt of wine per head—over 40 gallons—in Paris, is 80 times more than it is in the United Kingdom; our total imports being under 18 millions of gallons in 1880 (value, £6,465,944).

With respect to the high prices realized by old wines of famous vintages, we may state that as much as £2 per bottle has occasionally been given for Port and Tokay; and on one occasion a few years ago, two bottles of old Burgundy were sold at the very extraordinary price of £80 each.

Dietetic and Medical Value of Wines.—It may be laid down as a general rule, that the use of wine, even in moderate quantity, is not necessary for young or adult persons enjoying good ordinary health, breathing fresh country air, and not exposed to overwork or any other abnormal depressing agency. As, however, life advances, and the circulation becomes languid, wine in moderation becomes an essential, or, at all events, a valuable article of food; and even in earlier life, the physician meets large numbers of townspeople, especially women engaged in sedentary occupations, who cannot digest the national drink, beer, which is admirably suited to our outdoor laboring population, and to persons of higher rank who indulge freely in open-air exercises. In such cases, the beer is replaced by the more grateful beverage, tea, which, however, when taken too freely, and without sufficient solid food, gives rise to a form of distressing dyspepsia, which too often impels the sufferer to seek refuge in spirits. In many such cases, cheap wine, which may be purchased under our new tariff at from 1*s.* 6*d.* to 2*s.* a bottle, mixed with an equal bulk of water, will be found an excellent substitute for the beer or tea. We shall first notice the medical uses of those numerous cheap French, German, and Italian wines which have been, during the last few years, so prominently brought before the attention of the British public by certain enterprising wine-merchants; and then briefly notice the uses of the more expensive wines, such as Port, Sherry, Champagne, &c. In the first department of the subject, we shall take Dr. Druitt's *Report on Cheap Wines* as our chief authority, and we shall regard as cheap wines those whose price does not exceed 2*s.* 6*d.* a bottle. In prescribing wine, whether cheap or dear, the physician desires to give not merely alcohol, for that might be given far more cheaply under the form of gin or British brandy, but a compound liquid containing not only more salts or mineral ingredients than many a mineral water, but also the extractive parts of grape-juice, and the powerful oils and ethers which give to wine its special flavor or bouquet, and its singular exhilarating properties. 'The distinctive elements of wine,' says Dr. Druitt, 'are to be had in abundance in cheap Bordeaux, Burgundy, and other French wines; in Rhine wine; in the Hungarian, Austrian, and some Greek wine; and in all with a natural and not injurious quantity of spirit. In prescribing *pure wine*—i. e., light natural, virgin wine—the practitioner has a perfectly new article of both diet and medicine in his hands.'—*Op. cit.*, p. 22. In cases of debility and indigestion, such wine as that which we are now considering, diluted with cold water, may often be freely prescribed with great advantage in place of tea at breakfast, as well as at luncheon or dinner, or dinner and supper, according as the patient arranges his meals. The best of the cheap wines are those of Bordeaux: they are pure, light, and exhilarating; moderately strong, seldom containing 20 per cent. of alcohol; free from sugar and other materials likely to induce gout or headache; and are admirably adapted, according to Dr. Druitt (who has experimented largely upon them), for children with capricious and bad appetites, for literary persons, and for all whose occupations are chiefly carried on indoors, and which tax the brain more than the muscle. They should be taken *at*, not *after*, meals; and in many cases, when judiciously prescribed, they will be of more service to patients suffering from anæmia, chlorosis, dyspepsia, or gouty or rheumatic tendencies, than any form of medicine. The Bordeaux wines are, moreover, of great use in relieving the restlessness, nightly wandering, and thirst that accompany scarlet fever and measles in children; one part of wine with one or two of cold water, according to age, being an excellent drink, acting at once as a diaphoretic, saline, and sedative. The Burgundy wines are fuller, stouter (on an average from 2 to 4 per cent. stronger in alcohol), and higher flavored than the Bordeaux of equal price. The cheap Burgundies are inferior to the Bordeaux as medicinal agents; but the higher-priced wines (at and above 4*s.* a bottle) are of extreme service in cases of debility with nervous exhaustion, and, as Dr. Druitt remarks, 'what Bordeaux is to the blood, that is Burgundy to the nerves.' Some of the Hungarian wines which are being now introduced into this country, are excellent substitutes for Bordeaux; and not having the acidity, austerity, and coldness of the latter, are often preferred by patients. Amongst the most important of the *dearer* kinds of wine are Port, Sherry, and Champagne. Good old Port is a tonic of great value in cases of fever and other forms of extreme debility; but many persons past 40 dare not take it if they have any predisposition to gout.

Port wine given with warm water, administered with a biscuit at bedtime, often induces a good night's rest during convalescence from fevers or other weakening diseases. But during the last 30 or 40 years, its price has risen from 30 to 100 per cent.; and the Port purchased at a vintner's by a poor invalid at 4*s.* a bottle is usually nothing but doctored British spirit that has been sent to Hamburg to be transmuted into wine. In place of good Port, now unattainable by the poor, the physician had better prescribe good British brandy, if a strong stimulant be required; or such wines as the Hungarian Ofner or French Madeira, if it is the nutritive value of wine that is required. Sherry is, in a dietetic point of view, the wine in most general use in this country, and if pure, it agrees well with most constitutions. It is the only wine admitted into the Pharmacopœia, in which it is employed in the composition of aloetic, antimonial, colchicum, and other medicated wines. It is a wine that suits the stomach in many cases of dyspepsia, but is not often prescribed medicinally. Champagne is a wine that acts as a most valuable medicine in cases of vomiting, irritable stomach, &c., and when the appetite flags, and there is great general debility. Genuine Tokay is so rare a wine that it is almost unnecessary to notice it; it is, however, when procurable, extremely valuable as a cordial for aged persons of broken-down constitution.

WI'NNIPEG, Lake, the largest of the lakes belonging wholly to British North America, lies 90 miles north of the state of Minnesota, and about 350 miles north-west of Lake Superior, in lat. 50°—54° N., 96°—100° W. It is 264 miles long, 35 miles broad, has an area of 9000 sq. m.; and lies 628 feet above sea-level. It is connected by navigable channels with Lakes Winnipegos and Manitoba, which lie to the west, and run almost parallel with it. Its tributaries drain an area of 400,000 sq. m. Of these, the largest is the Saskatchewan (q. v.), which flows eastward from the Rocky Mts. through a rich alluvial country, and joins the lake near its northern extremity.

The Winnipeg River, 300 miles long, and flowing in a north-westerly direction, connects Lake W. with the Lake of the Woods and Rainy Lake. The Red River and its great branch, the Assiniboin, discharge their waters at the southern extremity of Lake W., after flowing through the region to the south and south-west—a region which presents a singular and important combination of prairie and woodland. Nelson's River, issuing at the north end of Lake W., is its principal outlet.

WINNIPEG, capital of the Canadian province of Manitoba, stands at the confluence of the Assiniboine with the Red River, 50

miles south of Lake Winnipeg. Formerly known as Fort Garry, from the Hudson's Bay Company's post so called, it was incorporated as the city of W. in 1873. The population, then about 2500, was in 1881 close on 15,000—a fair index of the prosperity of the town. The principal buildings are the government offices, city hall, post-office, custom-house, the various banks, and the churches, of which, in 1878, there were eight. The University of Manitoba includes a Presbyterian, an Episcopal, and a Roman Catholic college. W. stands on the line of the Canadian Pacific Railway, and is connected through the Red River Valley with the railways of the United States. In 1883, W. had an estimated population of 25,000, and property assessed at £6,000,000; while its recently enlarged boundaries include an area of about twenty square miles. Its main street is traversed by a tramway and lighted by electricity.

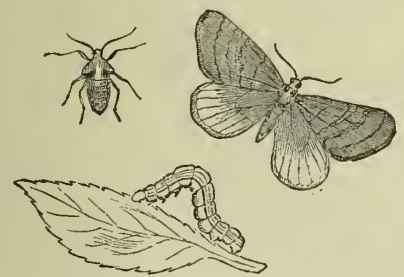
WINNIPISCIO'GEE, or WINNIPESAU'KEE, a beautiful lake of New Hampshire, U. S., 25 miles long, and of varying width, with deep bays, bold promontories, and numerous islands. Its crystal waters are stored with fish; and, surrounded by picturesque hills, it is a favorite resort of tourists to the White Mountains.

WINSEY, or WINCEY, a cloth of Scotch manufacture, consisting chiefly of wool mixed with a portion of cotton.

WINTER GREEN, the popular name of plants of the genera *Pyrola* and *Chimaphila*, of the natural order *Pyrolaceæ*, a suborder of *Ericeæ*. About twenty species of *Pyrolaceæ* are known. They are natives of woods throughout the whole of the northern hemisphere, and are herbaceous or half-shrubby plants, with a corolla of four or five segments, which are almost petals, but are slightly united at the base. Several species of *Pyrola* are natives of Britain, perennial herbaceous plants, with flowers of some beauty. Two species of *Chimaphila*, half-shrubby plants, with beautiful evergreen leaves, natives of North America, *C. umbellata* and *C. maculata*, are valued for their tonic, diuretic, and narcotic qualities, and are used in dropsy, calculus, strangury, and other diseases.

WINTERGREEN, OIL OF, or *Gaultheric Acid*, is an essential oil yielded by the flowers of the *Gaultheria procumbens* (see GAULTHERIA), abundant in New Jersey, and consisting chiefly of salicylate of methyl ($C_2H_3O.C_{14}H_5O_3$), mixed with a small quantity of a hydrocarbon, termed *Gaultherilene*, which is isomeric with oil of turpentine, and which, being more volatile than the salicylate of methyl, is easily separated from it. The latter is so much the more abundant constituent of the oil, that the two may be practically regarded as identical. This oil is not only yielded by the distillation of other plants, as the leaves and flowers of *Monotropa hypopitys*, and the bark of *Betula lenta*, but may be artificially formed by distilling a mixture of 2 parts of crystallized salicylic acid, 2 of anhydrous wood-spirit, and 1 part of oil of vitriol. In whatever mode it is obtained, it presents the appearance of a colorless or yellow oil, of a powerful, agreeable, and persistent odor; and hence it is largely used in perfumery.

WINTER MOTH (*Cheimatobia brumata*), a species of moth, the caterpillar of which is very injurious to plum trees. It has long been well known as common in many parts of the continent of Europe, and has of late begun to be very abundant also in some parts of England, as in the Vale of Evesham, in Worcestershire, celebrated for its plum plantations, where damage has been done



Winter Moth, wingless Female, and Caterpillar.

by it to the extent of £20,000 or £30,000 in a year. It is an insect about half an inch long, of a light-brown color. The male alone has wings; the female, as in a few other moths, is wingless. The eggs are hatched early in spring, and the caterpillars, at first very minute, feed upon the buds of the plum. The eggs are deposited on trees, chiefly around the base of the buds, and in chinks of the bark. Like most of the moths, this insect is nocturnal in its habits. It is during night that the males fly about the trees, and the wingless females creep up their stems. The best mode of preventing its ravages is to surround the stems of the trees with something over which the females cannot climb from the ground, in which they pass their chrysalis stage. Boxes are used for this purpose in Germany, in which the ascending insects are trapped. A more easy method is to coat the trees with a composition of tar and grease in the beginning of winter, the time at which these moths appear in their perfect state, and when, of course, the laying of eggs takes place. By visiting the plantation of plum trees with a lantern at this season, the gardener is often also successful in killing great numbers of them.

WINTER'S BARK, a stimulant, aromatic, and tonic bark resembling cinnamon, and used for the same purposes. It derives its name from Captain Winter, who first brought it from the Strait of Magellan in 1579. It is the produce of *Drimys Winteri*,



Winter's Bark (*Wintera aromatica*).

a native of some of the mountainous parts of South America, and abundant in the lower grounds of Cape Horn and Staten Island—an evergreen shrub with laurel-like leaves, corymbs of white flowers, and many-seeded berries. This shrub belongs to the natural order *Magnoliaceæ*, and to a section of it which has by some been constituted into a separate order, *Winteraceæ*, chiefly distinguished by dotted leaves and aromatic qualities. The Star Anise (*Illicium*) is nearly allied to it. The bark of other species of *Drimys* has similar properties to Winter's Bark, as that of *D. Granatensis*, much used in Brazil as a remedy for colic, and of *D. axillaris*, a New Zealand tree.

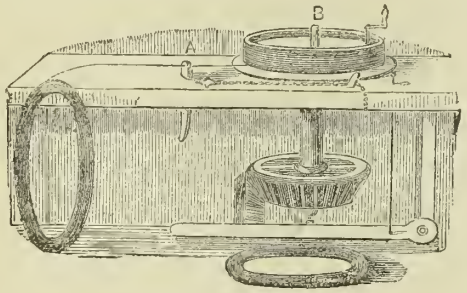
WI'NTERTHUR, one of the most industrious and beautiful of the smaller towns of Switzerland, in the canton of Zurich, stands on the Eulach, 14 miles north-east of Zurich. Its situation among hills, many of which are clothed with vines, is specially pleasant. Cotton-spinning, cotton-printing, dyeing, and the manufacture of machinery and weapons, are actively carried on. Pop. (1880) 13,595.

WINTHROP FAMILY.—JOHN, governor of the colony of Massachusetts, was born in Groton, county of Suffolk, England, January 12, 1588, was bred to the law, appointed Justice of Peace at the age of 18, and on account of his excellent and pious character, was, in 1629, elected by the governor and company of Massachusetts Bay to govern their colony. He sold his estate, and April 7, 1630, sailed from Yarmouth with 900 persons. During the voyage, he composed an essay, entitled *A Model of Christian Charity*. He was re-elected governor every year until 1634, when he became deputy-governor under Sir Harry Vane, with whom he had an animated controversy on the doctrines of Mrs. Hutchinson. In 1637, he was elected over Sir Harry, and continued governor, with a brief interval, during his life, and had more influence probably than any other man in forming the political institutions of the northern states of America. He was opposed to an unlimited democracy, for he said: 'The best part of a community is always the least, and of that best part the wiser part is always the lesser.' He kept a journal up to 1649, two books of which were published in 1790; and the third, found in the New England Library, kept in the tower of the Old South Church in Boston, in 1816. A revised edition was published at Boston, in 2 vols. (1825—1826). He died at Boston, March 26, 1649.—JOHN, governor of Connecticut, son of the preceding, was born at Groton, England, February 12, 1606; educated at Trinity College, Dublin; made the tour of Europe; went to America in 1631, was chosen a magistrate in Massachusetts, but returned to England; and in 1635 went to Connecticut, built a fort at the mouth of the Connecticut River, was made governor of the colony, and founded the city of New London in 1661. He obtained a charter for the colony from Charles II., and was first appointed governor under it; and, in 1676, represented his colony in the congress of the united colonies at Boston. He was a man of eminent virtues, and considerable acquirements. Some of his papers are contained in the *Philosophical Transactions*. He died at Boston, April 5, 1676.—JOHN, LL.D., American scholar, a descendant of the first Governor W., was born in Massachusetts, 1715; graduated at Harvard College, 1732; and in 1738 was appointed Hollis Professor of Mathematics and Natural Philosophy. In 1740, he observed the transit of Mercury; and, in 1761, went to New-

foundland to observe the transit of Venus. He published tracts on Earthquakes, Comets, and other astronomical subjects. Died at Cambridge, May 3, 1779.—ROBERT CHARLES, LL.D., American statesman and orator, descendant of the sixth generation from the first Governor W., was born at Boston, May 12, 1809, graduated at Harvard College in 1828, studied law with Daniel Webster, and was admitted to the bar in 1831, but soon abandoned law for politics, and was elected to the state legislature in 1834, where he served five years, three as Speaker of the House. In 1840, he was elected to Congress, of which he was a member for ten years. In 1847, he visited Europe, and was the Whig candidate for Speaker, but defeated after a balloting of three weeks. In 1850, he succeeded Mr. Webster, who became Secretary of State, as senator from Massachusetts, a place in which he was succeeded by the more radical Charles Sumner. He was also defeated as a candidate for governor of Massachusetts. He published *Life of J. Winthrop*, *Memoir of N. Appleton* (1861), *Speeches* (1853—1867), and *Washington, Bowdoin, and Franklin* (1876).

WIRE AND WIRE-DRAWING. The facility with which any metal can be drawn into wire depends upon its ductility. Most metals have this property; but some, like bismuth and antimony, are so brittle that they can only be drawn out with difficulty, and wire made from such metals is useless, from want of tenacity. See DUCTILITY.

Metals largely used for making wire, such as iron, brass, and copper, are drawn by essentially the same process. We may take iron as an example. It is prepared by cutting up flat rolled plates into square rods of a given thickness. This is done by means of a pair of slitting rollers; one of these has grooves, equal to the



Wire-drawer's Bench.

breadth of the rods wanted, fitting into corresponding grooves in the other, which cut up the metal like scissors. The rods are cleaned of scales of oxide, either by mechanical rubbing, or by chemical treatment with dilute sulphuric acid. If the rod is thick, it has its square edge taken off by rollers. It is then drawn into wire by forcing it through the hole of a *draw plate*. This is an oblong piece of hard steel pierced with conical holes, gradually diminishing in diameter, and having the smallest ends of these tapering holes carefully prepared to the required size. Sometimes cubical-shaped dies, each with a single trumpet-shaped hole, are used. A wire drawer's bench is shown in the annexed figure, in which A is the drawing-plate, and B the drawing-block or cylinder. The motion is given by means of beveled wheels connected with a shaft driven by steam or water power.

The workman commences by making a point on the rod, so as to allow it to pass through the hole, and be grasped by a pair of pincers attached to a chain, which draws it out till the length is sufficient to pass round the cylinder. This much is done by hand, and then the cylinder, being put in gear, is made to revolve and pull the wire through the draw-plate—coiling it round itself as the drawing proceeds. After being once drawn, it is again passed through a smaller hole, and so the process is repeated till it has been reduced to the size required. Fine wire may require from 20 to 30 drawings. The cylinder revolves slowly with a thick wire, and the speed is increased as the size diminishes. After being passed a few times through the draw-plate the metal becomes brittle, and requires to be annealed. Sometimes, a lubricating substance—as wax, grease, or soap—is employed during the drawing, especially for fine wires.

For some very accurate purposes, such as chronometer springs, and for gold and silver lace, the wire is drawn through jeweled holes, that is, holes perforated in rubies and other hard gems. A silver wire 170 miles long, and about $\frac{1}{300}$th of an inch in diameter, has been drawn through a hole in a ruby, and found, by a micrometer, to be of exactly the same size at the end as at the beginning; whereas the drawing of a length of 16 miles of brass wire through a steel draw-plate necessitates a readjustment of the hole.

Platinum wire can be drawn as thin as $\frac{1}{5000}$th of an inch in diameter by first encasing it in silver, drawing down the compound wire, and then dissolving off the silver with nitric acid. By the same process, gold wire can be obtained only $\frac{1}{5000}$th of an inch in diameter. It has been shown by Babbage, as an illustration of how greatly labor increases the value of a raw material, that one pound of iron, which costs twopence, will yield 50,000 wire pendulum springs for watches, each weighing about one-seventh of a grain, and selling at the retail price of twopence.

Wire, although mostly cylindrical in form, is drawn of many different sections, such as oval, half-round, flat, triangular, moulded, and the grooved pinion-wire from which the small toothed pinions for clocks and watches are cut. Copper wire of different forms is used to form patterns in the blocks used by calico-printers.

The following table (given by Dr. Tomlinson) of weights, omitting fractions of a pound, which were sustained by wires 0·787 of a line in diameter, shows the comparative tenacity of a few of the metals: Iron, 549 lbs.; copper, 302 lbs.; platinum, 274 lbs.; silver, 187 lbs.; gold, 151 lbs.; zinc, 110 lbs.; tin, 35 lbs.; lead, 28 lbs. It may be remarked here that some kinds of brass wire have been noticed to become extremely brittle in the course of time, especially if subjected to vibration, and even to break when used to support objects, without any assignable cause.

The quantity of wire used in the English manufacturing districts must be enormous, steel and iron wire being required for the manufacture of needles, fish-hooks, hooks and eyes, carding-machines, screw-nails, fencing, and basket-work; brass wire for the manufacture of pins, wire-cloth for paper-making and other machines, and chain-making; and copper wire for bell-hanging. Nothing, however, has increased the production of wire, both iron and copper, more than the electric telegraph. Belgium, which a few years ago exported none, now exports 1200 tons annually of iron wire.

WIRE-ROPES have come greatly into use of late years for winding purposes in mines and on inclines, for the rigging of ships, and for numerous engineering contrivances; also for the construction of electric-telegraph cables. They are almost always 'galvanized,' that is, coated with zinc. A hemp rope 6 inches in circumference, and weighing 9 lbs. per fathom; an iron-wire rope $2\frac{3}{8}$ inches in circumference, and weighing 5 lbs. per fathom; and a steel-wire rope $1\frac{1}{4}$ inch diameter, and weighing 3 lbs. per fathom, are all of equal strength—the breaking strain of each being 10 tons.

WIRE-WORM, a name given by farmers and gardners to the larvæ of Click Beetles (q. v.), which are long and hard, and often swarm in corn-fields, gardens, and pastures, feeding on the roots of crops, and doing great mischief. The best known British species are *Elater* or *Agriotes lineatus*, *E.* or *A. obscurus*, and *E.* or *A. sputator*. The first of these, which is the largest, is in its perfect



Wire-worm:
a, perfect insect, magnified; *b*, natural size of perfect insect; *c*, wire-worm magnified; *d*, natural size of wire-worm.

state about half an inch long, with brown head and thorax, clothed with cinereous down; the elytra tawny, striped with brown. The larva, when full grown, is fully half an inch long, very narrow, yellowish, hard, and shining, the jaws tipped with black. The second species named is in its perfect state of an earthy-brown color. The third has a black head and thorax, with many dots, the elytra light brown with dotted lines. It is only about a quarter of an inch in length. Wire-worms are very small when first hatched, and are said to live for years in the larva state. Moles, rooks, and pheasants are useful in destroying them. Clover crops are said to have the effect of increasing their numbers.

Farmers and gardeners resort to various means in order to get rid of this pest, as hard rolling after a top-dressing of lime, and mixing spirits of tar, gas-lime, or rape-cake with the soil; but one of the most effectual is the strewing of slices of potatoes or turnips on the ground, under which they soon congregate, and great numbers are thus easily destroyed. The name W. is often very vaguely used, so as to include not only the larvæ of some moths, but even myriapods of the genus *Julus* (q. v.), which somewhat resemble the true wire-worms in form, although in reality very different, and probably not injurious to crops, as they are.

WI'SBECH, or WISBEACH, a market-town in Cambridgeshire, in the Isle of Ely, occupies a position of importance in the

Fen District, on the Nen, 18 miles east-north-east of Peterborough. W. is a busy and prosperous place. Its principal buildings are the Church of St. Peter and St. Paul, lately restored; the corn exchange, the town-hall, the cattle-market, and the new schools. W. is connected with the Great Eastern, the Great Northern, and the Midland Railways. By the Nen, which falls into the Wash, at the distance of 12 miles below W., communication is maintained between this town and the North Sea. The navigation of the river has been much improved within recent years, and W. is considered the port of Cambridgeshire. It is generally well built, contains a number of useful institutions, and carries on rope-spinning, brewing, and general trade. Corn, timber, wool, salt, and seeds are exported; wine, deals, oil-cake, corn-slates, and coal imported. In 1880, 727 vessels, of 65,151 tons, entered, and 633, of 46,562 tons, cleared the port. Pop. (1881) 9248.

WI'SBY, a once famous seaport of the Swedish island of Gothland (q. v.), capital of the island, and situated on its west coast, about 130 miles south of Stockholm. It is of the highest historical and antiquarian interest; and though the time of its foundation is unknown, it was, during the 10th and 11th centuries (200 years before the establishment of the Hanseatic League in 1241), one of the most important commercial cities in Europe. It was a principal factory of the Hanseatic League during the 14th and 15th centuries. The eastern trade, which during the 11th and 12th centuries passed through Russia, and thence down the Baltic to Gothland, centred in W., and greatly enriched that port. In 1361, Valdemar III. of Denmark took the town by storm, and, plundering it, obtained an immense booty. This was a fatal blow to the prosperity of the place. The architecture of W. is exceedingly interesting. Its ancient feudal walls and towers exist in almost as entire a state as they were in the 13th c., and render its appearance, as seen from the sea, exceedingly striking. The early grandeur of the town is attested by the fact, that it contains, well preserved, the remains of 18 churches, all of which date from the 11th and 12th centuries, are varied in form and ornament, and are a mine of interest to the student of Early Gothic. The oldest is the church of the Holy Ghost, built in 1046. St. Mary's, built in 1190, is the only church now kept up for the use of the inhabitants. Pop. (1880) 6922.

WISCHEHRAD (Old Slav. and Bohem. *wyschehrad*, Pol. *wyszogrod*) is the name of numerous towns and castles in all Slavonic countries; e. g., the original residence of the princes of Bohemia, now a quarter of the city of Prague. The word is composed of the root *wys* or *wysch*, high, and *hrad* (Rus. *gorod*, Pol. *grod*, in some dialects *grätz*), a fort, castle, town. *Hrad* is from the same root as Ang.-Sax. *hreod*, Eng. *reed*, *rod*, another form being *yerde* or *yard*. It signified primarily a place defended by rods or poles, a palisaded fort, and hence a town. See TON.

WISCO'NSIN, one of the United States of America, between lat. 42° 31'—47° N., and long. 87° 8'—92° 54' W.; 302 miles from north to south, and 258 from east to west; containing 53,924 sq. m., or 34,511,600 acres; is bounded N. by Lake Superior and the state of Michigan, E. by Lake Michigan, S. by Illinois, and W. by Iowa and Minnesota, from which it is separated by the Mississippi and St. Croix rivers. It is divided into 60 counties. Its chief towns are Milwaukee, Fond du Lac, La Crosse, Oshkosh, Racine, Janesville, Watertown, Madison (the capital), &c. Its chief rivers are the Mississippi and its branches, Rock, Wisconsin, Black, Chippewa, and St. Croix, which drain four-fifths of its surface; the Menomonee on the north-eastern border; Wolf and Fox, emptying into Green Bay; and numerous small rivers emptying into Lakes Michigan and Superior. Besides these great lakes and Lake Winnebago, the whole state is studded with small, clear, and beautiful lakes, well stocked with fish. The country is a high rolling prairie, from 600 to 1200 feet above the sea, with no considerable mountains, but numerous hills or mounds. In the rainy season, the rivers Fox and Wisconsin, emptying into the Mississippi and Lake Michigan, flow into each other. The geological formations extend only from the Primitive to the Devonian. On Lake Superior are primitive rocks, granite, magnetic iron, quartz, slates, sandstone, drift, and beds of red clay and marl; sandstone cliffs on the Mississippi; the middle and southern parts of the state have the Lower Magnesian Limestone, a belt of white sandstone with beds of shells, then the lead-bearing group of Upper Magnesian Limestone. Besides the great magnetic iron bed on Lake Superior, and the rich lead region bordering on Illinois, copper is found in several places; zinc, some silver, plumbago, bitumen, peat, fine marble (some of light pink with red veins, and blue and dove color), gypsum, and coal in small quantities. Of the curiosities are earthworks in the forms of men and animals; ancient fortifications; Devil's Lake, of 600 acres, on the summit of a mound 300 feet high; the precipitous shores of Lake Pepin rising to 500 feet, 200 feet being a perpendicular wall of magnesian limestone; the high bluffs of the Mississippi and Wisconsin rivers; the falls of the St. Louis (320 feet in 16 miles) and of the Menomonee (134 feet in 1½ mile). The climate is cold, the winters long and severe; but the state is considered one of the most healthy in the west.

The soil in the north is broken, with drift and boulders, covered with heavy pine forests, and not well adapted to cultivation; the middle and southern region of prairies and park-like oak openings, is exceedingly rich and productive, raising great quantities of wheat, Indian corn, oats, barley, potatoes, tobacco, &c. Besides the great pine-forests of the north, there are spruce, cedar, various oaks, hickory, birch, elm, sycamore, sugar-maple, &c. Of animals there remain the elk, deer, bear, foxes, wolves, beaver, gopher, &c.; and numerous birds and water-fowl fattening upon the wild rice, on the margins of the numerous lakes. The chief manufactures are of iron, lumber, agricultural implements, flour, spirits, and malt liquors. W. is one of the six chief wheat-producing states. State and government appropriations of land have richly endowed a state university at Madison, normal, high, and common free schools, and the usual state asylums. The constitution and government closely resemble those of the older states. W. was explored by the French missionaries in the latter part of the 17th c., and Indian trading posts were also established; but the actual peopling of the state has been recent, and very rapid—a large proportion being of foreign birth—German, Norwegian, Irish, Welsh, &c. It was organized as a territory in 1836, and admitted into the union as a state in 1848. In 1880, the state debt amounted to 2,252,000 dollars, the amount of taxable property was close on 440,000,000 dollars (including 94,000 dollars worth of pesonal property) in the same year; while the total receipts were 1,050,000 dollars. There are 3950 miles of railway in the state, and extensive lake and river navigation. Pop. (1840) 30,945; (1850) 305,391; (1860) 775,873; (1870) 1,054,670; (1880) 1,315,497.

WISCONSIN, a river of Wisconsin, U.S., rises in the northern center of the state, and flows south and west to join the Mississippi. Length, 270 miles. A canal, completed in 1850, connects with the Fox River; so that there is steam-boat communication between Lake Michigan and the Mississippi.

WISE, HENRY ALEXANDER, American statesman, was born at Drummondtown, Accomac county, Virginia, December 3, 1806; graduated at Washington College, Pennsylvania, in 1825; studied law at Winchester; settled and married at Nashville, Tennessee, but two years after returned to his native county, and engaged in politics; in 1825, advocated the nomination of General Jackson at the Baltimore Convention; opposed nullification, but maintained the state-rights doctrines of Jefferson and Madison as expressed in the Virginia resolutions of 1798, that 'each state for itself is the judge of the infraction of the constitution, and of the mode and manner of redress.' Elected to Congress in 1833, he was involved in a duel with his opponent, whose arm he fractured. On the removal of the government deposits by General Jackson, he went over to the opposition or Whig party, but was sustained by his constituents, over whom he had an unbounded personal influence. In 1837, he was the second of Mr. Graves, a member of Congress from Kentucky, who shot Mr. Cilley, a member from Maine, in a duel. In 1840, he secured the nomination of John Tyler as Vice-president; and on Tyler becoming President by the death of General Harrison, had a powerful influence in his administration. Nominated minister to France, he was rejected by the Senate, but confirmed for Brazil, where he resided until 1847. He was now once more identified with the Democratic party; and in 1854, after an arduous electioneering campaign, in which, though in feeble health, he traveled 3000 miles, and made 50 stump speeches against the 'Knownothing' or Protestant native American party, he was elected governor of Virginia. In 1859, he published a treatise on Territorial Government, maintaining the right of Congress over the institution of slavery. In December of this year, he signed the death-warrant of John Brown, hanged for treason in attempting to excite a negro insurrection. In 1861, as member of the Virginia Convention, he labored for conciliation; but when his state voted for Secession, he entered heartily into the war, and was appointed Brigadier-general, serving in the Kanawha Valley, and later, defending Roanoke Island, where his son was killed. He died at Richmond in September 1876.

WISEMAN, NICHOLAS, Cardinal and Roman Catholic Archbishop of Westminster, was born August 2, 1802, at Seville, of an Irish family settled in Spain. He was brought to Ireland in his childhood, and received his first education at Waterford, whence he was removed to the Roman Catholic college of St. Cuthbert at Ushaw, near Durham. In his 16th year, he entered as an ecclesiastical student the English College at Rome, and after a very brilliant course, received holy orders at Rome in 1823, at which time he was also admitted to the degree of Doctor of Divinity, and was appointed Vice-rector of the English College and Professor of Oriental Languages in the university of the Sapienza. In 1828, he published his *Horæ Syriacæ*, and in the end of that year was named Rector of the English College. It was while he held this office that he delivered his *Lectures on the Connection of Science and Revealed Religion* (2 vols. 8vo, 1836).

But in England he first became known by a series of lectures on *The Doctrines of the Catholic Church*, delivered at Moorfields Church, and published in two vols. in 1836. In the same year he established, in concert with Mr. O'Connell, the *Dublin Review*, a journal which has since continued to be the quarterly organ of the Roman Catholic body, and to which Dr. W., even while residing abroad, was a regular contributor. In 1840, he was named Coadjutor Vicar-apostolic of the Central District of England, with the title of Bishop of Melipotamus *In Partibus Infidelium* (q. v.). At the same time he was appointed President of St. Mary's College of Oscott, where he took up his residence. The circumstances of religious parties in England at this period contributed much to bring Dr. W.'s very remarkable abilities as a polemical writer into prominence; and the dissensions which arose in the Church of England during the Tractarian Controversy, were turned to effect by him in various lectures, pamphlets, reviews, essays, &c. In 1846, he was transferred as Coadjutor Vicar-apostolic to the London district; and in 1849 became himself acting vicar. In the following year, he came still more remarkably into notice, during the progress of a change in the position of the Roman Church in England, which, for a time, was the occasion of almost unexampled religious excitement in the country.

From the reign of Elizabeth, the sees in England having been occupied by bishops of the Established Church, and it being penal for a bishop or priest of the Roman Catholic Church to officiate in England, the Catholics, for the necessary religious ministrations of their church, had resorted to the well-known expedient of a system of bishops *In Partibus Infidelium* (q. v.), with the title and authority of Vicars Apostolic (q. v.). This form of church government, with some modification, had in substance subsisted from the time of James I.; but from the date of the passing of the Catholic Emancipation Act, a desire had gradually sprung up among Catholics for the restoration of the normal form of church government by the appointment of regular bishops. This measure was finally determined on by the pope in the year 1850, and a new distribution of the kingdom was made into twelve sees (one of them archiepiscopal), in which, in order that it might not be supposed to clash with the existing episcopal system, the names of the ancient sees were carefully avoided, the titles of the new bishops being taken exclusively from cities and towns which were non-episcopal. Dr. W. was named archbishop of the see of Westminster, which included great part of the district already under his charge, and was at the same time created cardinal. This measure, for which the Protestant public were but little prepared, and which was made more formidable in their eyes by the language which was employed, although but following the established canonical forms, and bearing altogether on the spiritual concerns of the Catholics, was supposed to involve an invasion of the rights and dignities of the Established Church and of the crown, and called forth a storm of religious excitement which was unexampled during the memory of the living generation. Whilst this excitement, which was much influenced by a letter addressed by the prime minister to the Bishop of Durham, was at its height, the new cardinal, who had gone to Rome to receive the cardinal's hat, returned to England, and published an explanatory address of great ability and moderation, but yet firmly asserting the strictly constitutional rights of his fellow-Catholics, entitled *An Appeal to the Reason and Good Feeling of the People of England on the Subject of the Catholic Hierarchy.*

This address, as well as certain lectures subsequently delivered by him, and extensively circulated, did much to mitigate the excitement, which nevertheless led to violent debates in parliament, and to the passing of an act prohibiting the use of ecclesiastical titles other than those recognized by the law. See ECCLESIASTICAL TITLES ASSUMPTION ACT. Notwithstanding these unfavorable circumstances of his introduction into notice in England, however, the undoubted abilities and great literary eminence of Cardinal W. eventually compelled the admiration of the British public. He took frequent occasion, moreover, by public lectures and addresses on the neutral subjects of education, literature, and art, to identify himself with the spirit of progress, and with the national sentiments of his fellow-countrymen; and notwithstanding the infirmity of his constitution, which began to fail soon after his return to England as cardinal, he published during these years a succession of works which, although with the strong religious bias natural to a Roman Catholic churchman of earnest convictions, possessed much, nevertheless, congenial to the sympathies of cultivated Englishmen of every degree. The *Lectures on Religion and Science* already referred to; *On the Connection between the Arts of Design and those of Production;* on the *Influence of Words on Thought and Civilization;* on the *Points of Contact between Science and Art; Recollections of the Last Four Popes*, and other similar works, obtained an extensive circulation; and partly from their effect upon the public mind, partly, no doubt, from the reaction consequent on what was soon felt to have been a groundless and exaggerated alarm, Cardinal W. came by degrees to command the respect of the public at large. He died in his 63d year, on the 15th February 1865; and his funeral, which was conducted with great solemnity, and excited great public curiosity and interest, was witnessed with every demonstration of respect by one of the largest assemblies seen for many years in London. Besides admittedly high professional learning, he was a scholar of rare and singularly various attainments, an eminent linguist, a well-informed scientific scholar, a distinguished orator, a graceful and vigorous writer, and an accomplished critic and connoisseur of art.

In addition to the works incidentally mentioned above, he published *The Real Presence of the Body and Blood of our Lord Jesus Christ in the Eucharist* (8vo, 1836); *Reply to Dr. Turton on the Eucharist* (8vo, 1839); *Lectures on the Ceremonies of Holy Week* (8vo, 1839); *Essays on Various Subjects* (3 vols. 8vo, 1853)—a selection of articles contributed to the *Dublin Review* and other periodicals, and of other fugitive essays; *Fabiola, or a Church of the Catacombs;* a singularly truthful and life-like picture of early Christian life in classic Rome; *Sermons* (2 vols. 8vo, 1864); with many shorter publications. He also left a large collection of MSS., many of them prepared for the press. In 1866 appeared *The Witch of Rosenburg, a Drama in Three Acts;* and *Daily Meditations* in 1868.

WISHART, GEORGE, one of the early Reformers of Scotland, is supposed to have been a native of Forfarshire, a son of James Wishart of Pittarrow, justice-clerk in the reign of James V. The exact date of his birth is unknown. He first emerges into notice in the beginning of the 16th century. At this time he taught a grammar-school at Montrose, and made himself remarkable by introducing the study of Greek. He began also to preach the doctrines of the Reformation, and was obliged to flee into England. Here he is found at Bristol about 1538, preaching the same doctrines, but being seized upon and threatened with death, he publicly recanted. Later he is found at Cambridge, in the center of the Anglican Reform movement, which had begun there under the influence of Bilney and Latimer. He is described at this time by a pupil of the name of Tylney as a 'tall man polde-headed, of melancholy complexion, black-haired, long-bearded, comely of personage, well spoken after his country of Scotland, courteous, lowly, lovely, glad to teach, desirous to learn, abstinent in his habits, and very charitable to the poor.' His portrait, which has been preserved in the university of Glasgow, answers to the personal characteristics here mentioned. He returned to Scotland in 1543 or 1544, with the commissioners sent to negotiate a treaty with Henry VIII., and it was then that he entered upon his special reforming mission, terminating in his martyrdom.

He appears to have possessed great powers as a preacher, although it is doubtful whether he ever took orders; and he traveled from town to town, and county to county, making everywhere a great impression by his stirring words. Knox has given in his *History*, Book i., a very striking description of the effects of W.'s preaching. Its effect upon himself was the most important and fruitful of all. When the preacher came to Lothian, Knox, charmed by his character and teaching, attached himself to his person, bearing a 'two-handed sword' before him. This precautionary defence was rendered necessary by two attempts supposed to have been instigated by Beaton against his life. His activity and influence were too prominent long to escape notice. Cardinal Beaton had had his eye upon him for some time, and while he rested at Ormiston, after preaching a powerful sermon at Haddington, he was made a prisoner by the Earl of Bothwell. Beaton himself was in the neighborhood with a considerable force, in case it should have been attempted to rescue him. He was conveyed to St. Andrews, and immediately put upon his trial before an ecclesiastical tribunal. Arran, the governor, refused to give his countenance to the proceedings; but the Reforming preacher was nevertheless condemned to be burned at the stake; and the sentence was carried out before the castle or episcopal residence at St. Andrews on the 1st of March 1546.

W. is reported to have given utterance at the stake to a prophecy of the death of the cardinal, which took place about three months after his martyrdom. 'But he who from yonder high place beholdeth us with such pride shall, within a few days, be in the same as ignominiously as now he is seen proudly to rest himself,' are the words attributed to him. This has appeared to some recent writers to strengthen the suspicion, otherwise suggested, of W. having been accessory to the plot for assassinating the cardinal. The main ground of this suspicion is the discovery of a document in the State Paper Office, bearing that 'a Scotishman called Wysshart,' a friend of the Laird of Brunstone, was concerned in this plot.

Mr. Tytler confidently adopted the view that this friend of the Laird of Brunstone and the Reformer were the same person, and it cannot be denied that there are reasons in favor of this inference, not in the mere coincidence of the name perhaps, but in the fact of the association of the person bearing it with the Laird of Brunstone, who was a familiar friend of W.; and further, in

the fact, that Kirkaldy of Grange and the Master of Rothes, who are mentioned in the document as conspiring either to 'apprehend or slay the cardinal,' were afterwards really his murderers. At the same time, it cannot be said that there is decisive evidence to prove that the 'Wysshart' of the state document was George W., the Reformer and the martyr. The coincidences might be accidental, and the question will probably remain among the *questiones vexatæ* of Scottish history.

WI'SHAW, a thriving town of Scotland, in Lanarkshire, 15 miles south-east of Glasgow, has made great advances within the last thirty years. The staple trade of the district is coal, of which upwards of 1,000,000 tons are sent from W. annually. There are also numerous iron-works, &c. Pop., with Cambusnethan (1871) 10,607; (1881) 13,112.

WI'SMAR, the second seaport of Mecklenburg-Schwerin, at the head of a bay of the same name, an inlet of the Baltic. Its harbor is the best on the Baltic coasts, and is furnished with shipbuilding docks. Its old fortifications have been removed; but many of its old buildings, which are exceedingly curious and picturesque, remain. Commerce, the fisheries, tobacco and sailcloth manufactures, and agriculture are the principal employments of the inhabitants; there are also breweries and distilleries. W. is the terminus of a branch of the Mecklenburg Railway, and communication by steamers subsists between it and Copenhagen. Pop. (1880) 15,518.

WISSEMBOURG (German, *Weissenburg*), till 1871 a French fortified town, now capital of a district in the German province of Lower Alsace, is on the Lauter, 34 miles north-north-east of Strasburg. It has a flourishing trade, and a pop. of (1880) 6185. Here was fought, on the 4th August 1870, the first great battle of the Franco-German war. Besides the fortifications of W., demolished in 1872, the Lines of W. are famous—a line of works extending to Lauterburg, 9 miles south-east.

WISTA'RIA, a genus of plants of the naturel order *Leguminosæ*, sub-order *Papilionaceæ*, having pinnate leaves and flowers in terminal racemes, the pod leathery. The species were formerly included in the genus *Glycine*. Some of them are amongst the most magnificent ornamental climbers known in British gardens. *W. frutescens*, a native of Virginia, Illinois, and other parts of North America of similar climate, found chiefly in marshy



Wistaria Chinensis.

grounds, attains the length of 30 feet, and has beautiful racemes of fragrant bluish purple flowers. *W. chinensis* or *consequana*, a native of China, has larger flowers in pendulous racemes, and its branches run to the length even of 90 feet. In Britain, these plants are generally trained on walls.

WI'TCHCRAFT* is merely the form that the belief in the arts of magic assumed under the action of certain notions introduced by Christianity. The powers supposed to be possessed by the witches, and the rites and incantations by which they acquired those powers, were substantially the same as belonged to the devotees of the Greek Hecate (q. v.), the Striga and Venefica of the ancient Romans, and the Vala or Wise Woman of the Teutonic pagans. But when, along with the knowledge of the one true God, the idea of a purely wicked spirit, the enemy of God and man, was introduced, it was natural that all supernatural powers not proceeding directly from the true God, should be ascribed to him. This gave an entirely new aspect to such arts: they became associated with heresy; those who practised them must be in compact with the devil, and have renounced God and the true faith. Previously, if a witch was punished, it was because she had been guilty of poisoning, or at least was believed to have poisoned or wrought some other actual mischief. Now, however, such power was only the power to work evil; and merely to be a witch was in itself a sin and crime that filled the pious mind with horror. This feeling, zealously fostered, first by the Catholic clergy, and then no less by the Protestant, rose to a frenzy that for four centuries filled Europe with the most shocking bloodshed and cruelty.

Almost all the various notions and practices noticed under the heads MAGIC, DIVINATION, INCANTATION, AUGURIES, CHARM, TALISMAN, ORDEAL, FETICHISM, EVIL EYE, &c., are embodied more or less prominently in the huge mass of superstitions which formed the creed of witchcraft in its full development. A reference, therefore, to those heads, and to the kindred subjects of ASTROLOGY and ALCHEMY, saves the necessity of entering into descriptive details of what witchcraft was. What was new and distinctive in the witchcraft of Christendom was the *theory* of magical arts which it involved. The doctrine of the Devil (q. v.), as finally elaborated in the middle ages, established in the world a rival dominion to that of the Almighty. The Arch-fiend and his legions of subordinate Demons (q. v.) exercised a sway, merely permitted, no doubt, but still vast and indefinite, not only over the elements of nature, but over the minds and bodies of men—all except those who had been admitted by baptism into the number of the 'redeemed' (see ATONEMENT), and continued to be guarded by the faith and rites of the church. The faithful could not be led into evil against their will, nor essentially injured in person; but not even they were altogether exempt from diabolic annoyance, for the immunity does not seem to have extended to their belongings. As a strictly logical consequence of this assumed constitution of things, it followed, that those mortals who had the gifts of producing supernatural effects of any kind (and that such gifts had been possessed by individuals in all ages and countries, was not for a moment questioned), must derive their power from the Prince of Darkness and be acting as his agents—always excepting, of course, those miraculous powers which the church herself claimed to exercise in the name of Heaven. Moreover, as the universally coveted powers of fortune-telling, and of controlling the elements for your own benefit or the hurt of your enemies, could not be supposed to be bestowed by being of the devil's character except as a *quid pro quo*, and as the object dearest to the devil's heart—the very aim and end, in fact, of his struggle with the kingdom of light—was to win back as many as possible of the souls that had been redeemed from his dominion by the death of Christ; it was natural to conclude that the price he would demand for his gifts would be a renunciation of Christianity and entrance into his service. Hence it came to be the established belief, that in order to acquire the powers of witchcraft, the person must formally sell his or her soul to the devil.

The idea of a covenant with the Arch-enemy was not involved in the early and heathen conception of magic. Originally, magic was identical with the lowest form of religion, that is, Fetichism (q. v.). It was grounded on the idea that certain natural objects and certain rites and observances had, in themselves, a mysterious power of producing wonderful effects; and the art of the magician consisted in the knowledge of these mysterious powers, and in the skill to combine and direct them to special purpose. The effects were not conceived as being produced by the interference of any conscious being—god or devil. On the contrary, a human being could, through magical means, acquire control over supernatural beings. The Hindus carry this notion so far, that they represent some of their sages as practising austerities and performing sacrifices and other rites, until they can control the gods themselves, and even threaten their destruction along with that of the universe (see VISWAMITRA). The higher kind of European magic in the middle ages was mixed up with what physical science there then was; and the most noted men of the time were addicted to

* Not a little light is thrown on the original conception of witchcraft and the magic arts in general, by observing the primary meaning of the various terms employed in connection with them. The most striking thing is the number of those terms that come from roots signifying simply *to do, perform*. From this notion, the transition is easy to a variety of shades of meaning, as is seen in Lat. *facinus*, which radically signifies a deed (from *facere*, to do), but became restricted to a *bad* deed, a crime. The Greek ερδειν or εργειν (=Eng. work), and the Lat. *facere*, *operari*, were used, without any addition to signify to perform sacrifice or other sacred or magical rite. Accordingly, in Low Lat., *factura* signified sorcery; and in modern Ital. *fattura* = incantation, and *fattucchiera* = a sorceress or witch. Lat. *factum* becomes in Span. *hecho*, and means a crime; while *hechicero* is a sorcerer, and *hechiera*, a witch. The Portuguese *feitiçao*, magic, is also from Lat. *factum*; and Sans. *kratu*, a sacrifice, is from *kri* (= Lat. *creare*), to make.

The Eng. *witch* is *vicce* in Ang-Sax., which has also *viccian*, to fascinate, and *viccancräft*, the art of magic; the Low Ger. dialects have similar forms (e. g., Dutch *wikkerij* = witchcraft); in High Ger. there are no cognate names. These words, as is seen in the Dutch form, have clearly no connection with *witan* (Ger. *wissen*), to know, which is usually given as the root of the English witch; and the most probable etymology is that proposed by J. Grimm, who derives them from the Gothic *veihan* (O. H. Ger. *wihan*, modern Ger. *weihen*), which signified to consecrate, but which he infers to have meant primarily to do, make, perform (see *Deutsche Myth.*, pp. 36, 58, 408; *Deutsche Gramm.* iii. 181). *Wiht*, or *wicht*, is evidently a derivative from this root, and signified a thing made (Lat. *factum*), a creature, a person, and, in some Teutonic dialects, a demon. A *vicca* was thus a doer of sacred or magic rites (compare the 'I'll do, I'll do, I'll do!' of Shakspeare's witches). *Wicked* is a participle from the same root, and signified primarily hewitched, accursed, hence perverse. *Wizard* is probably a masculine form of *vicca*.

Nearly corresponding to English witch were the Lat terms *saga*, a knowing or wise woman; *strix*, *striga*, a kind of nocturnal bird, hence a witch; *venefica*, literally, a poison-maker, a concocter of drugs. The Ger. *hexe*, Old Dutch *hagetisse*, Ang-Sax. *hägtesse*, or *hägesse* (from which Eng. *hag*), appear to come from *hag*, cognate with Lat. *sagus*. In O. Norse, *hägr* signifies dexterous, cunning.

the pursuit, or were at least reputed to be so. So far from deriving their power from the kingdom of darkness, the scientific magician, by the mere force of his art, could compel the occasional services of the Arch-fiend himself, and make inferior demons the involuntary slaves of his will. A belief, however, had early existed that individuals in desperate circumstances had been tempted to purchase, at the price of their souls, the help of the devil to extricate them from their difficulties (see THEOPHILUS); and hence a suspicion began to grow that many magicians, instead of seeking to acquire their power by the laborious studies of the regular art, had acquired it in this illegitimate way. At last, as the system of dualism above mentioned became more perfect, the art of magic was wholly diabolized, and a compact with the Evil One was thought to be the sole charter of supernatural power. See FAUST. This transformation took place earlier and more completely (about the 13th c.) in regard to those lower forms of the magical art which constitute witchcraft proper, and which have from ancient times been considered the special province of women.

The chief cause of the prominent part assigned to the female sex in this matter is noticed in the article MAGIC. In addition, it may be observed, that their more excitable temperament renders them peculiarly liable to those Ecstasies (q. v.) which have been associated with the gift of divination from the priestess of the ancient heathen oracle down to the medium of modern spiritualism. Further, when witchcraft came to be prosecuted as heresy, the part assigned to woman in the Scripture account of the Fall led to her being looked upon as specially suited to be the tool of the devil. Founded on this circumstance, a constant element of the creed of witchcraft came to be the belief in a carnal intercourse between witches and evil spirits. The devil was supposed to tempt them in the shape of a wooer, and the unholy compact was consummated in carnal fashion.

The bargain was usually in writing, signed with the witch's own blood. She was rebaptized, receiving a new name, and had to trample on the cross and renounce God and Christ (among Roman Catholics, also the Virgin Mary) in forms parodying the renunciation of the devil in the formula of Christian baptism. A mark was impressed on some part of her body; this mark remained for ever after insensible, and was one of the means of discovery employed by the witchfinders. The powers conferred by Satan on these covenanted servants of his, were essentially the same as had always been attributed to sorcerers; the mode of exercising them was also the same, namely, by charms, incantations, concoctions, &c. The only change was in the theory. These mystic rites, instead of producing their effects by an inherent virtue, were merely symbols by which the witch conveyed her behests to the devil and his ministers, who obeyed them according to the compact. Another difference to be noted is, that the power was exclusively directed to work evil—to raise storms, blast crops, render men and beasts barren, inflict racking pain on an enemy, or make him pine away in sickness (which was usually done by making an image of wax, and sticking it full of pins, or setting it to melt away before the fire). If a witch attempted to do good, the devil was enraged, and chastized her. A remarkable circumstance is, that witches seem to have been powerless to serve their own interests, for they remained poor and miserable.

A prominent point in witchcraft was the belief in stated meetings of witches and devils by night, called *Witches' Sabbaths*. First anointing her feet and shoulders with a salve made of the fat of murdered and unbaptized children, the witch mounted a broomstick, distaff, rake, or the like, and, making her exit by the chimney, rode through the air to the place of rendezvous. If her own particular demon-lover came to fetch her, he sat on the staff before, and she behind him; or he came in the shape of a goat, and carried her off on his back. At the place of assembly, the arch-devil, in the shape of a large goat, with a black human countenance, sat on a high chair, and the witches and demons paid homage by kneeling to him, and kissing his posteriors. The feast was lighted up with torches, all kindled at a light burning between the horns of the great goat. Among the viands there was no bread or salt; and they drank out of ox-hoofs and horses' skulls; but the meal neither satisfied the appetite nor nourished. After eating and drinking, they danced to music played on a bagpipe with a horse's head for the bag, and a cat's tail for a chanter. In dancing, they turned their backs towards one another. In the intervals, they narrated to one another what mischief they had done, and planned more. The revel concluded with obscene debauchery; after which, the great goat burned himself to ashes, which were divided among the witches, to raise storms with. They returned as they came; and the husband was kept from being aware of the wife's absence by a stick being laid in the bed, which he mistook for her. The places of meeting were always such as had feelings of solemnity and awe attached to them, derived from tradition or otherwise; the more noted are known to have been places of sacrifice in heathen times (see WALPURGA).

The *prosecutions* for witchcraft form one of the most deplorable episodes in human history. They show more strikingly than anything else has ever done, on the one hand, what relentless cruelty human nature is capable of under the influence of a fanatical delusion; and on the other, how little reliance is to be placed on the concurrence of any number of witnesses when any extensive excitement prevails on a subject involving the sentiment of wonder. Multitudes will be found testifying, and testifying honestly, to alleged facts which fall in with the prevailing belief, but have no better foundation than their own heated imaginations.

In the early laws of Rome, the Twelve Tables, there were penal enactments against him who should bewitch the fruits of the earth, or conjure away his neighbor's corn into his own field. A century and a half later, 170 Roman ladies were convicted of poisoning under the pretence of charms and incantations; which led to additional laws against such practices. But in all this, the penalties were directed against those who had done, or were believed to have done, positive injury to another; and this is probably the meaning of the Mosaic law against witchcraft. At all events, in the heathen world, the mere possessing, or being believed to possess, supernatural powers was not in itself a crime. It was feared, no doubt, as being liable to be turned to malicious purposes; but on the whole, magic was looked upon as a beneficial art, being, in fact, the only form of the healing art known, and in part also the religion of domestic life. This view of the subject continued to prevail for many centuries after the reception of Christianity. Constantine, in the 4th c., while ordaining capital punishment for those who practised noxious charms against the life or health of others, is careful to protect from prosecution all magical means used for good—such as warding off hailstorms and excessive rains (*Codex Justin.* lib. ix. tit. 18); and the distinction between *black* and *white* magic was long kept up. It was through the prosecutions directed against heresy, which were systematically organized in the 11th c. (see INQUISITION), that the magic arts came gradually to be all dyed black alike. Along with errors in doctrine, the heretics were almost always accused of magical practices, and their secret meetings were represented as a kind of devil-worship, attended with all kinds of abominations. Thus sorcery and heresy became synonymous; and to the dread of supernatural power was added the feeling of pious horror. White magic, no less than black, was now looked upon as the work of Satan; and the counter-charms against the malice of him and his agents were to be sought only in the rites of the church as ministered by the accredited servants of Heaven. The belief in this ecclesiastical white magic was as zealously cultivated by the Protestant clergy as by the Roman Catholic.

Fostered chiefly by the proceedings against heresy, the popular dread of witchcraft had been on the increase for several centuries; and numerous executions had taken place in various parts of Europe. At last, Innocent VIII., by his celebrated bull, *Summis Desiderantes*, issued in 1484, gave the full sanction of the church to the prevalent notions regarding sorcery, and charged the inquisitors and others to discover and put to death all practisers of these diabolical arts. Two special inquisitors, appointed for Germany (to which country the bull was specially directed), Heinrich Institor and Jacob Sprenger, with the aid of a clergyman of Constance, Johannes Gremper, drew up the famous *Malleus Maleficarum*, or Hammer for Witches; in which the whole doctrine of witchcraft was systematized, a regular form of trial laid down, and a course of examination appointed by which inquisitors everywhere might best discover the guilty. From this we may date the beginning of the witch-mania proper. The edict of 1484 was subsequently enforced by a bull of Alexander VI. in 1494, of Leo X. in 1521, and of Adrian VI. in 1522—each adding strength to its predecessor, and the whole serving to increase the agitation of the public mind upon the subject. The results were dreadful. A panic fear of witchcraft took possession of society; every one was at the mercy of his neighbor. If any one felt an unaccountable illness, or a peculiar pain in any part of his body, or suffered any misfortune in his family or affairs; or if a storm arose, and committed any damage by sea or land; or if any cattle died suddenly, or, in short, if any event, circumstance, or thing occurred out of the ordinary routine of daily experience—the cause of it was witchcraft. To be accused, was to be doomed; for it rarely happened that proof was wanting, or that condemnation was not followed by execution. Armed with the *Malleus Maleficarum*, the judge had no difficulty in finding reasons for sending the most innocent to the stake. If the accused did not at once confess, they were ordered to be shaved and closely examined for the discovery of devil's marks, and if any strange mark was discovered, there remained no longer any doubt of the party's guilt.

Failing this kind of evidence, torture was applied, and this seldom failed to extort the desired confession from the unhappy victim. A large proportion of the accused witches, in order to avoid these preliminary horrors, confessed the crime in any terms which were dictated to them, and were forthwith led to execution. Other witches seemed to confess voluntarily, being probably either insane persons, or feeble-minded beings, whose reason had been distorted by brooding over the popular witchcraft code.

In Germany, the prosecutions were carried to a frightful extent. In the small bishopric of Bamberg, 600 fell victims to the delusion in the course of about four years; and in Würzburg, which is not much larger, 900. In the small district of Lindheim, a twentieth part of the population were sacrificed in the same space of time. Similar accounts are on record regarding the other countries of Europe. In Geneva, in three months (1515—1516), 500 persons were burned. In the district of Como, 1000 were burned in one year (1524), and 100 per annum for several years afterwards. In France, about the year 1520, fires for the execution of witches blazed in every town; and throughout the century, the provincial parliaments were incessantly occupied with witch-trials and enactments against them, especially against that form of the superstition known as Lycanthropy (q. v.; see also WERE-WOLF).

In England and Scotland, the witch-mania was somewhat later in setting in than on the continent; but when it did so, it was little if at all less virulent—the Reformation notwithstanding. The statute of Elizabeth, in 1562, first made witchcraft in itself a crime of the first magnitude, whether directed to the injury of others or not; and the act of James VI., in the first year of his reign in England, defines the crime still more minutely: 'Any one that shall use, practise, or exercise any invocation of any evil or wicked spirit, or consult or covenant with, entertain or employ, feed or reward any evil or wicked spirit, *to or for any purpose;* or take up any dead man, &c.; such offenders, duly and lawfully convicted and attainted, shall suffer death.' Many years had not elapsed after the passing of the statute, ere the delusion, which had heretofore committed but occasional local mischief, became an epidemic frenzy, devastating every corner of England.

The poor creatures who usually fell victims are thus described by an able observer: 'An old woman with a wrinkled face, a furred brow, a hairy lip, a gobber tooth, a squint eye, a squeaking voice, or a scolding tongue, having a ragged coat on her back, a spindle in her hand, and a dog by her side—a wretched, infirm and impotent creature, pelted and persecuted by all the neighborhood because the farmer's cart had stuck in the gateway, or some idle boy had pretended to spit needles and pins for the sake of a holiday from school or work'—such were the poor unfortunates selected to undergo the last tests and tortures sanctioned by the laws, and which tests were of a nature so severe that no one would have dreamed of inflicting them on the vilest of murderers. They were administered by a class of wretches, who, with one Matthew Hopkins at their head, sprung up in England in the middle of the 17th c., and took the professional name of *witch-finders*. The practices of the monster Hopkins, who, with his assistants, moved from place to place in the regular and authorized pursuit of his trade, will give a full idea of the tests referred to, as well as of the horrible fruits of the witchcraft frenzy in general. From each town which he visited, Hopkins exacted the stated fee of 20*s*., and in consideration thereof, he cleared the locality of all suspected persons, bringing them to confession and the stake in the following manner: He stripped them naked, shaved them, and thrust pins into their bodies to discover the witch's mark; he wrapped them in sheets, with the great toes and thumbs tied together, and dragged them through ponds or rivers, when, if they sank, it was held as a sign that the baptismal element did not reject them, and they were cleared; but if they floated—as they usually would do for a time—they were then set down as guilty, and doomed. He kept them fasting and awake, and sometimes incessantly walking, for 24 or 48 hours, as an inducement to confession; and, in short, practised on the accused such abominable cruelties, that they were glad to escape from life by confession. If a witch could not shed tears at command, said the further items of this wretch's creed, or if she hesitated at a single word in repeating the Lord's Prayer, she was in league with the Evil One. After he had murdered hundreds, and pursued his trade for many years—from 1644 downwards—the tide of popular opinion finally turned against Hopkins, and he was subjected, by a party of indignant experimenters, to his own favorite test of swimming. It is said that he escaped with life, but from that time forth he was never heard of again.

The era of the Long Parliament was that, perhaps, which witnessed the greatest number of executions for witchcraft. *Three thousand persons* are said to have perished during the continuance of the sittings of that body, by legal executions, independently of summary deaths at the hands of the mob. Witch-executions, however, were continued with nearly equal frequency long afterwards. One noted case occurred in 1664, when the enlightened and just Sir Matthew Hale tried and condemned two women, Amy Dunny and Rose Callender, at Bury St. Edmunds, for bewitching children. It is stated that the opinion of the learned Sir Thomas Browne, who was accidentally present, had great weight against the prisoners. He declared his belief that the children were truly bewitched, and supported the possibility of such possessions by long and learned arguments, theological and metaphysical. Yet Sir Matthew Hale was one of the wisest and best men of his time, and Sir Thomas Browne had written an able work in exposition of Popular Fallacies! Chief-justices North and Holt were the first individuals occupying high places who had at once the good sense and the courage to set their faces against the continuance of this delusion, and to expose the general absurdity of such charges (1694). Summary executions, however, continued for some years to be still common, in consequence of confessions extracted after the Hopkins fashion. In 1716, a Mrs. Hicks and her daughter, aged nine, were hanged at Huntingdon for selling their souls to the devil, and raising a storm by pulling off their stockings and making a lather of soap! With this crowning atrocity, the catalogue of murders in England closes.

In Scotland, witchcraft as a crime *per se* was first made legally punishable by an act passed in the reign of Mary (1563). On coming to execute the functions of majesty, James VI. made numerous official investigations into alleged cases of witchcraft, and derived a pleasure in questioning old women, respecting their dealings with Satan. In 1590, James, it is well known, made a voyage to Denmark, to bring home his appointed bride, the Princess Anne. Soon after his arrival, a tremendous witch-conspiracy against the happy conclusion of his homeward voyage was discovered, in which the principal agents appeared to be persons considerably above the vulgar. The king had all the accused brought before himself for examination, and even superintended the tortures applied to them to induce confession. One of them, Mrs. Agnes Sampson, declared that one great object with Satan and his agents was to destroy the king; that they had held a great witch-convention at North Berwick for no other end; and that they had endeavored to effect their aim on many occasions, and particularly by raising a storm at sea when James came across from Denmark. The witches demanded of the devil why he bore such hatred to the king, who answered that the king was the greatest enemy he had in the world. On this occasion, 30 persons were executed on the Castle-hill of Edinburgh. These proceedings, no doubt, gave occasion to the famous work on Demonology which James VI. published shortly after. The removal of James to England moderated but did not altogether stop the prosecutions. As the spirit of Puritanism gained strength, however, they again increased. The General Assembly was the body in fault on this occasion, and from this time forward, the clergy were the great witch-finders in Scotland. The Assembly passed condemnatory acts (1640, 1643, 1644, 1645, 1649), and with every successive act the cases and convictions increased with even a deeper degree of attendant horrors than at any previous time. At a single circuit held at Glasgow, Stirling, and Ayr in 1659, 17 persons were convicted and burned for this crime. The popular frenzy seems to have exhausted itself by its own virulence in 1661—1662. After this period, the dying embers of the delusion only burst out on occasions here and there into a momentary flame. The last regular execution for the crime is said to have taken place at Dornoch in 1722, when an old woman was condemned by David Ross, sheriff of Caithness. The number of victims in Scotland from first to last has been estimated at upwards of 4000.

In the British colonies of New England, the witchcraft mania raged with peculiar intensity. As in Scotland and elsewhere, the clergy were the prime movers. Two clergyman have obtained a special and unenviable notoriety for the part they acted in this matter. The one was the Rev. Cotton Mather (q. v.), a man who was considered a prodigy of learning and piety, but whose writings and proceedings in regard to the trial and execution of witches, of which he was the chief instigator, show a degree of fanaticism, credulity, and blind cruelty that is almost incredible. The other, a Samuel Parris, minister of Salem, made use of the popular feeling to gratify his own spite at individuals. At last, in the 'Salem tragedy,' as it is called, in 1692, the executions, torturings, and imprisonments rose to such a height as to be no longer endurable, a complete revulsion of public feeling took place, and the delusion was broken. For details of New England witch-trials, we must refer to No. 141 of *Chambers's Miscellany of Tracts*.

Dr. Sprenger, in his *Life of Mohammed*, computes the entire number of persons who have been burned as witches during the Christian epoch at *nine millions*.

Throughout the middle ages, it is doubtful if one person could have been found who doubted the reality of witchcraft; and it was not till the middle of the 16th c. that any one had courage to raise his voice against the enormities which the delusion was occasioning. The first, probably, to do so was a physician of the name of J. Weier (*De Præstigiis Dæmonum*, &c.), in Germany, in 1563. He was followed in 1584 by Reginald Scot (q. v.), 'a solid and learned person, beyond almost all the English of that age' (Hallam), who demonstrated the absurdity and impossibility of the prevalent notions. The delusion, however, was still in the ascendant, and found multitudes of defenders, who branded the sceptics as 'Sadducees.' The most prominent of these champions was James VI. of Scotland, who, through his treatise on Demonology (1597), and his activity in the inquisition of cases, is entitled to rank with Pope Innocent and the inquisitor Sprenger, as at the

same time a chief enemy and chief encourager of witchcraft. At last the world began to awaken from the horrid nightmare; the feelings of the humane began to be shocked by the continued butchery, and the more intelligent to question, if not the existence of witchcraft, at least the evidence on which the accused were for the most part condemned. Advocates took courage to defend a reputed witch, and judges, like North and Holt in England, to throw cold water on the proceedings; and the frenzy gradually subsided all over Europe. Individual cases occurred later on the continent than in Britain. A man was executed at Würzburg in 1749 on a charge of sorcery; and a witch was burned at Glarus, in Switzerland, in 1782. Perhaps the latest instance of a judicial execution for witchcraft occurred in 1793, in the grand duchy of Posen. The laws against witchcraft were formally repealed in England in 1736, in Austria not till 1766.

The cessation of judicial proceedings, however, did not all at once put an end to popular outrages on supposed witches. In 1751, an aged female pauper and her husband were killed by a mob near Tring, in Staffordshire; and for the murder, one of the perpetrators was tried and executed. Not longer ago than 1863, a reputed wizard was drowned in a pond at the village of Hedingham, in Essex; and it was considered worthy of notice that nearly all the sixty or seventy persons concerned in the outrage were of the small tradesmen class, none of the agricultural laborers being mixed up in the affair. Besides such violent outbreaks, striking revelations are frequently made in the course of judicial proceedings, how deep-seated and general the dread of witches continues to be throughout the more ignorant strata of European society, especially in rural places; and, concurrent with this, the faith in the skill of certain 'wise men' and 'wise women' (white witches) to counteract their malicious practices. As recently as March 1867, a man calling himself Dr. Harris (S. Wales) was committed for trial at the next Radnorshire Assizes, for duping various persons, by persuading them that their ailments were caused by their being 'witched,' and pretending to cure them by giving them written charms to wear. From one man he had extorted £4, from another £6, and so on.

The belief in magic or sorcery, in fact, continues to be the most energetic belief of the ignorant and degraded all over the world, no matter what their nominal religion is. To the mass of the adherents of Buddhism in Central Asia, the lama or priest is merely a wizard who knows how to protect them from the malignity of evil spirits; and, according to Livingstone and other travelers, trials and executions for witchcraft are at this day common throughout Africa, as they were in Europe in the 17th c., and under forms ludicrously similar. See ORDEAL, MAGIC.

Of the numerous books written about witchcraft, we note the following: *Sadducismus Triumphatus, Sadducism Vanquished, or, Considerations about Witchcraft*, a work vindicating the belief in witchcraft, by Dr. Joseph Glanvil, Chaplain-in-ordinary to Charles II., who was one of the first Fellows of the Royal Society, and wrote a meritorious treatise showing the value of scepticism in science. R. Baxter (q. v.), in his *Certainty of the World of Spirits*, upholds the same side. Balthazar Bekker, a Reformed Dutch clergyman, was the first, at the end of the 17th c., to attack the very foundation of the superstition—namely, the belief in the devil himself, or, at all events, in the possibility of his interference in the affairs of this world. A successor of Glanvil, D. F. Hutchinson, chaplain to George I., in his *Historical Essay concerning Witchcraft* (1718), writes from the sceptical point of view. Sir W. Scott, *Letters on Demonology and Witchcraft*, entertaining but superficial. Brand's *Popular Antiquities of Great Britain*, edited by Sir H. Ellis (1855), gives a collection of witch-beliefs put together without much connection or method. H. Williams's *Superstitions of Witchcraft* (1865) takes a wide historical view of the subject, and evinces extensive reading. C. Mackay gives a good digest of it in brief space in a section of his work on *Extraordinary Popular Delusions* (1841). Thomas Wright's *Narratives of Sorcery and Magic*, 2 vols. (1852), contains a large collection of the most interesting stories of individual cases. Soldan, *Geschichte der Hexenprocesse* (Stutt. 1843); Ennemoser, *Geschichte der Magie*, 2d ed. (Leip. 1844; translated by W. Howitt, Lond. 1854). L. F. Alfred Maury, *La Magie et l'Astrologie dans l'Antiquité et au Moyen Age* (Lond. 1860), attempts to give a philosophy or theory of all superstitious beliefs. J. Grimm, *Deutsche Mythologie*, with his wonted sagacity and prodigality of learning, traces the several elements of the witch-creed to their roots in the beliefs of pagan times. Haas, *Die Hexenprocesse* (1865); Roskoff, *Geschichte des Teufels* (1869); Buckle, *History of Civilization* (1857–61); Lecky, *History of Rationalism* (1865); Tylor's *Primitive Culture* (1871); Conway, *Demonology and Devil Lore* (1878).

WITCH-HAZEL (*Hamamelis Virginica*), a North American shrub of the natural order *Hamamelidaceæ*. This order contains only a very small number of species, much diffused over the world, but none of them European; shrubs or small trees, with alternate, stipulate, feather-veined leaves, and small axillary unisexual flowers. The W. is often not more than 6 or 8 feet in height, dividing at the base into several cylindrical grayish branches. Sometimes it attains a height of 20 or 30 feet. The leaves are about four inches long, and two or three broad. The flowers are clustered, yellow and showy, with long linear petals. They appear in winter, or at the season when other trees and shrubs are parting with their leaves. The English name is derived from the supposed virtues of a forked twig as a divining-rod. The bark is much esteemed as a sedative and discutient.

WITENA-GEMO'T (A.-S. *witena*, genitive plu. of *wita*, a wise man, from *witan*, to know, and *gemót*, assembly, from *metan*, to meet), the great national council of England in Anglo-Saxon times, by which the king was guided in all his main acts of government. Each kingdom had its own Witena-gemót before the union of the Heptarchy in 827, after which there was a general one for the whole country. It was composed of the chief ecclesiastics, the ealdormen (see ANGLO-SAXONS) of shires, and some of the chief proprietors of land. It would rather appear, though the matter is not quite free from doubt, that the lesser thanes, who formed part of the *scir-gemót*, or next inferior court, were not entitled to form part of the general council. In the year 934, there were present at one of these assemblies King Athelstane, four Welsh princes, two archbishops, seventeen bishops, four abbots, twelve dukes, and fifty-two thanes.

The powers of the Witena-gemót seem to have been very extensive. The king's title, however hereditarily unexceptionable, was not considered complete without its recognition, and it possessed the power of deposing him. It could make new laws and treatises; and along with the king it appointed prelates, regulated military and ecclesiastical affairs, and levied taxes. Without its consent, the king had no power to raise forces by sea or land. It was also the supreme court of justice, civil and criminal. The Witena-gemót was abolished by William the Conqueror, and its powers were only in part transmitted to parliament.—See Hallam's *Middle Ages*, c. 8; Sir F. Palgrave's *Rise and Progress of the English Commonwealth;* and Kemble's *Saxons in England*.

WITHER, GEORGE, was born on the 11th June 1588, at Bentworth, an estate in Hampshire of which his father was proprietor, and which in due course fell to the son. He was educated at the grammar-school of Colemore, and afterward at Magdalen College, Oxford, which he entered in 1604. He remained there several years, and after passing some time at home, he went to London, and entered himself at Lincoln's Inn. His bent was, however, rather to literature than law; and he shortly became known in certain circles as a writer of clever verses. In 1613, he came before the public in a volume of satire, the title of which, *Abuses Stript and Whipt*, in some sort defines its contents. Certain things in the book were considered offensive by the authorities, and he was sent to the Marshalsea prison, and kept there for some months. During his imprisonment were composed his *Satire to the Kings* and his *Shepherd's Hunting*. In 1622, appeared a collection of his poems under the title *Mistress of Philarete*, and in 1635, his *Emblems, Ancient and Modern*. Though he had very much identified himself with the party of the Puritans, among whom his writings were most popular, on the breaking out of civil disturbance, he served as a captain of cavalry in the ill-judged and abortive expedition of Charles I. against the Scotch Covenanters in 1639.

When a little later, however, the general discontent determined itself into the grand struggle between the king and the English parliament, he promptly sided with the latter, and raised a troop of horse for its service by the sale of his estate. In the army of the parliament he attained the rank of major; but of his special services not much is known. On one occasion he was taken prisoner, and is said to have owed his life to a joke of Denham's, who besought the royalists to spare his life, on the ground that so long as W. lived, he (Denham) was not the worst poet in England. On the final triumph of the side with which he had ranged himself, it appears that opportunities were afforded him of feathering his nest rather comfortably by the spoil of the defeated party. With the Restoration naturally a reverse came; and as the reputed author of a pamphlet entitled *Vox Vulgi*, of a so-called seditious tendency, he was committed to the Tower, and an impeachment of him having been ordered, his life for a time seemed to be in some danger. The impeachment was not, however, proceeded with, and sooner or later—the date seems somewhat uncertain—he obtained his liberty. He died in London on 2d May 1667.

W. was an excessively voluminous writer. Upwards of 100 separate publications of his have been noted by modern bibliographers (see 1st and 2d vols. of Park's *British Bibliographer*), yet, after his death, his poetry fell into oblivion, or, so far as remembered, was regarded with such contempt that we find him introduced by Pope in the *Dunciad* as 'wretched Withers.' A later time has, however, revised this decision; the grace, sweetness, fancy, and charm of natural simplicity which distinguish not little of his verse have since been sufficiently recognized; and a modest niche in the temple has been accorded him, from which he cannot

now be degraded. The men to whom the resuscitation of his fame is chiefly owing are Southey, Lamb, and Sir Egerton Brydges. In his *Shepherds' Hunting*, in particular, passages occur of such rare and finished beauty, that no collection of the choicest things in English poetry could be held to be complete which should omit them. His *Hymns and Songs of the Church* were edited, with an introduction, by Mr. Ed. Farr in 1856. By far the best and most complete account of W.'s life and writings is to be found in Wilmott's *Lives of the Sacred Poets* (Lond. 1834).

WITNESS, a person summoned, or capable of being summoned, by a court of law, or some officer authorized to take evidence relating to a judicial or other proceeding. All persons are liable to be witnesses, either voluntarily or involuntarily, and it is a duty which every citizen owes to his fellow-citizens, to be available whenever his testimony is deemed desirable. It is a compulsory duty, and the presence of any person can be enforced, both in civil and criminal cases. In England, the usual mode of summoning a witness in a court of law, is by serving him with a *subpœna*, i. e., a formal writ proceeding in the Queen's name, reciting that a certain action is pending in a court named, and a trial is to take place, and commanding the witness to lay aside all and singular business and excuses, and appear at the time and place before the court mentioned under a penalty (*sub pœnâ*) of £100. This is called a *subpœna ad testificandum*. The corresponding term in Scotch law is Diligence (q. v.). If the witness is required to produce a document in his possession, it is called a *subpœna duces tecum*, and he is told in the writ to bring the document. If a witness do not attend at the time and place mentioned, he is liable to be punished, either by attachment, i. e., summary imprisonment for contempt, or by an action for damages at the suit of the party summoning him. The subpœna, or notice to attend, must be served a reasonable time before the witness is wanted, and it is generally necessary to give a day's notice beforehand. During a witness's attendance on this public duty, he is privileged from arrest: thus, he cannot be taken into custody for debt while he is going to, remaining at, or returning from the court. Moreover, he is entitled, before he go to the court, to have his reasonable traveling expenses paid to him, and a sum for subsistence while he remains in attendance. He is also entitled to a reasonable allowance for his lost time while attending a civil trial, and courts of law allow 5*s*. per day to a laborer or journeyman, 7*s*. 6*d*. to a master-tradesman, and £1, 1*s*. to £3, 3*s*. to professional men; to females, according to their station in life. A witness may, in a civil case, but not in a criminal case, refuse to give evidence until his expenses are paid.

A witness, before examination, is required to take an oath, which may be in any form which he considers most binding on his conscience; but he must at least believe in a God and a future state of rewards and punishments. When a witness is examined, he is generally asked specific questions, first, by the party calling him, and during this examination in chief, the rule is that he is not to be asked leading questions, i. e., questions which suggest the answer that is required. The opposite party is then allowed to cross-examine the witness, and in doing so, may ask leading questions, or test in every way the truth of the witness's statement. After this, the witness is re-examined. There is a technical rule that the party calling a witness is not allowed to impeach his credit, or ask anything having that effect. There are certain questions which a witness may refuse to answer. Such are questions the answer to which might render the witness liable to a criminal charge or penalty; but he cannot refuse if the effect would merely be to render him liable to a civil action, or merely to degrade him. If a witness live in a foreign country, he cannot be compelled to come to this country by any subpœna, and therefore the only way of getting his evidence is to send a commission to some person in the foreign country to take the examination there. Where, however, a witness residing in Scotland is required for a trial in England, and *vice versa*, he may now be compelled by subpœna to attend in the same way as if he had resided in England or Scotland respectively. If the witness is aged or infirm, so that his attendance at the trial would be dangerous to him, he may be examined by a commissioner or examiner before trial. In England, when a witness is sworn, a New Testament is put in his hand, and after the officer of court repeats the form, he kisses the book. The form is: 'The evidence you shall give to the court and jury, touching the matter in question, shall be the truth, the whole truth, and nothing but the truth.' When the witness is a Jew or foreigner, the form varies. In Scotland, the witness, when sworn, stands, holding up his right hand, while the judge of the court repeats this form: 'I swear by Almighty God, as I shall answer to God at the great day of judgment, that I shall tell the truth, the whole truth, and nothing but the truth, in so far as I know or shall be asked.'

WI'TNEY, a small market and manufacturing town of Oxfordshire, in a dreary district on the Windrush, 10 miles west-north-west of Oxford. It is a neat and well-built town, consisting principally of two streets. There is a spacious cruciform church, a blanket-hall (built 1721), a town-hall, and cross (1683). It is celebrated for its blankets, which are distinguished for their peculiar whiteness, communicated, it is said, by the sulphureous qualities of the waters of the Windrush, used in their manufacture. This branch of industry has, however, somewhat declined, from the introduction of machinery for blanket-making in other towns. Gloves, malt, pilot-cloths, and felting for paper are also manufactured. The Saxon form of the name is *Witaneye*, and means, 'the island of the Wise Men,' or 'the island of the parliament.' W. is connected by a branch with the Great Western Railway. Pop. (1871) 2976; (1881) 3017.

WITTEKIND, a Westphalian chieftain, the most celebrated leader of the Saxons against Charles the Great, made his first appearance as leader in the expeditions which the Saxons undertook in 774 against the fortress of Eresberg, in Westphalia, and the Frankish province of Hesse, while Charles was subduing the Lombards. When most of the Saxon nobles submitted to the Emperor Charles at the imperial diet at Paderborn in 777, W. fled to Siegfried, king of Jutland, whose sister Geva he is said to have married. In 778, he returned, and when Charles was absent in Spain, began to lay waste the Rhine country. Charles's return obliged him again to take refuge in Jutland; but in 782 he fell upon the Frankish army by surprise at the Sintleberg, and entirely annihilated it—an act for which Charles took frightful vengeance by the execution of 4500 Saxons. On this, all the Saxon tribes rose in arms, and the war was again led by W. until 785, when Charles entered into negotiations with him, the result of which was, that W. repaired to the emperor's camp at Attigny in Champagne, and received baptism. After that, he appears no more in history.

According to the legend, however, that is still current among the people in Westphalia, Charles promoted W. to be Duke of the Saxons, and made over Engers to him. From his castle called Babilonie, situated in the neighborhood of Lübeck, he is said to have ruled with gentleness and justice till 807, when he met his death in a campaign against Duke Gerold of Swabia. His bones repose in the parish church of Engers, in the duchy of Ravensberg, where Charles IV., in 1377, erected a monument to him; and on October 18, 1812, another monument in his honor was erected at Minden by the Westphalian Society. The higher of the two hills which form the Westphalian gates on the Weser, near Minden, bears the name of Wittekindsberg.

WI'TTENBERG, a town of Prussian Saxony, stands on the Elbe, 55 miles S.W. of Berlin. It is no longer a fortified place, though till 1873 it was a fortress of the third rank. It is interesting as having been the capital of the electorate of Upper Saxony, as the cradle of the Reformation, and as containing the remains of the reformers Luther and Melanchthon. The once famous university, in which Luther was professor, and mentioned by Shakspeare as the school where Hamlet studied, is now removed and incorporated with that of Halle. In the *Stadt-Kirche* are two remarkable but poor pictures supposed to be by their contemporary and friend Cranach, in one of which Melanchthon is represented as dispensing the sacrament of baptism, and Luther as preaching to a congregation, of which the two foremost figures are his wife and son. In the *Schloss-Kirche* are the tombs of Luther and Melanchthon, as well as those of Frederick the Wise (with a noble bronze statue by Vischer) and John, electors of Saxony. Upon the doors of this church—burned down by the French, but replaced by others of metal—Luther hung up his 95 theses against the papal doctrine of indulgences. The house of the great Reformer, containing his chair, table, &c., and two portaits of him by Cranach, remains almost unaltered. The houses of Melanchthon and Cranach are also shown. In the market-place is a bronze statue of Luther by Schadow, not far from which is also one of Melanchthon; and outside the Elster Gate a spot is pointed out as the place where Luther burned the papal bull. Manufactures of woollen and linen goods, hosiery, and leather are carried on. Brandy is distilled, and beer brewed. Pop. (1880) 13,594.

WOAD (*Isatis*), a genus of Plants of the natural order *Cruciferæ*, having a 1-celled, 1-seeded, laterally compressed pouch, with the valves keeled and eventually separating. It contains only a few species, mostly natives of the countries around the Mediterranean. DYER'S W. (*I. tinctoria*) is sometimes found in cultivated fields in England, but most probably has been introduced, as it was formerly much cultivated both in England and Scotland, for the sake of a blue dye obtained from its root-leaves. The use of this dye has in great part ceased, in consequence of the more general introduction and diminished cost of indigo. Dyer's W. is a biennial plant, with oblong crenate root-leaves about a foot in length, on pretty long stalks; an upright, much branched leafy stem, about 3 feet high; small yellow flowers, and large seed-vessels, about half an inch long and 2 inches wide, hanging from slender stalks. The leaves when cut are reduced to a paste, which is kept in heaps for about fifteen days to ferment, and then formed into

balls which are dried in the sun, and which have a rather agreeable smell, and are of a violet color within. These balls are subjected to a further fermentation before being used by the dyer. When W. is now used, it is always in union with indigo, which improves the color. Even by itself, however, it yields a good and very permanet blue. It is supposed that W. was the dye used by the Picts for painting their persons. W. is now cultivated only to a very small extent in Britain.

WO'BURN, a township of Massachusetts, U. S., 10 miles north-north-west of Boston, on the Boston and Lowell Railway, containing numerous factories supplied with water-power, country residences of wealthy Bostonians, numerous churches, academy, &c. Pop. (1860) 6778; (1870) 8560; (1880) 10,571.

WODEN. See ODIN.

WODROW, ROBERT, the second son of James Wodrow, professor of divinity in the university of Glasgow, was born at Glasgow in the year 1679. He was educated at the university of his native city, and after passing through the classes in arts, studied theology under his father. At an early age he devoted a considerable portion of his time to historical researches, and to this taste he probably owed his appointment as librarian to the university. He did not hold this office long. Having finished his theological studies, in the year 1703 he received a license to preach from the presbytery, and in the month of October of the same year was appointed minister of Eastwood, a parish in the county of Renfrew, at no great distance from Glasgow. In that parish he remained till his death, faithfully discharging the duties of his office, and declining offers which were made to him of appointments to pastoral charges of more importance. He had been brought up in the strictest principles of presbyterianism, and he zealously adhered to the party in the Established Church, which was most strenuous in maintaining those principles, and in resisting what were deemed to be the encroachments of the secular power. Soon after his settlement at Eastwood, he began to devote his leisure hours to what became the chief object of his life —the writing of a history of the Church of Scotland from the Restoration to the Revolution. He spared no pains and no expense, so far as his limited means could afford, in collecting materials for this work. He corresponded with all persons who could give him any information, and transcribed with his own hand the civil and ecclesiastical records bearing on his subject. The work was published in two folio volumes, the first in 1721, and the second in the following year. It was dedicated to King George I., whom the author styles 'the best as well as the greatest of kings;' and in the year 1725 he received an order on the Scottish exchequer for £105, as a mark of the royal bounty. It is probable that this sum was the chief pecuniary recompense of his labors; but considerations of that nature formed no part of the inducements which had led him to undertake the work. A second edition of the history, in 4 vols. 8vo., was published at Glasgow in 1828, under the editorship of Dr. Robert Burns.

W. contemplated other works, chiefly of a biographical character, illustrative of the ecclesiastical history of Scotland. None of these were published till the present century. Two vols. of his collections on *The Lives of the Scottish Reformers and most eminent Ministers*, and 4 vols. entitled *Analecta; or, a History of Remarkable Providences*, have been printed by the Maitland Club. Three volumes of his correspondence were published by the Wodrow Society—a literary club called after his name, and instituted in 1841 for the publication of the works of the fathers and early writers of the Reformed Church of Scotland. This correspondence, which extends from the year 1709 to the year 1731, throws much light on the ecclesiastical history of the time, and contains letters addressed to persons of some note in their day, not only in Scotland, but in England, Ireland, and North America. W.'s health was impaired by the eagerness with which he prosecuted his laborious studies. He died on the 21st of March 1734, in the 55th year of his age. His great work—the one by which his name is generally known—is the history. It is what it professes to be in the title-page, a 'History of the Sufferings' of the Presbyterian Church, rather than an ecclesiastical history of the period. This of itself implies a one-sided character, and warns its readers that they need not expect an account of events not coming within its limited range. Of its great value as a storehouse of materials to the student of Scottish history, no one who has examined its pages can have a doubt. As little hesitation will there be in regard to the absence of every grace of style. The only question will be as to the degree of credit to be given to the facts which the writer relates. So far as concerns his fidelity in transcribing records, and incorporating in the text the narratives furnished to him, there is no reason to doubt his general accuracy. But beyond this nothing can be said. His credulity was so great as to make him entirely unable to give any weight to intrinsic improbabilities or the conflict of external evidence. He could rarely admit a fault in those of his own side, and it is hardly an exaggeration to say that he could never see a virtue in his opponents.

Much of his history is gathered from the records of the Privy Council of Scotland, and an examination of these valuable and voluminous papers will make it pretty evident that W. disingenuously neglected to extract particulars which tell against his party. It is obvious, therefore, that in the perusal of his work, allowance must be made, not only for the absence of whatever does not come within its proper subject, but also for exaggerations of the virtues and sufferings of one party, and the crimes and errors of the other. The fullest memoir of W. is that which is prefixed by Dr. Burns to his edition of the history. Interesting details of his domestic life and of his labors and studies will be found in the printed volumes of his correspondence.

WOJWODA (Polish, *Wojewoda*), an old Slavonic word (composed of *woi*, warrior, and *wodit*, to lead), means, literally, army-leader or general, and was from early times used by most Slavonic nations in this sense. Afterwards, it became the title of the elective princes before hereditary monarchies were formed. Thus, at one time, the princes of Walachia and Moldavia were called Wojwodes; from the Greek emperors, with whom they had been in intimate alliance from the year 1439, these princes next received the title of Despots, a title they afterwards exchanged for that of Hospodar. The name was also given to the elective princes of Transylvania, whether dependent or independent. The same title of Wojwoda was applied to the elective chiefs of the Polish government before the beginning of the Piast dynasty. Later, the name denoted office and dignity; and was given, in the former kingdom of Poland, to the governors in the districts, or Wojwodschafts, into which the kingdom was divided. They had at first only a military authority; afterwards, however, both the civil and military were united in one person, so that Wojwoda and Palatine were one and the same. The name of Wojwodschaft was preserved in Russian Poland till recent times; now the Polish Wojwodschafts are named uniformly with the other Russian 'governments.' From 1849 till 1860 the Banat and part of the military frontier constituted a separate Austrian crownland, called 'the Servian Woiwodina and Temeser Banat.'

WO'KINGHAM, or OAKINGHAM, a small but improving market-town of Berks, 7 miles south-east of Reading, with which it is connected by rail. Shoes are made, and guaze and silks woven. In the original *Rose* inn, Gay, Swift, Pope, and Arbuthnot, being detained here by wet weather, composed among them the old song of *Molly Mog*. The parish church was rebuilt in 1864; the town-hall, with covered market, dates from 1860. W. is the only town in Windsor Forest. The ancient amusement of bull-baiting was continued here until within the last 50 years. Pop. (1851) 2272; (1861) 2404; (1871) 2868; (1881) 3100.

WOLCHO'W, or VOLKHOV. See ILMEN, LAKE, and LADOGA, LAKE.

WOLCOT, DR. JOHN, better known under the pseudonym of *Peter Pindar*, was born at Dodbrooke, in Devonshire, in 1738. He was educated at the charge of his uncle, a respectable surgeon and apothecary of Fowey, in Cornwall. After studying medicine at the London hospitals, he accompanied Sir William Trelawny to Jamaica in the capacity of medical attendant; but finding his professional income too small for his wants, he solicited and obtained a church-living in the island. His congregation consisted mostly of negroes, and Sunday being their principal holiday and market, the attendance at church was very limited. Sometimes not a single person came; and W. and his clerk—the latter being an excellent shot—used at such times, after waiting for ten minutes, to proceed to the seaside, to enjoy the sport of shooting ring-tailed pigeons. The death of his patron, Trelawny, induced him to abandon both Jamaica and the church. Returning to England, he tried to establish himself as a physician at Truro, in Cornwall, but does not appear to have succeeded. At any rate, he soon removed to London, where he gave himself up to writing audacious squibs and satires in verse, on all sorts of persons, from King George III. down to the Liverymen of London, and even lower.

W.'s line in literature is not a very respectable one, and most people would probably prefer obscurity to a reputation like his; but, to do him justice, Peter Pindar is an excessively clever writer. Unscrupulous, impudent, and coarse, he is yet a master of burlesque humor and comic caricature: his verse is easy, vigorous, and idiomatic; and his fancy rich in the production of ludicrous metaphor. Two of his raciest pieces, leveled at his sovereign, are *The Apple-dumplings and a King*, and *Whitbread's Brewery Visited by their Majesties*. Besides these, we may mention his *Lyrical Odes* on the Royal Academy Exhibition (the earliest of his London efforts, and dating from 1782); *Bozzy and Piozzi, or the British Biographers; Peeps at St. James's; Epistle to a Fallen Minister; Odes to Mr. Paine;* and the *Lousiad, a Heroi-comic Poem*, in five cantos; &c. The *Lousiad* has its foundation in the fact that an obnoxious insect had been discovered in the king's plate among some green peas, which produced a solemn decree that all the servants in the royal kitchen were to have their heads

shaved. Some of W.'s serious effusions actually possess considerable merit. If the matter, or rather the themes of his verse, had been less worthless, it would have stood a better chance of permanent popularity. In his own lifetime, his pieces were greedily read, and he had an annuity from the booksellers of £250 for the copyright of them. He was considered so formidable a personage, that the ministry are said to have endeavored to bribe him into silence. W., who records this proof of his power, also asserts the incorruptibility of his patriotism. He died 14th January 1819.

WOLF, Frederick Aug., the most gifted classical scholar and first critic of his age, was born 15th February 1759, at Haynrode, near Nordhausen. He was brought up and educated with great strictness by his father, the leader of the choir and organist of the place; but was afterwards sent to the gymnasium at Nordhausen. Here, under the training of the rector Hake, were developed in him not only that restless ardor for the thorough study of the ancient languages which actuated him throughout life, but also, what was afterwards the predominating trait of his character, the habit of inquiring and judging for himself, and of pursuing only one object at a time. Before leaving the gymnasium for the university, he had read the principal ancient authors, as well as the French, Italian, Spanish, and English; and had also perfected himself in the theory and practice of music. At the university of Göttingen, which he went to in 1777, with the intention of studying philology exclusively, he attended the lectures very irregularly, being already much given to private study. For the rest, he lived very retired, was little visited or known, and was only intimate with a few. However, he gave lessons to several students in Greek and also in English, for which he published Shakspeare's *Macbeth*, with explanatory notes (Gött. 1778). From Heyne (q. v.), who had once excluded him from hearing a course of lectures on Pindar, on account of the irregularity above noticed, he kept himself quite aloof. In order, however, to commend himself to a man who had so much influence as Heyne had, he laid before him, shortly before his departure in 1779, a dissertation, containing some novel views regarding the Homeric poems; which, however, Heyne coldly returned. In the same year, he went as teacher to the Pædagogium at Ilfeld, and there first established his fame by an edition of the *Symposium* of Plato, with notes and introduction in German. In 1782, he was appointed to the rectorship of the High School at Osterode, in the Harz; and, in 1783, accepted an invitation to Halle, as professor of philosophy and of pedagogical science. In Halle, W. had at first difficulties to encounter, as he rather estranged than attracted students by the high tone of his teaching. However, he soon learned to adapt himself to his audience, and then the crowd of eager pupils was very great.

As academical teacher, he went on the principle that classical antiquity should be looked upon chiefly as serving for a model of what is noblest and greatest in public and private life, and as such, is to be employed as a medium of education. He made it the principal duty of his office to provide able teachers and superintendents for the schools of his native country, and to deliver education, as much as possible, from the scientific pedantry of the old school of pedagogues. Literary labors and fame he looked upon more as a subordinate object; and his effectiveness as a teacher was unparalleled during the twenty-three years he lived at Halle. He nevertheless established his reputation as a scholar and critic by an edition of Demosthenes's *Oratio adversus Leptinem* (1789), which attracted much attention, and still more by his celebrated *Prolegomena ad Homerum* (1795), in which he unfolded, with prodigious learning and acuteness, his bold theory, that the *Odyssey* and *Iliad* are composed of numerous ballads or rhapsodies by different minstrels (strung together in a kind of unity by subsequent editors (see Homer). This work made a great sensation through the whole of Europe. Some scholars gave out that they had long entertained similar notions regarding the Homeric poems; and Heyne insinuated that the Prolegomena were only a reproduction of what W. had heard at Göttingen. This gave rise to the spirited *Briefe an Heyne* (Letters to Heyne, Berl. 1797), of which the first three may be considered as models of scholarly polemic and fine irony. Some years afterwards W. published the text of the four orations of Cicero, whose genuineness had been called in question by Markland in England—namely, *Post reditum in Senatu, Ad Quirites post reditum, Pro domo sua ad pontifices, De haruspicum responsis*—appending the previous controversy, and adding striking observations of his own in proof of their spuriousness. He next went still further, and attacked the authenticity of the oration *Pro Marcello*, which had long been studied by the Ciceronians as a model of eloquence and style, pronouncing it to be mere inflated declamation, in a diction hardly Latin, and which Cicero never could have written. This audacious scepticism produced no little alarm. After having refused a call in 1796 to Leyden, in 1798 to Copenhagen, and in 1805 to Munich, his condition was considerably improved, and he received the title of Privy-councilor.

After the disasters of 1806, the university at Halle was dispersed, and W. was for a time reduced to great straits. However, he soon found a suitable position as member of the Academy of Sciences at Berlin, where he took an active part in the reorganization of the university, and became a professor. He was taken into the Ministry of the Interior as member of the section for public instruction; but, finding that the duties interfered with his time and strength for teaching, which he considered his mission, he continued only a short time in public office. He next gave up the work of an ordinary professor, and reserved at last only the privilege of lecturing in the university on such subjects as he chose. For the benefit of his health he took a journey to the south of France in April 1824, and died at Marseille, 8th August 1824. The multitudinous works of W. we cannot attempt to enumerate. They consist chiefly of critical editions of classical writings, with dissertations and annotations, and often with admirable translations either in German or Latin. While in Berlin he edited, along with Buttmann, the *Museum der Alterthumswissenschaften* (1807—1810), and afterwards the *Literarische Analecten* (1817—1820), which has been pronounced perhaps the best philological journal that has ever been published, and which contains, among other papers by W., a long notice of Richard Bentley. From the papers which he left, his son-in-law, Körte, published *Ideen über Erziehung, Schule und Universität* (Ideas on Education, School and University; Quedlinb. 1835).—See Hanhart, *Erinnerungen an Fr. Aug. W.* (Bas. 1825); Körte, *Leben und Studien Fr. Aug. W.'s des Philologen* (2 vols., Essen. 1833); Gottholdt, *Fr. Aug. W. die Philologen und die Gymnasien* (Königsb. 1843).

WOLF, Johann Christian von, a celebrated philosopher and mathematician, was born in 1679, at Breslau. His father, a rather poor but well-informed artisan, made it his chief object to give a good education to his son, who at an early age showed excellent abilities. W. received the elements of his education at the gymnasium of Breslau, and went to Jena in 1699 to study theology. However, mathematics and philosophy were his favorite sciences, and to them he almost exclusively devoted himself. In particular, he studied Descartes and Tschirnhausen's writings, to whose *Medicina mentis* he wrote annotations, which brought him into connection with Leibnitz. In 1703, he delivered at Leipzig a graduation disputation, *De Philosophia Practica Universali Methodo Mathematica Conscripta*, which made a very favorable impression, and then began to give lectures in mathematics and philosophy, which were very numerously attended. By various works which he published on special branches of mathematics, his name became celebrated even in foreign countries. When the incursion of Charles XII. into Saxony obliged him to leave Leipzig, he received, on the recommendation of Leibnitz, a call to Halle, as professor of mathematics and natural philosophy. He there acquired great celebrity by his systematical method of teaching, as well as by numerous mathematical writings. The clearness and definiteness of the ideas and propositions which he exhibited in his mathematical lectures, were something till then quite unknown. Hence it came that his system of metaphysical and moral philosophy, which he worked out according to this mathematical method, and published, met with universal approbation, and quickly spread through Germany: it became a kind of rage to treat all sorts of subjects in the mathematical method, the effect of which was often ludicrously pedantic. W., however, was violently attacked by his colleagues in Halle, especially by those theologians who favored the pietism then coming into vogue: he was declared to be a despiser of religion, and a teacher of error; and a formal accusation was brought against him to the government.

The immediate ground of the accusation was his oration *De Philosophia Sinensium Morali*, in which he spoke with approval of the morality of Confucius, besides which the basest insinuations were brought against him, derived from his doctrine of freedom, which, it was said, encouraged social anarchy. By a cabinet order of Frederick-William I., of date 15th November 1723, W. was deposed from his office, and commanded, under pain of death, to quit Halle in 24 hours, and the Prussian dominions in two days. He did so on the 23d November, and met with a favorable reception in Cassel, and was appointed to a chair in the university of Marburg. The dispute about his philosophical system now became general, and nearly the whole of Germany took part either for or against him. At the same time he received from abroad many marks of honor and advantageous proposals, which last, however, he declined. In the meantime the Prussian government had begun to regret the steps it had been led to take against him, and had appointed a commission to re-examine the matter. This resulted in his entire justification; and when Frederick II., who had a great esteem for him and had studied his system, ascended the throne (1740), W. was induced to return to Halle as Professor of the Law of Nature and Nations, and with the titles of Privy-councilor and Vice-chancellor. In 1743, he became Chancellor in the place of Ludwig, and was raised to the rank of Baron of the Empire by the Elector of Bavaria during the regency. W. died

in 1754. Before his death, he saw his philosophy spread over the whole of Germany and a great part of Europe; he had, however, outlived his reputation as an academical teacher. That he did great service to philosophy, cannot be denied. If he did not enrich it by great and brilliant discoveries, he at least directed attention to systematic method; and by treating scientific subjects in the mother tongue, he did much to create that wide-spread taste for philosophical speculation which has since been characteristic of Germany.

W. adopted Leibnitz's hypotheses and principles, which he endeavored to carry out into a complete system and popularize. But although the Wolfian philosophy was a great improvement on the scholastic Aristotelianism that had previously prevailed, its dogmatism could not stand the criticism of Kant, and it is now a theory of the past. By his voluminous writings, written partly in the German language, and the immense number of his pupils, W. had a wide and beneficial influence on his age, more especially as counteracting pietism and mysticism, then rampant. He also did good service to the German language. The multitude and extent of his writings is truly marvelous, even if we look at nothing else than the mechanical labor of writing them. He treated mathematics and philosophy in a double set of works; the one in full in Latin, the other shorter as German school-books, of the most of which several editions have been published. Besides these, are a great number of treatises on single subjects in physics, mathematics, and philosophy. His systematic works on all the chief branches of philosophy alone, amount to 22 vols. in quarto.—See *Christian W.'s eigene Lebensbeschreibung* (Christian W.'s Autobiography), published by Wuttke (Leip. 1841); Ludovici, *Sammlung und Auszüge der Sämmtlichen Streitschriften wegen der Wolf'schen Philosophie, u. s. w.* (Collection and Extracts of the Controversies about the Wolfian Philosophy, &c., 2 vols. Leip. 1737); by the same author, *Ausführlicher Entwurf einer vollständigen Historie der Wolf'schen Philosophie* (3 vols. Leip. 1737).

WOLF (corresponds to Lat. *vulpes*, a fox), the name of a wild animal of the same genus with the dog, and of which it is indeed doubtful if it constitutes a distinct species; whilst, as to the different kinds of wolves found in different parts of the world, it must be deemed at present wholly uncertain whether they are to be regarded as species or varieties, although they have, provisionally, received specific names. There exists among them the same close resemblance as in the different kinds of dog, with a similarly marked distinction of characters, which, however, it is difficult to state as specific characters are generally stated. The same difficulty, therefore, occurs in the natural history of wolves as in that of dogs, although the number of different forms is not so great. In their most important characters, and those which, as least subject to variation, are generally regarded as best marking specific distinction, they agree not only with each other, but with dogs. The opinion, that the W. is the parent of the dog, or of some of the kinds of dog, is favored by the identity of the period of gestation, a point which seems to be pretty well established, and which, in such a question, is to be regarded as of great importance. Dogs and wolves, also, intermix, but it is not yet fully ascertained that the offspring will continue fertile among themselves. It is further observed that wild races of dogs, whether originally wild, or having become wild (*feral* races), resemble wolves in many respects, in their dull uniformity of color, in their lengthened muzzle, lengthened limbs, lank form, and gaunt aspect, and even in the bushiness of the tail. It has been alleged, as a reason against supposing the W. and the dog to be really of the same species, that the W. is incapable of domestication and of attachment to man. This, however, is not the case. Both the Common W. of the Old World and the wolves of America have been found capable of domestication, when taken young, and instances are on record of their having displayed an attachment to their master like dogs.

The Common W. (*Canis lupus*) inhabits Europe and the northern parts of Asia, its range extending from the Arctic regions as far south as the northern parts of Africa and of India. It is of a yellowish or tawny-gray color, with strong coarse hair, which is longest on the ears, neck, shoulders, and haunches, but particularly on the throat; the muzzle is black, the upper lip and chin white. The ears are erect and pointed, the muzzle sharp; the legs rather longer than those of the Shepherd's Dog; the tail bushy, but not curling; the eyes oblique, giving a peculiar vicious expression to the countenance. The W. is swift of foot, and hunts deer and other animals, packs of wolves associating for this purpose; it also often commits great ravages among sheep, and attacks calves, but seldom full-grown oxen. It seldom attacks man, unless hard pressed by hunger, when it becomes very dangerous. The hungry wolves which sometimes descend, in severe winters, from the forests of the Alps, Pyrenees, and other mountains are much dreaded by the inhabitants of neighboring regions; and terrible stories are told of travelers chased by packs of wolves in the forest-covered plains of the east of Europe and in Spain. In general, the W. is cowardly and stealthy, approaching sheepfolds and farm-buildings by night, in search of prey, and readily scared by any demonstration of watchfulness, fleeing from dogs, and not readily exposing itself within range of shot. It defends itself, however, with great vigor, when compelled to do so. It is not easily trapped, being extremely cautious, and appearing to understand the nature and purpose of a trap almost as well as those by whom it is set. Wolves have often been



Common Wolf (*Canis lupus*).

known even to approach a trap so skillfully as to devour the bait without harm to themselves, getting at it from below.

Diversities appear in the wolves of different countries of Europe and Asia, but not very considerable. The French wolves are generally browner, and rather smaller, than those of Germany; the wolves of Russia are larger, and have longer hair; the wolves of the Alps are brownish-gray, and not of large size; in Italy and Turkey a tawny color predominates. In some very northern regions wolves become white in winter; and white wolves, probably albinos, sometimes occur in more southern regions. The Black W. is the most marked European variety. It is found in the Pyrenees and in Spain, and is very large and strong. Strings of mules are often followed by these wolves in the passes of the Pyrenees, after evening comes on, and they not unfrequently succeed, notwithstanding all the care of the muleteers, in capturing some of the animals.

Wolves are still very plentiful in some parts of Europe. In the Pyrenees and Ardennes, amongst the Carpathian Mountains, in Turkey and the Principalities, they are common; and in the vast forests of Poland and Russia wolves often appear in formidable packs, and still cause much loss by their attacks on cattle, sheep, and horses. As culture increases, wolves become scarce. The W. was formerly common in Britain, and the Anglo-Saxon name for January, *Wolf-month*, is significant of this fact. Places of refuge from wolves were erected for travelers in wild and unpeopled districts, as at Flixton in Yorkshire. King Edgar commuted the punishment of criminals on their producing a certain number of wolves' tongues. Lands in Derbyshire were held on condition of killing wolves. It is not easy to say at what date wolves ceased to exist in England; it was probably about the end of the 15th c., but they continued to commit serious ravages on flocks, in Scotland, in the end of the 16th c., and the last W. in Scotland is said to have been killed in 1743. In Ireland, the last was seen in 1770 (see Hastings's *British Animals*, 1881).

The American wolves are very similar to those of the Old World. They have been described as forming several distinct species, but are by some included in one, doubtfully distinguished from the Common W., and to which the name *Canis occidentalis* is given. The fur is thicker, and the form more robust than in the Common W., the muzzle is less pointed, and the profile not so straight, the legs and ears are shorter, and the tail is more bushy. The Gray W. (*Canis occidentalis*, var. *griseo-albus*, or *C. griseus*) is abundant in the northern parts of North America, except in the long-settled districts, from which it has been expelled by man. It is the only kind found in Canada. A few still remain in the mountainous and wooded parts of New England. Packs of wolves hang around the herds of buffaloes (bisons) on the western prairies, not daring to attack strong animals, but ready to seize any sickly straggler that falls behind the rest. They hunt and run down deer. The Gray W. equals the European species in cunning, and has been known to bite off the cord close to the trigger of a set gun, and afterwards to devour in safety the bait placed before the muzzle. It has also been known to haul up fishing-lines set in a hole of the ice, and to help itself to the fish. It is frequently taken by means of pit-falls. On the prairies, the Indians kill great numbers of wolves by enclosing them in a circle gradually reduced, but originally extending over many miles. A premium of 10 to 20 dollars a head was formerly paid, in some parts of America, for the destruction of wolves.

partly by the state, and partly by the county or town, because of their ravages among sheep. The range of the Gray W. extends to the coldest northern regions, as Melville Island and Banks's Land.

In the north-western states, the Gray W. gives place to the DUSKY W. (*Canis nubilus* of many naturalists); and in the south is the BLACK W. (*C. ater* or *Lycaon*); whilst on the upper parts of the Missouri, the WHITE W. appears, and the RUFOUS W. in Texas. They differ little in characters and habits from the Gray Wolf.—The PRAIRIE W. (*C. latrans*, or *Lyciscus latrans*), the COYOTE of the Mexicans, is a very different animal, more resembling the jackal. It is found from Mexico northwards to the Saskatchewan, abounding on the vast plains of the Missouri. It is 36 to 40 inches long, with a tail of 16 or 18 inches; the muzzle sharp and fox-like, the ears very large and erect, four toes on each foot, and on the fore-feet a sharp claw on the inside, two inches above the ground, attached to the rudimentary thumb; the color is usually dull yellowish gray, with black cloudings, the under parts dirty white. It hunts in packs. It is an extremely fleet quadruped, excelling every other in the countries which it inhabits, except the Prong-horn. Its voice is a kind of snapping bark. The true wolves never bark, the only sound they emit being a prolonged and dismal howl.

South America has numerous species of *Canidæ*, some of which are known as Aguana wolves, and are nearly allied to the Prairie Wolf.

WOLF-DOG, a kind of dog used for hunting the wolf, formerly abundant in Norway and Sweden, but now almost exclusively found in Spain, into which it is supposed to have been introduced by the Goths. It is of the same group with the Shepherd's Dog; and is of a large size, little inferior to the mastiff, with pointed nose, erect ears, long silky hair, and a very bushy tail curled over the back. In color it is mostly white, with large clouds of tawny color or brown.

WOLFE, THE REV. CHARLES, the son of a county gentleman of Kildare, was born on 14th December 1791, at Dublin. The family having come to England on the death of his father, which took place whilst he was yet quite young, the boy received his chief education at Winchester, where he showed himself an apt scholar. Being transferred, in 1809, to the university of Dublin, he succeeded in securing a scholarship, and in 1814 his degree of Bachelor of Arts. During this period, he was actively employed as a tutor: at this time it was also that he composed the greater part of the poetry which he left as his legacy to the world. In 1817, his celebrated lines on *The Burial of Sir John Moore*, suggested by reading Southey's impressive account of it in the *Edinburgh Annual Register*, were written; and soon after, they found their way into the newspapers. So generally admired were they, that even whilst the name of their author remained unknown, they had won for themselves a secure place in the memory of the British people. As a singularly felicitous and touching poetical record of a noble and pathetic incident in our national history, they are perhaps not likely to be forgotten whilst that history is patriotically read and remembered. W., after qualifying himself to take orders, became, in 1817, curate of Ballyclog, in the county of Tyrone, from which he was shortly transferred to the larger parish of Donoughmore. His devotion to his duties was extreme, and was repaid by the warm affection of all with whom they brought him in contact. But they seem somewhat to have overtaxed the strength of a constitution at no time robust; symptoms of consumption appeared; and a visit which he made to Edinburgh in May 1821, developed it. He tried in search of health, successively, England, the south of France, and finally the sheltered Cove of Cork, in which last place he died on 21st February 1823.

His literary *Remains*, consisting of sermons chiefly and poems, were given to the world, with a Memoir, in 1825, by the Rev. John A. Russell, M.A., archdeacon of Clogher, an attached friend of the deceased. The work, though containing some poetry of real merit, never made any great impression, and is now quite forgotten. The one beautiful piece which preserves for us the name of W., was attributed by guess, whilst he lived, to more than one of the most famous writers of the day—as, notably, Campbell and Byron. Since his death, several nefarious attempts have been made to filch from him the fame he continues to derive from it.

WOLFE, JAMES, the most famous English general of his time, was born at Westerham, in Kent, on 2d January 1727. His father was a lieutenant-colonel, afterwards General Wolfe, an officer of merit and distinction, who served under Marlborough and Prince Eugene. Along with his brother Edward, who was about a year younger, James received his first education at a small school in that neighborhood. From the first, the boy had resolved to follow his father's profession of arms; and when little more than 13 years old, he started to accompany the colonel as a volunteer in the unfortunate Carthagena expedition. An attack of illness, however, made it necessary to put him ashore at Portsmouth just before the fleet sailed. In 1742, he received his commission as ensign in the 12th, or Colonel Duroure's Regiment of Foot, with which he was soon after embarked for service in Flanders. In the year following, he took part in the famous battle of Dettingen; and it is evidence of the capacity he already began to display that we find him, though still the merest boy, acting in the responsible capacity of adjutant of his regiment.

After the battle of Fontenoy in 1745—at which W., who had now become a captain in the 4th, or Barrell's Regiment of Foot, was, notwithstanding a current tradition to that effect, certainly not present—the British troops were withdrawn from Flanders to assist in the suppression of the rebellion at home. With the army in Scotland he served in the capacity of brigade-major, and was present at the battles of Falkirk and Culloden. In 1747, he was again abroad on service. At the battle of Lanfeldt, he was wounded, though not seriously; and his conduct was so distinguished, that he was publicly thanked by his commander-in-chief, the Duke of Cumberland. In the beginning of the year 1749, he was appointed major of the 20th Foot, then stationed at Stirling, whither he proceeded. In the absence of the colonel, the command of the regiment devolved upon him. In this responsible position, which was rendered much more trying by the disaffection still prevalent, young as he was, W. conducted himself with admirable tact and discretion. With little interruption, he remained in Scotland till the end of 1753, when the regiment returned to England. From the tone of his correspondence, it is evident he was not greatly delighted with Scotland or its inhabitants. In the mismanaged expedition against Rochefort in 1757, W. was appointed to act as quarter-master-general of the force. The total failure of the operations brought disgrace to nearly all concerned; but it became sufficiently known that, had W.'s prompt and daring counsels been followed, the result would have almost certainly been different; and his reputation, already a brilliant one, rose considerably in consequence. In particular, it appears that the attention of Pitt was now first decisively drawn to him as an officer of whom, in any enterprise intrusted to him, great things might be expected. As marking approval of his conduct, the full rank of colonel was conferred on him. The high opinion thus formed of him, was signally confirmed the year following, when he was intrusted with the command of a brigade in the expedition against Cape Breton, under General Amherst.

A great success was obtained in the capture of Louisbourg; that it was mainly due to W.'s skill, boldness, and activity was quite clearly understood, and he became popularly known as 'the Hero of Louisbourg.' Presently came the opportunity which was to consummate his glory, in the instant of heroic death. Pitt was now organizing his grand scheme for the expulsion of the French from Canada; it was his just boast that he 'sought for merit wherever it was to be found;' and the expedition, which had for its object the capture of Quebec, the enemy's capital, he confided to the care of W., allowing him, as far as possible, a *carte blanche* for the choice of his subordinate officers. On 17th February 1759, W., advanced to the rank of major-general, and commanding an army of between 8000 and 9000 men, set sail from England. At Louisbourg, he had news of the death of his father, the state of whose health had for some time been such as to prepare him for the event. On the 26th June, W. landed his forces on the Isle of Orleans, opposite Quebec, and proceeded to concert his plans for the attack upon it. This, of which he had shortly before written as likely to be found 'a very *nice* operation,' proved, on a closer examination, to be one of stupendous, and, indeed, nearly hopeless difficulty. The system of defence adopted by his adversary, the skillful and wary Montcalm, was such as to offer him no point of advantage. In all his attempts, though seconded most ably by Admiral Saunders, who commanded the fleet, he found himself completely foiled. The season wore fast away during which operations could be continued; and an abortive result seemed imminent of the expedition from which so much had been hoped. But at last, at day-dawn of the 13th September, he found himself at the head of his little army, on the Heights of Abraham, above the city, where Montcalm, sorely against his will, was forced to risk decision of the struggle by battle in the open field.

Resolving to stake all on a final effort, W. had, during the night, succeeded in scaling the cliffs at a point insufficiently guarded—an operation of such frightful risk and difficulty, as in war has scarcely a parallel. Of victory he had no doubt; his little force, now—exclusive of detachments necessarily left behind—reduced to something like 5000 men, was indeed opposed to near 8000 of the enemy, besides Indian auxiliaries; but of these it was well known that only a part could be depended on as trained and veteran troops. The result justified his confidence; after a short struggle the enemy was driven from the field in complete rout; the capitulation of Quebec followed some days after; and its fall decided the fate of Canada. But W. did not live to reap the fruits of his victory; he died in its very hour. In person he led the right; twice wounded, he refused to leave front; a third bullet prostrated him; and he was carried, plainly dying, to the rear. He lived only long enough to know that the battle

was decisively won; then rallying his last strength to give one final order, and saying: 'Now God be praised! I die in peace,' he expired. The gallant Montcalm also fell, paying, with almost his last breath, the tribute of a true soldier to the valor of the troops who had beaten him: 'Since,' said he, 'it is my misfortune to be discomfited and mortally wounded, it is a *great consolation* to me, to have been vanquished by so brave an enemy. If I could survive, I would engage to beat three times the number of such forces as mine were, with a third of British troops.'

The news of the victory was received in England with a tumult of exultation, dashed with grief for the loss of the hero to whom the nation owed it. When parliament met in November, the House of Commons addressed the king, praying that his Majesty would order a monument to be erected to the memory of the dead soldier in Westminster Abbey; where, accordingly, an *effigies* of him may be seen, with allegorical adjuncts as tasteless and absurd as usual. He was buried beside his father, in the family vault under the parish church at Greenwich.

A single military achievement, however brilliant, cannot be made ground of a claim for the successful soldier to take rank as a great captain. But that W. had the true genius for command, which needed only time and farther opportunity to win for him a fame still more splendid, it is scarcely permitted us to doubt. Through the lower regimental grades he rose rapidly by sheer force of personal merit, at a time when the service was a mere hotbed of corruption; and on attaining to higher commands, he in every instance gave evidence of the higher military qualities which proved him eminently worthy of them. He had only reached the age of 33, when in his last, and properly his one great achievement, he died, seemingly cut off in the mere opening of a brilliant career. He was of warm affections, and frank and generous nature; though his temper was somewhat eager, impulsive, and irascible, few men have ever been more generally beloved; and not many men so famous have left behind them a memory in every way so pure and spotless.

See the *Life of Major-general James Wolfe—founded on Original Documents, and illustrated by his Correspondence*, by Robert Wright (Lond. 1864).

WO'LFENBÜTTEL, a very old town of Brunswick, stands in a low marshy district on both banks of the Oker, 7 miles south of Brunswick by railway. Its old fortifications have been converted into promenades. There are several churches, schools, charities, and a college. In a handsome building formed after the model of the Pantheon at Rome, is the famous library placed here in 1644, of which Lessing was sometime librarian. It consists of nearly 270,000 volumes, and upwards of 10,000 manuscripts, and contains some of the finest missals in Europe, an immense collection of Bibles, including Luther's Bible with autographic notes. In the same institution are preserved the great Reformer's marriage-ring, spoon, drinking-glass, and portrait by Cranach. The cultivation of vegetables is carried on to a great extent, and there are manufactures of lacquered and japanned wares, paper-hangings, leather, tobacco, and liqueurs; a trade in corn, cattle, and linen-yarn. W. has five annual fairs. Pop. (1875) 11,105.

WOLFENBÜTTEL FRAGMENTS. See LESSING; REIMARUS.

WO'LFFIAN BODIES, important organs in the vertebrate embryo, in which they serve only a temporary purpose, except in the lowest classes (the fishes and Amphibia), where they remain permanently. In the development of the chick, these bodies may be seen as early as the fourth day, lying along either side of the vetebral canal, from the region of the heart downwards and backwards, consisting of a series of tubules opening at one end into the body-cavity, and at the other into a longitudinal duct, the Wolffian duct, and corresponding with the so-called kidneys of fishes, which in reality are true persistent Wolffian bodies. On the fifth day, the appendages become convoluted, and the body which they collectively form increases in mass. The appendages are then seen to possess a secreting property, and the fluid which they secrete is conveyed by the duct of each side into the urogenital sinus, into which opens also the *allantois*, a sac which, at the same time, acts as a temporary respiratory organ, and is also used as a urinary bladder, but atrophies in adult birds and mammals. Hence these organs may be regarded in the light of temporary kidneys.

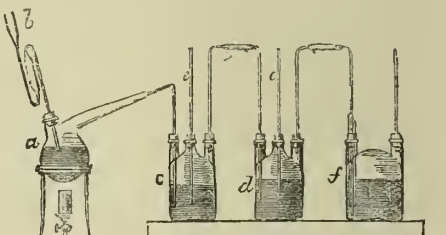


State of the *Urinary* and *Genital Apparatus* in the early embryo of the bird: *x*, Corpora Wolffiana; *b*, *b*, their excretory ducts; *c*, kidneys; *d*, ureter; *e*, *e*, testes.

In the chick, the true kidneys begin to form from the Wolffian bodies at the fifth or sixth day and gradually increase in size as the temporary organs diminish; and at the end of foetal life, only a shrunken rudiment of them can be observed. In man the process is very similar, the Wolffian bodies beginning to appear towards the end of the first month; while in the seventh week, the true kidneys first present themselves. From the beginning of the third month, the Wolffian bodies begin to decrease, the kidneys increasing in a corresponding ratio, and at the time of birth, scarcely any traces of the former can be seen. It was formerly believed that the essential parts of the generative apparatus—the testes in the male and the ovaria in the female—were also developed from these bodies; but this is not the case, as they have an independent origin in a special mass of blastema peculiar to themselves, in the immediate vicinity of the Wolffian bodies.—See Balfour, *Comparative Embryology*.

WOLFFIAN BOTTLES, the name given to a set of apparatus employed for the distillation of Hydrochloric Acid (q. v.). It consists of a retort, *a*, in which chloride of sodium (common salt) is submitted to the action of sulphuric acid, gradually added through the funnel *b*, and the vapor evolved passes out into the first bottle (which, in the accompanying figure, is represented as half full of water), and is absorbed by the water. This process continues till the power of absorption of the water in the first bottle ceases (or, in other words, till the water becomes *saturated*), when the vapor collects in the neck of the retort and in the tube *c*, till it acquires sufficient tension to force its way through the water, and enter the second bottle by the tube *d*. In turn, the water in the second bottle becomes saturated, after which the gas is forced to find its way into the third bottle through the other two by means of the connecting tube *f*.

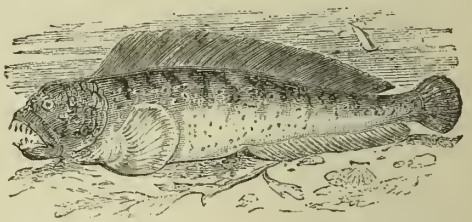
After the force of reaction in the retort has become weakened, the evolution of the gas is quickened by the application of a flame, which requires to be gradually increased. Considerable heat being generated during absorption, it is desirable that the bottles should be immersed in cold water. The tubes, *e*, *e*, admit



Wolffian Bottles.

atmospheric air to prevent the rarefaction in the retort tending to force the contents of the bottles back into it.

WOLF-FISH (*Anarrhichas*), a genus of fishes of the family *Blenniidæ* (see BLENNY), having no ventral fins, the pectorals very large, a single dorsal fin extending from behind the head almost to the tail-fin, a long anal fin, the tail-fin rounded; the head round, smooth, and blunt; the teeth large and strong, not attached immediately to the jaws, but to bony processes connected with them by sutures. The jaws are powerful, the front teeth resemble the canine teeth of mammals, whilst the vomer



Wolf-fish (*Anarrhichas lupus*).

and palate are furnished with teeth which have the form of rounded tubercles. One species, the COMMON W., also called CAT-FISH and SEA-CAT (*A. lupus*), is found on the coasts of Britain, and is plentiful in more northern seas. It is frequent on the coasts of Scotland, particularly in the north, but is more rare on the English coasts. It is of a light gray color, brownish on the back; the lower parts exhibiting ten or twelve dark transverse stripes. The skin is covered with much slime. It attains the length of six feet, and is a creature of formidable and even repulsive appearance: it bites savagely when caught, and fishermen therefore generally despatch it as soon as possible by knocking it on the head.

It preys chiefly on molluscs and crustaceans, which its jaws easily crush. It is often very destructive to nets, being an active and powerful fish. Notwithstanding its ugliness, it is in esteem

for the table, and it is often brought to the Edinburgh market. It is much used in Iceland, both fresh and salted; and a kind of shagreen, used for bags and ponches, is made of its thick skin. A very similar species, *A. vomerinus*, is found on the American coast from New York to Greenland, and is not only used fresh, but also split, salted, and smoked.

WO'LFRAM is a native compound of tungstate of iron and manganese, from which the metal Tungsten (q. v.) is usually obtained.

WOLF'S-BANE. See ACONITE.

WO'LGAST, a commercial town and seaport of Prussia, in Pomerania, stands on the Peene, about 10 miles from its entrance into the Baltic, and 33 miles south-east of Stralsund. The shallowness of the water admits only the smaller class of sea-going vessels entering the harbor. There is a public dockyard and a school of navigation; and the inhabitants, who number (1880) 7832, are occupied in shipbuilding, seafaring, and in the manufacture of candles, soap, and tobacco. The larger ships discharge and take in cargoes at Ruden, a small island and pilot-station opposite the mouth of the Peene, known as the landing-place of Gustavus Adolphus in 1630. W. is a very old town; it was strongly fortified as early as the 12th c., and was once the residence of the Dukes of Pommern-Wolgast; it was taken and retaken five times between 1628 and 1675; the Russians plundered and burned it in 1713, and the Swedes retook it in 1715.

WOLLASTON, WILLIAM HYDE, M.D., a distinguished physicist, was the second son of the Rev. Francis Wollaston, of Chiselhurst, in Kent, and was born August 6, 1766. After the usual preliminary education, he was entered of Caius College, Cambridge, where he studied for the medical profession, and took the degree of M.D. in 1793, in which year, also, he was elected a Fellow of the Royal Society. After practising as a physician at Bury St. Edmunds, he removed to London; but being beaten by Dr. Pemberton in a competition for the post of physician to St. George's Hospital, he determined thenceforth never to write a prescription, 'were it for his own father,' but to devote himself wholly to scientific investigation. This sudden resolution proved ultimately most beneficial, leading him rapidly to wealth and fame; for unlike many eminent investigators of nature's laws and phenomena, W. combined 'the genius of the philosopher with the skill of the artist,' and succeeded in making industrial application of several of his important discoveries. His researches were prosecuted over a wide field, but were pre-eminently fruitful in the sciences of chemistry and optics. To the facts of the former science he added the discovery of new compounds connected with the production of gouty and urinary concretions, such as phosphate of lime, ammonio-magnesian phosphate (a mixture of these two forming the 'fusible' calculus), oxalate of lime, and cystic oxide; also the discovery in the ore of platinum of two new metals, palladium (1804) and rhodium (1805).

By his ingenious discovery of a mode for making platinum malleable, he is said to have gained £30,000, and his mode of hardening steel, and some other discoveries of a practically useful nature, were also very lucrative. His contributions to optics were the celebrated 'Goniometer' (q. v.), a most valuable gift to mineralogists; an apparatus for ascertaining the refractive power of solid bodies; the 'Camera Lucida' (q. v.); the discovery of invisible rays outside the violet band of the spectrum; and an immensity of valuable and interesting observations on single and double refraction. He did much to establish the theory of definite proportions. To other sciences his contributions were also of importance, for he was the first to demonstrate the identity of galvanism and common electricity, and explain the cause of the difference in the phenomena exhibited by each, &c. W. was elected secretary of the Royal Society, November 30, 1806. He died of effusion of blood on the brain on December 22 of the same year. His most important Memoirs, 38 in number, will be found in the *Philosophical Transactions* (1800—1829).

WOLSELEY, SIR GARNET JOSEPH, was born near Dublin, June 4, 1833. He entered the army in 1852, and since then has been constantly engaged in the service of his country, and has steadily risen to greater eminence in his profession. He served in the Burmese war of 1852–3; he was severely wounded in the Crimea, and received the cross of the Legion of Honor for his bravery there. He was in India during the mutiny, and in the Chinese war of 1860. Next year he went to Canada, and in 1870 successfully managed the Red River difficulty. On the outbreak of the Ashantee war, W., now Knight Commander of the order of Saints Michael and George, was appointed to the command; and on his return received the thanks of parliament and a grant of £25,000 for the 'courage, energy, and perseverance' he had displayed in the conduct of the expedition. In 1875, became a major-general, he was dispatched to Natal to superintend the affairs of the colony; in 1876 was nominated a member of the Indian Council. In 1878 he was made high commissioner and commander-in-chief in Cyprus, from which post he was recalled in 1879 in order to proceed to the seat of the Zulu War, with supreme civil and military command in Natal, the Transvaal, and adjacent disturbed territories. He arranged the terms of peace with the Zulu chiefs. He was commander-in-chief of the expedition to Egypt in 1882. W. is the author of a novel (*Marley Castle*, 1877), and of several essays and military handbooks.

WOLLSTONECRAFT, MARY. See GODWIN, WILLIAM.

WOLSEY, THOMAS, CARDINAL, was born in 1471 at Ipswich, in the county of Suffolk, and is reputed to have been the son of a butcher of that place. Though thus of humble origin, it is certain that by some means a good education was secured him, and at an unusually early age, he was sent to Magdalen College, Oxford, of which he became a Fellow. It is said that while at Oxford, he was brought into somewhat intimate relations with the great Erasmus, unquestionably then in England. He afterwards acted as tutor to the sons of the Marquis of Dorset, through whose favor he became in 1500, rector of Lymington, in Somersetshire. On one occasion, he appears to have got himself into difficulties. At a fair in the neighborhood, it was his misfortune one day, it is said, to be found drunk and disorderly; and by a certain knight of the shire, by name Sir Amias Poulet, he was put in the stocks for the misdemeanor. That he figured in the stocks is certain; that he did so on the score of drunkenness there is no adequate evidence. When the power to retaliate came to him, he took his revenge on Sir Amias by having him imprisoned for six years.

W., who was plainly one of the most insinuating of men, in Somersetshire became intimate with a Sir John Nafant, a man of considerable mark. Through the influence at court of this gentleman, he was appointed chaplain to Henry VII., with whom he speedily ingratiated himself. Being sent by the king on a special embassy to the continent, he acquitted himself so dexterously, that he rose still higher in favor; and in 1508, the deanery of Lincoln was conferred on him. The year after, Henry VIII. succeeded to the throne left vacant by the death of his father. Nearly from this time forward, the life of W., previously noted, indeed, as a rising man, yet of no special public importance, is in effect the history of the England of which he implicitly became the ruler. From Henry he enjoyed the most unbounded favor and confidence; and the influence which he thus exerted in the conduct of affairs was such as has seldom been exerted by a subject. The most valuable ecclesiastical preferments were showered upon him; and finally, in the same year (1515), he obtained the bishopric of Lincoln and the archbishopric of York. The year following, the dignity of cardinal was conferred on him by the pope, who, not long after, appointed him also legate. Besides these ecclesiastical honors, he was made by the king, in 1515, his Prime Minister, and Lord High Chancellor of England. From this time, up to that of his forfeiture of the royal favor, W. was one of the most important men in Europe; and at home his power was almost without limit. The revenues derived from his various offices were of princely magnitude; and they were further enlarged by subsidies from foreign potentates, eager to conciliate his favor. He did not bear his honors meekly; in his way of life he affected a sumptuous magnificence, and a state only not royal, whilst in bearing he was arrogant and imperious. He openly aspired to be pope; and there seemed more than once ground for supposing that this crowning object of his ambition was really within his reach. He was, however, disappointed; and it has been surmised that his resentment against Charles V., to whom he attributed his failure, determined, to a considerable extent, the foreign policy of the country.

Such a man could not fail to have many enemies, eager, as occasion might offer, to discredit him with his royal master; and an occasion at length came, of which they did not fail to take advantage. To the project on which the king had set his heart, of divorcing Queen Catharine, and marrying Anne Boleyn, W. showed himself hostile; of the latter part of the scheme he was known to disapprove; and his negotiations with a view to securing the consent of the pope to the divorce were conducted, as it seemed to the king, in a dilatory and half-hearted manner. Henry, where his passions were interested, could little brook contumacy of this kind; his displeasure was carefully fanned, and the disgrace of W. was accomplished. In 1529, he was stripped of all his honors, and driven with ignominy from the court. Symptoms of relenting showed themselves, however, next year in the mind of the monarch, and it seemed as if W. might again be taken into favor. The prospect, as it proved, was delusive. Being at the time in Yorkshire, the archbishopric having been restored to him, along with others of his minor preferments, he was arrested on a charge of high treason, and ordered to be conveyed to London for trial. On his journey, he was attacked with dysentery, and at the monastery of Leicester, in November 1530, he died.

The faults of W.'s character are obvious; but if his pride, am-

bition, and rapacity were inordinate, his luxury and ostentation somewhat unbeseeming a successor of the primitive apostles, he was not without redeeming qualities. Haughty and insolent to his enemies, and those whose claims ran counter to his own, to his dependents and inferiors he was generous, affable, and humane; and not a few of them showed their honorable sense of this by devotion to him in his misfortunes. Of learning, he was a most liberal and enlightened patron; and the endowment of Christ Church College, Oxford, survives as a monument to attest this. He was plainly a man of large and splendid capacity; and he seems, on the whole, to have been a diligent, faithful, conscientious, and salutary counselor and servant of the monarch who so long and entirely trusted to him. There are lives of Wolsey by Cavendish (1667). Fiddes (1724), Galt (1812), and Martin (1862).

WOLVERHA'MPTON, a municipal and parliamentary borough of Staffordshire, is the most populous town of its county, and a center of iron manufactures and tin-plate goods, 10 miles northwest of Birmingham. Of its numerous churches, that of St. Peter's, built in the 14th century, and recently restored, is a stately edifice, with a lofty embattled and pinnacled tower. At W. is published one daily newspaper and three weekly ones. The leading public schools are—a thriving grammar school, founded 1714; an Orphan Asylum, instituted 1850, for orphans from all parts of the kingdom, with 100 scholars, and room for 200; and a School of Practical Art, opened 1854. Among its philanthropic institutions, a General Hospital and Dispensary, opened 1849, having 100 beds, and, like the Orphan Asylum, supported by voluntary contributions, is the chief. W. sent members to parliament first in 1832, and became a municipal borough in 1847. It has Quarter Sessions of its own, a spacious cattle-market, and a market-hall. A commodious and handsome town-hall has been erected; there is a system of deep sewerage; and its abundant water supply is in the hands of the corporation. There is a handsome bronze equestrian statue of Prince Albert standing in Queen Square. The town possesses an Exchange, where iron-masters and merchants assemble; and an Agricultural Hall, for the use of farmers and corn-dealers.

W. stands upon the western edge of the extensive coal and ironmining district of South Staffordshire, and is the metropolis of that district. On the south and east, the vicinity is covered with coal-mines, ironstone pits, blast-furnaces, forges, rolling-mills, and foundries; but on the north and west it is rural and picturesque. Its chief manufactures are tin-plate and japanned goods (14 manufactories), enameled hollow wares, locks and keys, edge-tools, iron braziery and galvanized iron goods, gas and water tubes, cables and railway fastenings, iron-foundry goods, machinery, mills, cut nails, tips, cast hinges, electro-plate and papier-mâché goods, brass castings, and finished iron. Besides the establishments engaged in the hardware manufacture, there are several flour-mills and chemical and artificial manure works. The hardware goods manufactured at W. are remarkable for beauty of finish and genuineness of workmanship. The town enjoys unusual facilities for communication and transport. For a considerable time, it has commanded canal communication; and more recently it has become the focus of a number of converging lines of railway, by means of which it is placed in direct relations with the important quarters of the country. Its market-day is Wednesday, under a charter by Henry III. (1258). The borough returns two members to the House of Commons. Pop. (1861) of parliamentary borough, 147,670; (1871) 156,978; (1881) 164,303. Pop. (1861) of municipal borough, 60,860; (1871) 68,291; (1881) 75,738.—W., a town of considerable antiquity, was originally called Hampton, and afterwards Wulfrune's Hampton (of which its present name is a corruption), from the circumstance that Wulfrune, the sister of King Edgar, founded here (996) the church and college of which St. Peters is the modern representative.

WO'LVERINE. See GLUTTON.

WOMB, THE, professionally known as the *Uterus*, is a flattened, pear-shaped organ, whose position and various parts will be best understood by a reference to fig. 1. It consists of a body (1), a base or fundus (2), a neck or cervix (3), and a month or *os uteri* (4). It lies in the line of the axis of the outlet of the Pelvis (q. v.), with base directed upwards and forwards, and the neck directed slightly backwards. See fig. 2. In the unimpregnated condition, which we are now considering, it is about three inches in length, two in breadth, and one in thickness, and weighs about an ounce and a half. On laying it open, or exploring its interior by the introduction of an instrument through the *os uteri*, its cavity is found to be very narrow, and to contain a little mucus. Its walls are nearly half an inch thick, and are mainly composed of muscle-cells and fibres running irregularly in all directions except round the *os*, where they make a partial sphincter.

This muscular coat, which constitutes the bulk of the organ, is covered externally with a serous coat, derived from the peritoneum, and is lined internally by a mucous coat continuous with that of the canal called the *vagina*, by which the interior of the womb communicates with the outer surface of the body. This mucous coat abounds in small mucous follicles, and is provided with cili-

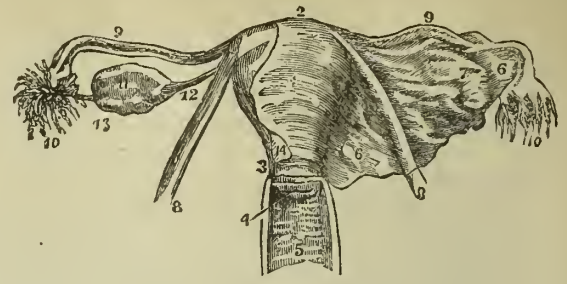


Fig. 1.—The Uterus and its appendages viewed on their anterior aspect: 1, the body of the uterus; 2, its fundus; 3, its cervix; 4, the os uteri; 5, the vagina laid open; 6, the broad ligaments of the uterus on left side; 7, a convexity of the broad ligament caused by the ovary; 8, 8, the round ligaments; 9, 9, the Fallopian tubes; 10, 10, their fimbriated extremities; 11, the right ovary; 12, the utero-ovarian ligament; 13, the Fallopio-ovarian ligament, on which some small fimbriæ are continued for a short distance; 14, peritoneum of anterior surface of uterus. The membrane is removed on the right side to show the parts embedded in its folds.—From Wilson's *Anatomist's Vade-Mecum*.

ated Epithelium (q. v.). The neck or *cervix* of the womb is distinguished from the body by a well-marked constriction. The mouth, or *os*, projects slightly into the vagina (which is shown as laid open anteriorly in the figure). This opening is nearly round in the virgin, and transverse after parturition. It is of consider-

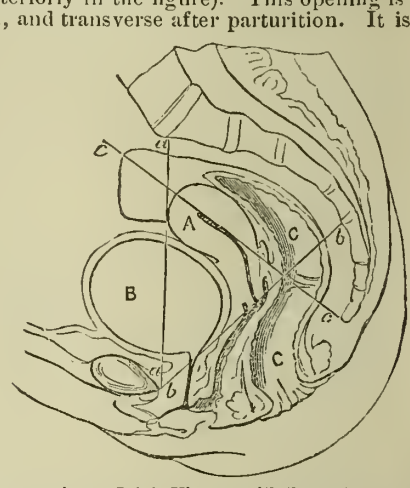


Fig. 2.—Section of Pelvic Viscera, with the parts in position: A, the uterus; B, the bladder; C, the rectum (the latter two being moderately distended;) *a a* is a line from the lower border of the symphysis pubis to the promontory of the sacrum; *b b*, from the same spot to the lower margin of the fourth sacral vertebræ; *c c*, the axis of the uterus. When prolonged, it runs three-quarters of an inch in front of promontory of sacrum, and hits the end of the coccyx.

able size, and is named the *orificium uteri externum;* it leads into a narrow canal which terminates at the upper end of the *cervix* in a smaller opening, the *orificium internum*, beyond which is the shallow triangular cavity of the womb, of which it forms the lower angle, while the two upper angles, which are funnel-shaped, constitute the beginning of the Fallopian Tubes (q. v.), whose apertures are so small as only to admit the passage of a fine bristle. The blood-vessels and nerves enlarge in a very remarkable way during pregnancy, so as to adapt themselves to the increased wants of the organ, which, at the ninth month of utero-gestation, weighs from two to four pounds.

The term *appendages to the uterus* is given to the Fallopian Tubes and Ovaries (q. v.), which are enclosed by the lateral folds of the peritoneum called the broad ligaments. The womb is suspended in the pelvic cavity in such a way as, by its mobility, to escape rude shocks from without or disturbance from the varying conditions of the surrounding viscera, while at the same time to allow of its vastly increasing in bulk with comparatively little discomfort when pregnancy occurs. This is effected by several duplicatures of peritoneum, containing variable quantities of fibrous and muscular tissue, and known from their form or connection as the *broad*, the *round*, the *utero-sacral*, and the *utero-vesical* ligaments.

The uterus is an organ peculiar to the Mammalia, and in comparatively few of them (excepting the Apes and Cheiroptera) is it of the simple oval or triangular form which we have described. It is *two-horned* in the Ruminantia, Pachydermata, Solipedia, and Cetacea; and it is said to be *divided* where it has only a very short body, as in most of the Carnivora and Edentata, and some Rodentia, which speedily divides both externally and internally, and is continuous with the oviducts or Fallopian tubes. The uterus is

actually *double* in some of the Edentata, and in most of the Rodentia, including the mouse and hare; in which each Fallopian tube passes into an intestiniform uterus, which has two completely distinct openings lying near to each other within the vagina. In the Marsupiata and Monotremata, the modifications of this organ are still more singular.

It is impossible to do more than name the chief offices or functions of the womb. They may be divided into those which relate to (1) Menstruation (q. v.), (2) Insemination, (3) Gestation, and (4) Parturition.—For a complete account of the anatomy, physiology, and pathology of the uterus and its appendages, we must refer to a masterly article by Dr. Arthur Farre on that subject in the last volume of the *Cyclopædia of Anatomy and Physiology*.

WOMB, Diseases and Derangement of the. In this article we shall not include the ailments of the pregnant or of the puerperal state, some of which, as *Phlegmasia Dolens* and *Puerperal Fever*, have been noticed in special articles. Many of the diseases, however, which we shall have occasion to notice, may be traced to pregnancy, miscarriage, or severe delivery, that had occurred months previously. A common result of inflammation that often succeeds miscarriage or a bad delivery is to check that process of involution by which the womb ought to be restored in a few weeks to the size and condition in which it existed previous to the occurrence of pregnancy. For a lucid description of the processes which act on the enlarged womb to restore it to its original state, we must refer to Dr. West *On Diseases of Women*, 2d ed. p. 90. How inflammation acts in interrupting these processes, is not easily explained; but after it has passed away, its effects may remain in the enlarged size and altered structure of the womb, changes which render it likely to suffer from the alternation of activity and repose to which the female generative system is liable. In this condition, the enlarged and heavy uterus is very likely to become prolapsed, or to become a seat of permanent congestion or chronic inflammation; and excessive menstruation and a feeling of weight in the pelvis are almost always present.

Besides this form of enlargement, there is a far less common form in which the enlargement of the womb takes place independently of previous pregnancy, and is the result of true hypertrophy. The symptoms are, according to West, 'a sense of weight in the pelvis, pain usually of a burning character, hæmorrhages having gradually come on, and forced themselves by their slowly increasing severity on the patient's notice.' The treatment is much the same in both these forms of enlargement—viz., the recumbent position on a hair or spring mattress, attention to the bowels, and local leeching every fortnight, to be continued for several months, together with the careful use of iron associated with small doses of iodide of potassium. Temporary separation from the husband's bed should also be insisted on. There is also a form of hypertrophy which is confined to the neck of the womb, which occasions great discomfort to the patient, and acts as a mechanical impediment to sexual union. In these cases, no relief can be afforded except by a surgical operation, which is described in West, *op. cit.*, p. 77.

From these results of 'simple errors of nutrition,' leading to increased growth of the organ, we pass on to the debatable and much-trodden ground of *inflammation of the womb*. *Acute inflammation* of the unimpregnated womb may arise from unaccustomed and excessive sexual intercourse, sudden suppression of the menstrual discharge, the extension of gonorrhœal inflammation, &c.; but, as it is comparatively rare, and seldom dangerous to life, we shall at once pass on to an affection which by most practitioners is regarded as one of the commonest to which woman is liable—viz., *chronic inflammation and ulceration* of the neck of the womb.

It is not forty years ago since a French physician, M. Recamier, invented an instrument—the speculum—for the application of local remedies to the neck of the womb in cancer; but the light which this instrument threw upon uterine conditions generally, led, amongst other results, to the conclusion, that leucorrhœal discharges (popularly known as *the whites*) were often derived from, and associated with, various morbid appearances of the mouth of the womb, and could often be removed by remedies directed to that part. Almost ever since the speculum began to get into general use, a large number of old-fashioned practitioners raised up a cry against its employment, on the grounds of its indelicacy, its inutility, &c., and denied the very existence of various morbid conditions, which the employers of the instrument declared they saw with its use. Hence two parties have arisen—one who believe in the speculum and its revelations; and another who reject the recent modes of investigating uterine diseases, who take small account of the new facts regarding *local* disease which have been revealed, and who regard uterine ailments as resulting from constitutional derangements, and who therefore trust mainly to general treatment. Now, although the view that the local disease is everything, may not be universally true, the opposite view is certainly untenable; and Dr. West and other writers on this subject have pointed out that there are reasons why the womb should more frequently than perhaps any other organ be the seat of certain forms of local ailment, and should consequently require the frequent employment of local treatment.

It would be out of place in these pages to describe the characters of the ulcerations or abrasions of the mouth of the womb, which are so frequently revealed by the speculum, or to enter into any detail regarding the high pathological importance attached by some writers to them. The conclusion which Dr. West draws from a prolonged investigation of this subject is, that 'the condition of so-called ulceration or abrasion of the os uteri is far from infrequent, even in cases where no uterine symptoms were complained of during life; but that it is usually unassociated with other important affections of the uterus, such as may be supposed to be the effects of inflammatory action; and, further, that such affections do not seem to be readily excited by causes acting on the neck of the womb, either when displaced, or when the organ is in its natural position.'—*Op. cit.* p. 120. Since uterine pain, disordered menstruation, and leucorrhœal discharges—the symptoms usually associated with ulceration of the mouth of the womb—are met with by impartial observers almost as frequently *without* as *with* ulceration, it may be fairly inferred that this ulceration is neither a general cause of uterine disease, nor a safe index of its progress; and although the local application of caustic to the os uteri is doubtless often successful in restoring the patient to health, it must not be considered as a general rule that the attempt, by local remedies, to remove this condition is the one and all-important point in the treatment of uterine disease. There is no doubt that, in the great majority of these cases (excepting a few of the more severe ones), temporary separation from the husband's bed, the recumbent position (which facilitates the return of blood from the womb and adjacent parts), due attention to the diet and state of the digestive organs, and the use of injections of nitrate of silver, which may be applied by the patient, are sufficient in a few weeks to effect a cure.

Chronic uterine inflammation of a more general nature (as of the interior, or body of the womb), with very similar symptoms, is by no means rare. If the disease is met with in the acute form, leeches should be applied to the womb itself; in the chronic form, which is generally observed, the pain in the back is best relieved by a croton-oil liniment, composed, according to Dr. West's directions, of one part of croton oil to ten of the camphor liniment (of the London Pharmacopœia), which should be applied (without rubbing it in) with a sponge twice a day on the back, at the seat of pain. Belladonna plaster or liniment also gives temporary relief. The irritability of the bladder, which is a common symptom, is usually associated with abundant phosphatic deposits in the urine, and is best relieved by a combination of ten or fifteen minims of dilute hydrochloric acid, half a drachm of tincture of henbane, and two ounces or more of decoction of Pareira-Brava (see Cissampelos), three times a day; and the tepid hip-bath may be used with benefit. The same general rules as to rest, diet, &c. which have been already given, must be attended to. Under the best management, a tendency to relapse is liable to occur at each monthly period, and after several such relapses, the womb is found (on surgical examination) to be enlarged and hardened, and less movable than natural. This condition is best removed by the careful and prolonged use of bichloride of mercury in small doses, which, as it is a deadly poison, must only be taken by professional advice; but the pain in the groin which usually accompanies this change, may be relieved or removed by the application of a small blister.

The profuse discharge—both menstrual and leucorrhœal—is best relieved by chalybeate preparations, of which the following is a useful and favorite compound: Take of sulphate of iron, 6 grains; sulphate of magnesia (Epsom salts), 3 drachms; dilute sulphuric acid, half a drachm; syrup of orange peel, half an ounce; caraway water, sufficient to make a mixture of 6 ounces, of which 1 ounce may be taken thrice daily, after meals; or if there be much hæmorrhage, a mixture of alum and sulphate of iron (4 grains of the former to 1 of the latter, dissolved in a small tumbler of water) may be taken three times a day. A hip-bath, containing half a pound of alum to every gallon of water, is often very useful as an astringent. It should be taken in the morning before dressing, and the patient should remain in it at least a quarter of an hour. For the first time or two, the water may have the chill just taken off. The same importance is not at present attached to vaginal injections as when it was believed that the vagina (and not the womb) was the main source of leucorrhœal discharge. In a case of leucorrhœal discharge of long standing, an excellent astringent injection may be formed by dissolving two drachms of tannin and half an ounce of alum in a quart of water. Special forms of female or vaginal syringes are sold for this purpose. Of the application of caustics to the mouth of the womb, we say nothing, as that is a matter which must be left solely to the medical attendant.

From these remarks on the diseases of this important organ, we pass on to a very brief notice of its occasional *misplacements*. The

singular mobility of the womb (without which pregnancy would be almost an impossibility) exposes it to the risk of displacement to such a degree as often to give rise to great personal discomfort. As all the causes which tend to produce displacement (such as increased weight of the organ during pregnancy, pressure of the superincumbent viscera, &c.) act in a downward direction, the obvious tendency of the womb is to be thrown downwards, or to suffer *Prolapsus* (q. v.), an affection which, in its extreme degree, when the organ is more or less protruded externally, is termed *Procidentia*. Causes sometimes come into play which incline the upper part of the uterus either backward or forward, giving rise to *retroversion* and *anteversion*, instead of mere prolapse. Prolapsus is sufficiently considered in the article bearing that title; and for a description of the symptoms and treatment of the two last-named misplacements, we must refer our readers to the standard works on the Diseases of Women.

The tendency of the womb to hypertrophy has been noticed at the beginning of this article; its individual tissues have a similar tendency to overgrowth, showing itself at particular parts, and thus giving rise to tumors or outgrowths, which are more common in this than in any other organ. Under this head may be mentioned several varieties of *Polypus*, which differ essentially in structure, but all of which are invested by the mucous membrane which lines the uterus, and are liable to be the source of hæmorrhage. Their removal by surgical means is generally a matter of no difficulty.

Much more important than these is the *Fibrous Tumor*, which is frequent in its occurrence, serious in its effects, and very slightly amenable to treatment. These tumors are of a spherical form and firm texture, resembling that of the womb itself, and usually occur in groups; several being frequently present, while one or two are considerably larger than the others. The symptoms to which they give rise vary extremely according as the chief tumor lies on the outer part of the womb, and grows into the abdominal cavity, or is developed within the walls of the womb, or projects into the interior. They may be of almost any size, cases being on record in which they weighed from 70 to 80 lbs. In regard to the symptoms of this affection, it must be premised that sometimes these tumors exist without exciting any disturbance, and that growths on the outer surface give rise to comparatively unimportant derangements, compared with those which are imbedded in the walls, or occupy the cavity of the womb. It will be readily understood that women who have passed the change of life (as it is popularly called) suffer less from these tumors than younger women. The diagnosis of fibrous tumor is effected partly by manual and instrumental examination (into which we shall not enter), and partly by the symptoms—such as (1) hæmorrhage occurring in about 50 per cent. of cases independently of their nature; (2) disturbance of the menstrual discharge in 62 per cent. of cases, it most commonly being excessive, and often painful; (3) pain, usually constant, and occasionally only at the menstrual period, described by some patients as a burning sensation, by others as a sense of bearing down, and by a few as occurring in paroxysms of intense agony; (4) dysuria—pain in voiding urine, or difficulty in discharging it, or frequent desire to pass it.

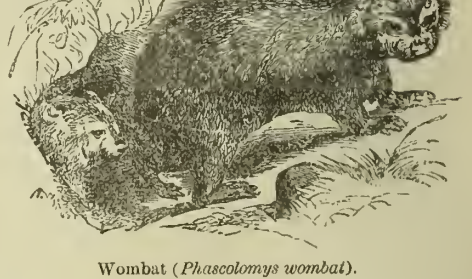
It is usually hæmorrhage, or inability to void the urine, that first directs the attention of the patient to her malady. Its tendency to excite abortion often leads the physician to suspect its presence. Although, as we previously mentioned, this is an affection little amenable to treatment, a woman with these symptoms should at once consult a physician (if possible, the physician-accoucheur to a large hospital), who, by his advice as to the general management of the case, especially during the menstrual period, may do much to palliate her sufferings. Iodine, bromine (and certain mineral waters containing these elements), and mercury have been vaunted as specifics, but nothing positive can be said regarding their successful action; and certain surgical operations have been recommended, which are accompanied with so much danger to the patient that it is needless to refer to them. But although the action of medicines on these growths is avowedly uncertain, nature in this as in many other cases not unfrequently strives towards a more or less complete cure. For example, if the tumor is pedienlated, and lies in the uterine cavity, the pedicle may finally give way, and the tumor may be expelled; or certain changes may take place in the interior of a tumor, leading either to its disintegration and elimination, or to its conversion into a chalky mass, which, though not eliminated, induces no local disturbances. These spontaneous cures are by no means rare, although we can hardly lead the patient to expect them in any special case.

We shall conclude with a few words on a disease which is the most painful and hopeless of all the disorders to which humanity is liable—*cancer of the womb*. It is a disease whose leading features are thus graphically—we may almost say, painfully—described by Dr. West: 'Pain, often exceeding in intensity all that can be imagined as most intolerable, attended by accidents which render the sufferer most loathsome to herself and to those whom strong affection still gathers round her bed; the general health broken down by the action of the same poison as produces the local suffering, and all tending surely, swiftly, to a fatal issue, which skill cannot avert, from which it can scarcely take away its bitterest anguish.' The three most constant symptoms are pain, and hæmorrhage, and discharge. From an examination of 132 cases by the above-named physician, the first symptom was found to have been,

In 58 instances, or	43·9	per cent.,	hæmorrhage without pain.
,, 26 ,,	19·6	,,	pain of various kinds.
,, 18 ,,	13·6	,,	hæmorrhage with pain.
,, 18 ,,	13·6	,,	leucorrhœa or other discharge without pain.
,, 12 ,,	10·3	,,	pain and discharge sometimes offensive.

It is unnecessary to enter into further details regarding the symptoms of this disease, as cases of this nature must always be under medical superintendence, and for the same reason we need only say regarding the treatment, that it is divisible into the *palliative* and the *curative*, the former being directed towards the three great symptoms, and the general symptoms of the cancerous cachexia (or constitution), while in the latter are included the operation of extirpating the whole womb, or removing the neck of the womb by ligature or excision. It is difficult to speak with accuracy regarding the frequency of this disease. An approximate estimate may be formed from the fact that, in 1877, the mortality from cancer in England amounted to 3923 males and 8038 females; the excess in the latter case, amounting to 4115, must be due to cancer of the breast or womb; and according to Tanchon, a French pathologist, cancer of the womb is more frequent than that of the female breast in the rate of 26 to 10. Hence the yearly deaths from uterine cancer in England amount to about 2972. The last-named writer calculated, from ten years' observation of the French records of mortality, that this disease causes 16 per 1000 of all female deaths. The disease is very rare before the 25th year, and by far the most common period of its appearance is between the ages of 40 and 50 years. Its average duration is 16 or 17 months, but it may prove fatal in 3 or 4 months. On the subject of cancer of the womb, Walsh *On Cancer* may be consulted; and for further information on the subject of this article generally, the reader is referred to the standard works of Churchill, Lever, Simpson, West, &c.

WO'MBAT (*Phascolomys*), a genus of marsupial quadrupeds, constituting a distinct family, *Phascolomydæ*, and of which only one species is known, *Phascolomys Wombat*, a native of Australia, abounding chiefly in mountainous districts of New South Wales, Victoria, South Australia, and Van Diemen's Land, and in the islands of Bass's Strait. In many of its characters, it resembles the *Rodentia*. The incisors are two in each jaw, long, and chisel-like; they are hollow at the base, and continue to grow as they are worn away; there are no canine teeth; and the molars are five on each side in both jaws. There is a wide gap between the incisors and the molars. The W. is an animal of clumsy form, having stout limbs and a blunt muzzle. It is 2 or 3 feet long, plump, with a thick coat of long, grayish brown, coarse, woolly hair; the head large, flat, broad, with small eyes and ears, the upper lip cleft; the feet five-toed, the claws long, except those of the inner toes of the hind feet; the tail very short. It is plantigrade, and the soles of the feet are broad and naked. It is nocturnal in its habits, slow in its motions; feeds on vegetable substances, and digs up roots with its claws; it makes its abode in holes among rocks, or in burrows



Wombat (*Phascolomys wombat*).

dug by itself. It produces three or four young at a birth. It is a creature of little intelligence, but gentle, and easily domesticated to a certain extent, not seeming to care much for any change of circumstances, so long as its wants are supplied. It shows considerable snappishness, however, if provoked. Its flesh is preferred to that of any other quadruped of Australia. It is generally

fat, and in flavor resembles pork. Wombats have frequently been brought alive to Britain.—The remains of a fossil species have been found in the caves at Wellington Valley, Australia.

WOMEN'S RIGHTS. In 1851, an article in *The Westminster Review* attracted attention to the novel subject of the enfranchisement of women. Since that time, the agitation for women's rights has in this country, and to a still greater extent in America, attained the dimensions of a political movement. The subject has therefore become one of general interest. The following is an account of the claims included in women's rights, and a brief statement of the chief arguments by which those claims are supported.

1. *The Political Rights of Women.*—The discussion has hitherto turned upon the right to the suffrage. The right to vote is claimed in accordance with the principles of political reasoning that are held conclusive in the case of men. The argument applies with peculiar force to a democratic constitution. Democracy involves two ideas. It is a protest against privilege and against despotism; it maintains that every individual is born with an equal right to the protection and consideration of the law; and it affirms that every one must have a vote in order to secure this fundamental right. The practice of the United States shows a gradual approach to those principles. Till lately, the negroes were refused the benefit of them; but the privilege founded on color has perished; and there remains now only the privilege founded on sex.

In England, the right to vote has been made to rest on the principles of English law. A petition of women to the House of Commons, presented on 7th June 1866, set forth, that the possession of property in this country carries with it the right to vote in the election of representatives in parliament. From the earliest times, the principle of the English constitution, and the spirit of the English people, have required that no man's property should be taken for the purposes of government without his consent. Since, therefore, the English law permits women to hold and manage property, it seems anomalous and inconsistent that it should refuse them a vote to protect their property from inordinate taxation. Other persons allowed by the law to hold property, but excluded from the suffrage, are minors, idiots, lunatics, and criminals. But the principle of disqualification in those cases does not apply to women. Moreover, there is alleged to be historical evidence that women have voted both in counties and boroughs. The disuse of the privilege is traced to historical causes. Such was the violence of the time, that women were often unable to administer their property, and it was therefore natural that they should take little part in elections. Besides, the right to vote was at first regarded, not as a privilege, but as a burden; for the power of the Commons was low, and the expense of paying members of parliament was considerable. The disfranchisement of women is therefore held to be an anomaly in the constitution, as it was an accident in history.

The objections to female suffrage are various. In an argument in the *Times*, it is said: 'There exists, as it were, a tacit concordat guaranteeing to the weaker sex the protection and deference of the stronger, upon one condition only: that condition is the political dependence of women.' This asserts a claim on the part of men to make laws for women, in return for protection and deference. Now, protection to person and property every one has a right to who obeys the laws and contributes to the support of the government. The reason for refusing votes to women must lie deeper. It may be said that, inasmuch as women are weak and at the mercy of men, men abstain from abusing their superiority only on one condition; that condition is, that women shall have no legal rights except those that men are pleased to give them. In the last resort, the rights and privileges of any class of men depend on their might. The nobility established their privileges when they had power. The working-class has been admitted to the franchise because its power has increased. But women have no physical power to enforce their rights. If rights are to be measured by might, women will occupy the bottom of the scale. This is their position among savages. But, as civilization has advanced, men have learned to renounce the advantage of their physical superiority, and freely to give women privileges that could not have been extorted. It would therefore seem that the rights women actually enjoy do not depend upon, and are not to be measured by, their physical strength. The rights of women flow from the prevailing sense of justice, and justice now means that the interests of women be consulted with as much impartiality as the interests of men. An unjust preference of either would be mischievous to both. Since, then, the interests of women should be fairly considered, what reason can there be to prevent them voting, and thereby intimating what views they take of their own interests?

Another objection to the enfranchisement of women is, that women have no business with politics, and that politics would withdraw them from their proper duties. Is this apprehension well founded? Granting that domestic life is the proper sphere of women, is it really impossible to unite an interest in politics with attention to a family? Upon this subject, we are not altogether without experience. In the great dissenting churches in Scotland, women, though excluded from office, vote equally with men in the appointment of ruling-elders, ministers, and in everything that is decided by a popular vote. But this privilege has not 'hardened' them, or made them 'unfeminine,' or interfered with their household work. On the other hand, it has largely contributed to the success of the voluntary system, and to the strength of the church. The chimerical nature of the alarm felt on this subject has been illustrated by the objections that might be made against allowing clergymen to vote. 'We should be told that clergymen have no business with politics; that it was their province to attend to spiritual matters, and that they ought to confine themselves to their proper sphere; that if they were permitted to participate in political affairs, it would deteriorate from the sanctity of their character; that the passions roused by political contests were inconsistent with that spirit of meekness and holiness which we look for in preachers of the gospel.' Women are not wholly excluded from politics. In some countries, a woman may be sovereign; and history affords many examples of women that have had the highest capacity for government. Women in this country, if they have the same qualification as men, have parochial votes. And few would go so far as to propose that women should not only be shut out from public affairs, but also be kept ignorant of politics. Even if family-life be made their sole occupation, it surely is not to bound the horizon of their knowledge and sympathies.

The remaining objections may be taken together. They are of the same kind as those recently employed against the enfranchisement of the working-class. They are briefly: That the interests of women are not neglected, for they are represented by their male connections; that women are ignorant of politics; that they would be exposed to intimidation at home, and to violence at the polling-booths; and lastly, that women do not want votes. It is not allowed that women are sufficiently represented by their male connections. Such indirect influence is not considered, in other cases, to be a reason for withholding the suffrage. Rich men have a great indirect influence, but they have also votes. It is an old argument, that operatives were represented by their employers; but that argument never convinced the operatives, and it has now ceased to affect the legislature. Why, then, should a *vicarious* representation, which is repudiated by every class of men, be considered sufficient for women? On the contrary, if women had votes, their interests would be better attended to, because no member can disregard with impunity any important section of his constituents. It would be the policy of statesmen to devise and carry out measures for their benefit.

But, it is said, women are ignorant of politics. This objection has lost much of its weight, now that household suffrage has been established. Educated women are surely not behind many of the new voters in political knowledge. Still, women, in general, know less of politics than men. They are constantly told that politics form no part of their business, and their opinions, like those of non-electors, have little direct and palpable influence on affairs. Political knowledge generally follows political power. Women have not the stimulus that acts on men; they have not the knowledge that their opinions form part of the legislative power.

There is little reason to fear that the possession of a vote would expose women to coercion and improper influence. The law has already defied a more serious danger. It permits women, and by special arrangement, even married women, to hold property, and it trusts its ability to protect them from the importunities of relations. If women can defend their property from greedy relatives, they will be no less able to give independent votes. The objection that women would be exposed to violence at the polling-booths, is not formidable. If such were the fact, it would be no argument against female-suffrage; it would be an argument against polling-booths. Should the police, however, be unable to protect female voters, there is the easy resource of voting-papers, already in use in the elections in the English universities.

The last objection is, that women do not want votes. A large number petitioned the Commons in favor of extending the franchise to women that possessed a household qualification; those petitioners represent a very much larger number, who are kept back by the various social checks that prevent women taking part in political agitation. Nor can there be any doubt that a proposal that makes way with men simply on the ground of justice, will find still more favor with women, since their interest is ranged on the same side.

The claim of women to the suffrage is not without support from practical considerations. History teaches that women must have votes in order to protect their interests; men, through all the vicissitudes of history, have shown a constant preference of their own interests.

In the matter of education, women suffer serious disadvantages. Till very lately there was no provision made for giving them the high education men value, and accordingly men have still almost

a monopoly of educated labor. Many of the charitable endowments for education were destined by the founders for girls as well as boys, but have generally been appropriated to boys. Christchurch Hospital in London, for example, educated lately 1100 boys and 26 girls. But of late much has been done for women's higher education. Girton College, transferred from Hitchin, was established at Cambridge in 1873, and Newnham College in 1875. The University agreed to try the girl undergraduates from these colleges by the same examinations as the men students; and in 1881 it was agreed that, admitted under certain conditions to the University examinations, they should receive certificates showing the position they would have obtained in the general University lists. Oxford has Clare Hall and Lady Mary's Hall for female students. London University made three ladies B.A.'s in 1881; and a fair proportion of the students of Bristol College are women. The Scottish Associations for University Education of Women have obtained lectures for women by university professorial teachers.

The law is unfair to women, especially the law of marriage. Marriage is constituted by free consent, and is supposed to imply the approval of both parties. Now, it would be a hard bargain, where one of the parties was offered all the terms of it in the lump, and was therefore obliged to take everything or reject the whole; yet all the incidents of marriage, all the terms of the contract, are fixed by the law, and the law is made by men. In constituting the relation of marriage—a relation of even greater importance to women than to men—women have no voice, they have only a barren and impracticable veto. The result is familiar to every lawyer.

By the law of England, the custody of a woman's children, after seven years of age, belongs exclusively to her husband; after they reach that age, she has no right even to see them. The common law strips a woman of her property, and leaves her fortune at the mercy of her husband; the husband also can seize his wife's earnings, unless she is protected by a judicial separation, or by an order from a magistrate. A married woman cannot enter into contracts. In practice, this bad law is avoided by settlements made before marriage; but this protection involves expense, and is in a great measure confined to the rich. More recent legislation is as unfair as the older law. In 1857, the Divorce Court was established, and it was enacted that, for adultery on the part of a wife, the husband could obtain a divorce; but for the adultery of a husband, a wife was not allowed a divorce. In addition to adultery, the husband must be guilty of cruelty or desertion. (The Married Women's Property Acts of 1881 and 1882 give a woman powers over her movable and personal estate, whether acquired before or after marriage; which, secured on herself, will not be liable to arrestment for the husband's debts. This does not affect ante-nuptial contracts.) The law is severe on offences against property; it is comparatively lenient in punishing brutal assaults by husbands on wives; garroters are flogged, but not wife-beaters. To quote Lord Brougham: 'There must be a total reconstruction of the law, before women can have justice.'

2. *The Industrial Rights of Women.*—These embrace admissibility to all offices, occupations, and professions; also admission to the universities, or some adequate provision for the education of women so as to fit them for high posts. This raises the question of the proper sphere of women. The prevailing ideas point to marriage as the true, if not the sole end of a woman's existence; but this theory is inadequate to meet our social difficulties. Many women are unmarried. What is to be done with them? To hinder them from doing the best they can for themselves, would be a manifest injustice; therefore, in the interests of single women, all occupations should be open. But the claims on behalf of women do not stop there. It is denied that men have any right to exclude women from active life, and so drive them into marriage as their only livelihood. On grounds of justice, the right of women to enter into industry is conceived as almost too clear for argument.

The objections to the Industrial Rights of Women must be noticed briefly. It is said that the proper sphere of woman is domestic life, and that she is by nature unfit for the struggles of industry. It appears from the census that just one half of women above twenty years of age are confined to domestic life. About a third of the adult female population are either of independent means, or support themselves by non-domestic industry; the rest occupy a secondary position in the industrial world, by assisting their husbands in business. But though the number of women engaged in industry is great, they are confined to poorly paid occupations, and their labor is for the most part unskilled.

Generally speaking, the women of the middle class take no part in industry. The real issue is therefore narrow. It is not, shall women be admitted to industry? for that is settled; but, shall skilled and educated female labor be allowed? There is no evidence that women have no capacity but for the meanest employments. What they are fit for, can be finally determined only by actual trial. All that the advocates of women's rights ask is, do not anticipate the result, or foreclose the experiment. Some think that while it is desirable women should not be left unoccupied, they should not be admitted to industrial occupations, but society should seek a field for unmarried women in some works of charity or religion, or in some semi-domestic pursuit. This proposal is an attempt to establish, in this country, that provision for unmarried women that is supplied by the monastic system in Roman Catholic countries. The objection to it is clear. If this semi-domestic pursuit is the most agreeable and lucrative to women, they will, of course, hail the discovery of it with gladness; but if it is not, they may decidedly object to make martyrs of themselves.

A common objection is, that to take women from domestic work would harden them, and destroy the peculiar traits of their character. Now, a great part of what used to be the work of the household has passed to another province; spinning, weaving, brewing, and baking were at one time domestic work. If women are to do their ancient customary work, they must follow it abroad. Those who believe that the peculiar attributes of women are an artificial product of civilization, may fell alarmed at any disturbance of the present condition. But the genuine distinctions between the sexes flow from organization, and will not be obliterated by similarity of education and employment; on the contrary, no feminine charm would be lost, but women would be more spirited, more intelligent, and fitter companions for men.

It is an argument sometimes relied upon, that an admission of women to industry would be prejudicial to men, because it would increase the supply of labor, and thereby lower the rate of wages. This objection is founded on the principle, that, when the wage fund is constant, the rate of wages falls as the laborers are more numerous, and rises as they become less numerous. But the competition of women is, to some extent, an exception, for if they do not work for themselves, they must be supported out of the wages of men. If, however, wages were to fall below the ordinary standard of comfort, the tendency would be, by fewer births or emigration, to reduce the excess of laborers, till the supply of labor should be adjusted to the required standard of wages; and experience shows that wages are not permanently lowered by the admission of women to industry. In the working-class, wages adjust themselves to a scale enabling a working man to maintain a wife and family.

In the last place, it is said that active life is inconsistent with the cares of maternity. This, of course, has no application to the large class of childless women; and there can be no necessity for prohibiting women from entering into industrial life, if their situation renders it impracticable. The incompatibility between active life and maternity may safely be left to look after itself. From the returns in the census, it appears that one out of eight married women are employed in non-domestic labor; but, since many of their occupations are not incompatible with household duties, and since many have no children to attend to, it seems probable that only among a small number of the working-class the duties of maternity are sacrificed to out-door employment. It is, however, a moot-point how far maternity interposes a barrier to the industrial education and employment of women. In the working-class, the mother usually nurses her children, for she could seldom make a profit by engaging in another employment and hiring a servant; but if women were employed in skilled and well-paid occupations, they would probably leave nursing, which at present is unskilled labor, to servants. The solution of this problem, must, however, be left to trial and experience. On principle, at any rate, is clear; except in so far as women are occupied as mothers, they should be employed in the most remunerative work. That would be beneficial to men, for it would relieve them of a pecuniary burden; it would be beneficial to women, for it would make them independent.

The women of the middle class, led astray by a mistaken aspiration to aristocratic leisure, have held aloof from the struggles and rewards of industry. This operates injuriously in various ways. It creates an unnatural competition with working-women as in needle-work. Middle-class women often discharge duties that might well be left to upper servants. If they entered into commerce and trade, they would fit themselves for, and require, a higher kind of occupation than those thankfully accepted by poor and untaught women. At present, the higher walks of business and even subordinate offices of trust and skill, are monopolized by men; hence women engaged in the lower employments derive little pecuniary benefit from trustworthiness, experience, or judgment, and have no hope of rising. If they should attempt to better their condition, they are left without encouragement or support. The exclusion of women of the middle class from industry is hurtful to themselves. It often leads to poverty of the bitterest kind—the poverty of gentle-women. It leaves them without occupation, a prey to *ennui* and bad health. It also forbids perfect companionship and sympathy between the sexes. The whole scope of a man's education is towards industry. In it he lives

and moves, and has his being. But of this world, women have no direct knowledge. Hence a want of intellectual sympathy between men and women, and an absence of any common standard of reasoning and evidence. Nor is this all. The virtues upon which industrial and public life repose, do not derive due support from women. They are ignorant of the difficulties that beset moral problems under circumstances of which they have no experience, and their moral wisdom can hardly go beyond traditionary saws. Indeed, their influence is sometimes on the wrong side. A man will be reluctant to injure his family in their pecuniary interests, for some point of conscience that his wife does not sympathize with, or for objects that she does not understand.

No account of women's rights would be complete without some notice of the claim to equality in marriage. This is the goal to which history points. 'Among tribes which are still in a primitive condition, women were and are the slaves of men for purposes of toil. All the hard bodily labor devolves on them. In a state somewhat more advanced, as in Asia, woman were and are the slaves of men for purposes of sensuality. In Europe, there early succeeded a third and milder dominion, secured, not by blows, nor by locks and bars, but by sedulous inculcation on the mind; feelings also of kindness, and ideas of duty, such as a superior owes to inferiors under his protection, became more and more involved in the relation. But it did not for many ages become a relation of companionship, even between unequals.' That stage has now been attained, and, 'for the first time in the world, men and women are really companions.' Women cannot be good companions for men unless they are equals. If they are kept inferior in education and knowledge, their influence will tend to drag men down to their own level. The intercourse, moreover, that is of value is not intercourse between an active and a passive mind, but between two active minds. The theory of the subordination of women involves several bad consequences; for women being unable to attain their ends directly, have recourse to management and artifice.

The general movement of society is from subordination to equality. Under the feudal system, society was constituted on the principle of subordination. The land was tilled by serfs, and there were few but said that serfdom was the natural position of a creature so low as an agricultural laborer. But serfdom did not endure, and we have learned that it is happier for all parties that the land should be tilled by freemen. And now, too, negro slavery, the most plausible form of slavery, has been abolished. The tendency of social changes is towards equality, as the most satisfactory relation between man and man; it also seems to point to equality as the highest relation between man and woman.

In the year 1869, an important step was taken towards the recognition of the claim for the concession of political franchises to women. In a bill passed in parliament respecting municipal elections, a clause was inserted extending the right of voting at such elections to women. Similarly, by the English and Scotch Education Acts of 1870 and 1872, women are permitted to vote at the elections of school boards.—The subject of women's rights is discussed in the following: *Dissertations and Discussions* by J. S. Mill, vol. ii., 'Enfranchisement of Women;' *The Political and Social Dependence of Women*, 1867; *The Industrial and Social Position of Women*, 1857; Speech by J. S. Mill in House of Commons, May 21, 1867; *The Westminster Review*, 1867, 1875, 1889; Professor Cairnes in *Macmillan's Magazine*, 1874; *Harper's Monthly*, 1880.

WOOD, ANTHONY, an antiquary, was born at Oxford, 17th Dec. 1632. In 1647 he was entered at Merton College as a gentleman commoner. In 1652, he took his degree as Bachelor, and in 1655, became Master of Arts. Deriving from his father an independence, he seems at first to have aimed at being a sort of Jack-of-all trades, as not bound in penalties of hunger to follow out any particular one. He practised the fiddle assiduously, and early devoted himself to heraldry and other antiquarian pursuits. Lighting on Dugdale's *Antiquities of Warwickshire*, he now worked more assiduously. As the fruit of his learned labors, he gave to the world, in 1669, his *History and Antiquities of Oxford*. A Latin translation appeared in 1674. Subsequently, in 1691, as result of his further investigations, W. published his *Athenæ Oxonienses*, containing a full and particular account of all the authors, bishops, &c., who had adorned that seat of learning from 1500 to 1690. In this work he attacked the character of the great Lord Clarendon, for which he was prosecuted at the court of the university, and expelled. He died 29th November 1695. His books and some MSS. he left to the University. See the *Life* in Bliss's edition of W.'s *Athenæ*.

WOOD AND WOODY FIBRE. Flowering plants agree with the higher cryptogams (ferns, club-mosses, horsetails) in the possession of 'fibro-vascular bundles' (see VASCULAR TISSUE)—longitudinal strands of tougher consistence than the Cellular Tissue (q. v.) by which they are surrounded. These bundles are always readily distinguished into two main constituents, *wood* and *bast;* which may be arranged either in a *collateral* or in a *concentric* manner; in the former case the wood and bast are placed side by side in the bundle, and in the latter the bast surrounds the wood. In flowering plants the former arrangement prevails; in vascular cryptogams, the latter. In cryptogams and monocotyledons, the bundle is incapable of growth after its first formation, all the embryonic tissue being used up at once; but in dicotyledonous plants (see EXOGENS), the bundles exhibit continuous increase in thickness throughout the life of the plant, by virtue of the persistence in active growth of a layer of embryonic tissue, the so-called Cambium (q. v.) which remains in the middle of the fibro-vascular bundle, interposed between wood and bast, both of which thus increase in thickness. Since the bundle lies in the cellular matrix with its woody portion directed towards the center, and its bast towards the circumference, the interposed cambium deposits each new layer of wood *outside*, and each new layer of bast *inside* the former ones; and the term *exogenous*, commonly applied to the growth of dicotyledonous stems, is thus seen to be applicable as regards the woody portion of their fibro-vascular bundles only.

The fibro-vascular bundles of monocotyledons lie scattered separately through a cellular matrix, the *ground substance* of the stem, which thus rarely possesses any great consistence, and has no separable bark. In dicotyledonous stems, on the other hand, the bundles anastomose at frequent intervals in their course along the stem, and this characteristic distinction can be readily seen by examining the stems of any two types of these groups, say of a lily or of a geranium, or more simply by inspection of their leaves, in which a similar arrangement of bundles prevails—that of the former exhibiting parallel, that of the latter reticulated venation. The cambium too tears readily; thus dicotyledons have a separable bark.

In the dicotyledonous stem, that portion of the cellular ground-substance which remains at the center within the bundles is termed *Pith* (q. v.); that which lies wholly exterior to them under the epidermis is the cellular envelope; while the narrow plates of cells lying between and separating the anastomosing bundles, and thus connecting the central pith with the circumferential cellular envelope, are known as the medullary rays, or 'silver grain.'

In both wood and bast, three main constituents are typically present—first, cells little modified from the ordinary shape, and termed *parenchyma;* secondly, cells greatly elongated and having their walls considerably thickened, these being termed *fibres* or *prosenchyma;* thirdly, vessels or cell-fusions, formed by the union of longitudinal rows of cells. Wood vessels are known as dotted, spiral, annular, &c., according to the mode in which their thickening is deposited. The whole constituents of stems are thus modifications of three main systems of tissue.

I. Epidermis.
II. Ground Substance (pith, medullary rays, cellular envelope).
III. Fibro-vascular bundles—

Wood—	(Cambium, when present.)	Bast—
1. Parenchyma.		1. Parenchyma.
2. Prosenchyma.		2. Prosenchyma.
3. Vessels, dotted, spiral, annular, &c.		3. Vessels (sieve-tubes).

Numerous anomalies occur in the structure of stems, perhaps the most remarkable being exhibited by the wood of conifers, which consists entirely of prosenchyma, the fibres bearing characteristic markings known as 'bordered pits.'

Wood is not only valuable at Timber (q. v.), but for fuel, being the chief fuel used in many parts of the world. To woody fibre we are indebted also for great part of our cordage and textile fabrics, including the very finest of them, as muslin and lace. Reduced to pulp, it is used for the manufacture of paper.

A kind of factitious or artificial wood, used for making ornamental articles, has recently been invented in France. It is called *Bois duré*. Its is formed of sawdust, heated to a high temperature, and subjected to very great pressure. Its compactness and hardness exceed those of wood itself. Another kind is made by mixing blood with sawdust, and compressing. Some kinds of costly wood are also imitated by mixing their sawdust with glue, and casting the mixture into the desired shape in moulds.

WOO'DBINE. See HONEYSUCKLE.

WOO'DBRIDGE, a market-town and river-port of Suffolk, on the right bank of the Deben, which here expands into an estuary, 11 miles from the sea, and 8 miles east-north-east of Ipswich. Vessels of 120 tons can reach the town. There are a custom-house, a bonding warehouse, and docks in which shipbuilding is carried on. The church is a striking edifice of black flint and freestone, with a magnificent tower. There is also a richly endowed charity which supports an excellent and well-conducted grammar-school, commodious and extensive alms-houses, a public dispensary and library. Corn, flour, and malt are exported. In 1880, 1589 ships, of 86,544 tons, entered and cleared. Pop. (1871) 4403.

WOODBURY PROCESS. See Positive Printing.

WOOD-CARVING is probably the oldest branch of art. Apparently, the first weapon was a club, and the first attempt at decoration was some scratching or carving on it. Amongst the Egyptians, Greeks, and Romans it was much practised. As a branch of Christian art it was one of the earliest, and attained a high development in the 15th century. It greatly declined during the last century, but has again revived, and promises to attain great importance. The wood-carvers of Great Britain have shown great capabilities, but hitherto have lavished too much care upon fineness of finish rather than on the artistic excellence of their designs.

WOOD-CHARCOAL is the most important, although not the purest, kind of charcoal. Wood consists of carbon, hydrogen, and oxygen, the last two being in the proportion to form water. When heated in the open air, it burns completely away, with the exception of a small white ash; but if the supply of air be limited, only the more volatile matters burn away, and most of the carbon remains. This is the principle of the process of charcoal-burning in countries where wood is abundant, as, for example, in the Harz mountains. 'A number of billets of wood are built up vertically in two or three rows into a large conical heap, which is covered over with turf or moistened charcoal-ash, holes being left at the bottom for the air to get in.

'A hollow space is also left in the middle of the heap, to serve as a flue for the gaseous matters which are evolved. The heap is set on fire by throwing burning pieces of wood into the central opening, near the top of which, however, a kind of grate, made of billets of wood, is placed, to prevent the burning fuel from falling at once to the bottom. The combustion then proceeds gradually from the top to the bottom, and from the center to the outside of the heap; and as the central portions burn away, fresh wood is continually thrown in at the top, so as to keep the heap quite full. The appearance of the smoke shows how the combustion is proceeding: when it is going on properly the smoke is thick and white; if it becomes thin, and especially if a blue flame appears, it is a sign that the wood is burning away too fast, and the combustion must then be checked, by partially stopping up the holes at the bottom, or by heaping fresh ashes on the top and sides, and pressing them down well, so as to diminish the draught. As soon as the combustion is completed, the heap is completely covered with turf or ashes, and left to cool for two or three days. It is then taken to pieces, and the portions still hot are cooled by throwing water or sand upon them. 100 parts of wood yield on the average from 61 to 65 parts by measure, or 24 parts by weight of charcoal.'—Watts's *Dictionary of Chemistry*, vol. i. p. 759. The charcoal thus prepared is the best suited for fuel. In England, a large quantity of charcoal is obtained in the dry distillation of wood in cast-iron cylinders, for the preparation of crude acetic acid. The charcoal thus prepared is preferable for making gunpowder, but is inferior for other purposes. A peculiar kind of charcoal of a reddish-brown color, and hence termed *charbon roux*, is prepared in France for the manufacture of the gunpowder used for sporting purposes, by subjecting wood in iron cylinders to the action of superheated steam under a pressure of two atmospheres. Powder made with this charcoal absorbs moisture more rapidly than ordinary gunpowder.

The general properties of wood-charcoal are, that it is black and brittle, and retains the form of the wood from which it was derived; it is insoluble in water, infusible and non-volatile in the most intense heat; its power of condensing gases is noticed in the article on that subject; and from its power of destroying bad smells, it has been regarded as possessing considerable antiseptic properties. It is frequently stated that charcoal is a bad conductor of heat, but a good conductor of electricity: these properties depend upon the nature of the charcoal, the lighter wood, such as willow, yielding a porous charcoal, with little power of conducting heat or electricity; while boxwood yields a very compact charcoal, which is a good conductor of heat and electricity, and is admirably adapted for the exhibition of the electric light. Charcoal never consists entirely of pure carbon, the degree of purity varying directly with the temperature; thus, charcoal charred at 480° contains 65 per cent. of carbon, while that charred at 750° contains 80, and that charred at 2730° contains 96; but the loss of charcoal occasioned by these high temperatures is very great, the three percentages of charcoal corresponding to these temperatures being 50, 20, and 15.

The uses of wood-charcoal are numerous and extensive. It is very largely employed as a fuel, taking the same place in many countries that coal occupies here. From its being proof against all ordinary chemical agencies, 'a superficial charring is frequently resorted to, with the view to protect wood from decay, as in the case of piles which are driven into mud or into the beds of rivers to serve as foundations. For the same reason, it is a common practice to char the interior of tubs and casks destined to hold liquids.'—Miller's *Inorganic Chemistry*, 3d ed., p. 77.

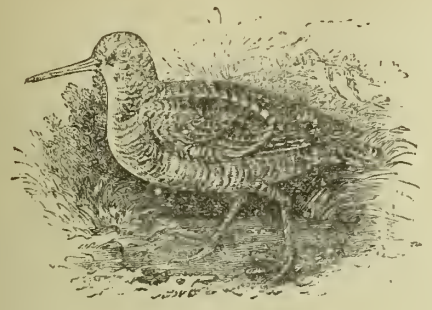
In a finely-divided state, it is commonly regarded, as has been already stated, as an antiseptic; and there is no doubt that the offensive effluvia from animal matter in an advanced stage of putrefaction disappear when the putrefying substance is covered with a layer of charcoal; but in reality the decay goes on, without the emission of any odor, till at length the whole of the carbon is dissipated as carbonic acid gas, and the hydrogen as water, while the nitrogen remains as nitric acid. For these explanations, we are indebted to Dr. Stenhouse, who has shown that the action consists in a rapid process of oxidation, dependent upon the power which finely-divided charcoal possesses of condensing oxygen. In a finely-divided state, charcoal not only condenses gases to a marvelous extent, but has the power of absorbing coloring matters, bitter principles, &c.; and hence it is of extensive use in the laboratory. From the rapidity of its absorbing action, 'Stenhouse has proposed to use a respirator filled with charcoal to protect the mouth and nostrils in an infected atmosphere; and the employment of trays of powdered wood-charcoal in dissecting-rooms, in the wards of hospitals, and in situations where putrescent animal matter is present, is found to exert a most beneficial influence in sweetening the atmosphere, by absorbing and decomposing the offensive gases. These properties render charcoal a valuable material in the construction of filters, not only for decolorizing purposes, but likewise for assisting in purifying water for domestic use. It is now also employed most successfully to prevent the escape of noxious vapors at the ventilating openings of the sewers, as it allows the free passage of air, but condenses the offensive effluvia in its pores, where they are destroyed by a process of oxidation.'—Miller, *op. cit.*, p. 78. Besides its employment in the manufacture of gunpowder, it has many applications in the arts. In Medicine, it is at present chiefly used to destroy fetor; for which purpose it is applied in the form of powder or poultice to gangrenous sores, phagedenic ulcers, &c.; it is also largely employed in tooth-powders, as by its mechanical action it removes incrustations, while by its chemical action it destroys fetor of the breath. In indigestion, accompanied by much flatulence, it may be given in doses of two or three tea-spoonfuls suspended in water, or may be administered in the form of charcoal-biscuits. Very finely divided poplar charcoal is regarded as the best for medicinal uses.

WOO'DCHAT (*Lanius, rutilus*), a bird which, notwithstanding its name, is not a species of Chat, but of Shrike (q. v.). Its whole length is about seven inches and a half. The upper parts are mostly black, the under parts white; but there is a white spot on the wing when closed, and other small portions of the wing-feathers are white, as well as the outer tail-feathers, and there is a narrow streak of white above the base of the bill on each side; the crown of the head and nape of the neck are rich chestnut red. The W. is a rare bird in Britain, but is abundant in the southern parts of Europe. It may be regarded as an African bird, being found from the Mediterranean to the Cape of Good Hope. In Europe, it appears only as a summer visitant, but in Africa it occurs at all seasons of the year.

WOO'DCHUCK (*Arctomys monax*), a species of Marmot (q. v.), inhabiting North America, from Hudson's Bay to South Carolina. It is from fifteen to eighteen inches long, blackish or grizzled above, chestnut red below; the form thick, the head broad and flat, with almost no apparent neck, the legs short and thick, the feet large, the tail bushy. The hair is rather soft, the whiskers long and stout. This animal digs deep holes in fields, on the sides of hills, or under rocks in woods; its burrow slants upwards, so that water may not enter, and within are several compartments. It passes the winter in the burrow, in a lethargic state. The food of the W. is vegetable, and it is particularly destructive to crops of red clover. It is easily tamed, and may be fed on bread, milk, and vegetables. It fights successfully with a dog of equal size. The name of Ground Hog is sometimes popularly given to it. Its flesh is sometimes eaten, but is rank.

WOO'DCOCK, the popular name of certain birds commonly regarded as of the same genus with the Snipes (q. v.), but of more bulky form than the true snipes, and having shorter and stronger legs. The Common W. (*Scolopax rusticola*), well-known as a game-bird in Britain, and highly esteemed as a delicacy for the table, is found also in all parts of Europe and the north of Asia. It is one of the birds of Japan. It is only a winter visitant of most parts of Britain, very rarely breeding in England, but it more frequently breeds in the northern parts of Scotland. Its summer haunts are chiefly the pine-forests of the northern parts of Europe and Asia; but in summer it inhabits higher and drier ground than in winter, when it is chiefly to be found in moist woods and swamps, seeking for worms, snails, and slugs as food, boring with its long bill in the soft ground. The quantity of food which it devours is very great; a single W. has been known to consume in a night more earth-worms than half-filled a garden-pot of moderate size. The W. is about thirteen inches in length; the upper parts varied with ruddy, yellowish, and ash

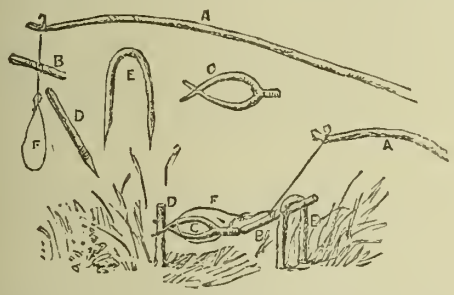
color, finely intermingled, and marked by large black spots; the lower parts yellowish red, with brown zigzag lines; the quills striped with red and black on the outer edge; the tail-feathers tipped with gray above and white below. The female is rather



Woodcock (*Scolopax rusticola*).

stouter and larger than the male, and sometimes attains a weight of fourteen or fifteen ounces. A W. of twenty-seven ounces is on record.

The W. makes its nest in warm dry situations, on the ground, of dead leaves loosely laid together. It lays only three or four eggs of a pale yellowish or reddish brown color. As woodcocks usually breed in very dry situations in the recesses of thick woods, the young ones would be left to starve but for the peculiar adaptation which enables the parent to transport them to moist feeding-grounds. It was long believed that the female W. used only her feet for carrying her young from place to place; but Mr. Charles St. John in his *Natural History and Sport in Moray*, says, that from close observation he found 'the old woodcock carries her young, even when larger than a snipe, not in her claws, which seem quite incapable of holding up any weight, but by clasping the little bird tightly between her thighs, and so holding it tight towards her own body.' The W. feeds chiefly by night. Great numbers sometimes appear in some parts of Britain, in their migrations. Besides falling to the gun of the sportsman, they are sometimes caught by nets placed in the tracks or open glades in



Woodcock Trap:

The upper portion of the fig. shows the separate parts; the lower portion their arrangement when set. The part C (being only supported in its position by the pressure of B) is displaced by the weight of the bird; this relieves the spring A, and the prisoner is caught by the legs in the running noose F.

(From St. John's *Natural History and Sport in Moray.*)

woods, by which they proceed from their retreats to their feeding-grounds, and by nooses or springes set about the places which they frequent.—The AMERICAN W. (*Scolopax* or *Philohela Minor*) is a smaller bird than the W. of Europe, being only about eleven inches long; very similar in plumage and habits. Three transverse black bands mark the hinder part of the head. It is found in all parts of North America, and is greatly esteemed for the table.

WOOD-ENGRAVING, or XYLOGRAPHY, the art of engraving designs on wood, differs from copper and steel plate engraving by having the parts intended to print on the paper, in *relief*. While *plates* are printed from the engraved lines by a laborious and necessarily slow process (see ENGRAVING), wood-engravings, having the object to be represented on the surface, in the manner of a type, may be printed along with the matter it is intended to illustrate in the ordinary printing-machine. This, of course, is an important point in the illustration of books, on the grounds of cheapness and expedition. Another advantage wood-engravings possess is, that they can be multiplied to any extent by means of the Stereotype (q. v.) and Electrotype (q. v.) processes.

The invention of wood-engraving, like that of gunpowder, has been claimed for the Chinese, whose books have certainly been printed from engraved wood-blocks for ages. It has indeed been asserted that the art of cutting figures in relief, and printing impressions of them on paper, was known and practised by that nation as early as the reign of the renowned Emperor Wu-Wang (1120 B.C.). There is no doubt that wood-stamps were used by the ancient Egyptians and Romans for stamping bricks and other articles of clay; and that wood and metal stamps of monograms, &c., were used in various European countries, for attesting deeds and other documents, at a very early period, when the ability to write was an extraordinary accomplishment even for princes. It is not, however, until the beginning of the 15th c. that we find any evidence of the existence of wood-engraving, as we now understand it. It appears to have been used in Germany at that time for printing playing-cards and figures of saints.

The earliest print of which any certain information can be obtained is in the collection of Earl Spencer. It was discovered in one of the most ancient convents of Germany—the Chartreuse of Buxheim, near Memmingen in Bavaria—pasted within the cover of a Latin MS.; it represents St. Christopher carrying the infant Saviour across the sea, and is dated 1423. Fig. 1. is a reduced fac-



Fig. 1.

simile of this curious engraving. It is a work of some merit, notwithstanding its apparent roughness; the infant Saviour and the drapery of the saint being drawn with considerable skill and vigor. The inscription at the bottom has been thus translated: 'In whichever day though seest the likeness of St. Christopher, in that same day thou wilt, at least, from death no evil blow incur.—1423.' Shortly afterwards, a series of books, printed entirely from wood-engravings, called block-books, were issued. They consisted principally of religious subjects, with short descriptions engraved on the same block. The most important of them were the *Apocalypsis, seu Historia Sancti Johannis;* the *Historia Virginis ex Cantico Canticorum;* and the *Biblia Pauperum*, the last containing representations of some of the principal passages of the Old and New Testaments, with explanatory texts. The illustrations, of which Mr. Jackson, in his treatise on the *History and Practice of*



Fig. 2.

Wood-engraving, gives an elaborate account and several specimens, seem to be drawn with a supreme contempt for perspective and proportion, but bear evidence of the draperies, and hands and faces, having been carefully studied. Fig. 2 is a copy of one of the cuts in the *Apocalypsis*. It represents St. John preaching to

three men and a woman, with the inscription: '*Conversi ab idolis, per predicationem beati Johannis, Drusiana et ceteri*' (By the preaching of St. John, Drusiana and others are withdrawn from their idols). Fig. 3, from the *Biblia Pauperum*, is curious as showing the

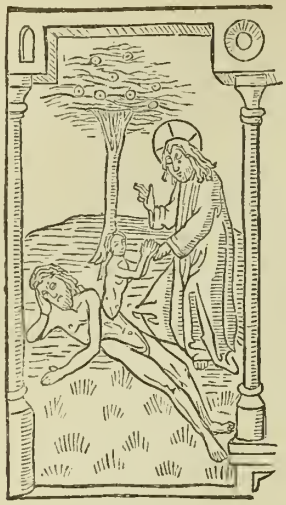


Fig. 3.

general manner of representing the creation of Eve during the 15th c., the same subject frequently occurring previous to 1500. Both have the appearance of careful drawings 'spoiled in the engraving.' Previous to the invention of movable types, whole books of text were also engraved on wood, and the impressions had evidently been taken by *rubbing* on the back of the paper, instead of steady pressure, as in the printing-press, the ink used being some kind of distemper color.

The Psalter printed by Faust and Schöffer at Mentz in 1457 (see GUTENBERG), is illustrated with initial letters engraved on wood, and printed in two colors, blue and red, which Mr. Jackson considers 'the most beautiful specimens of this kind of ornament which the united efforts of the wood-engraver and the pressman have produced. They have been imitated in modern times, but not excelled.' It is worthy of note, that although printed upwards of 400 years ago, the freshness and purity of the colors remain unimpaired.

As printing spread, the publication of illustrated books became general in Germany and Italy, and reached England in 1476; in which year Caxton (q. v.) published the second edition of the *Game and Playe of the Chesse*, with figures of the different pieces. They are very rude, compared with the earlier German works. Fig. 4 is a reduced copy of the 'Knight,' and is interesting as one



Fig. 4.

of the first wood-engravings executed in this country: several works followed, all, however, in the same rude manner. The first attempt at something finer than simple lines appears in the frontispiece to the Latin edition of Breydenbach's *Travels*, printed at Mentz by Erhard Renwich, 1486. It is by an unknown artist, and is an elaborate and really very beautiful specimen of the art. It is also remarkable as being the first engraving introducing *cross-hatching* to represent dark shadows.

The *Hypnerotomachia Poliphili*, printed at Venice by Aldus, in 1499, is worthy of mention for the extreme beauty of the designs, which have been ascribed by some authorities to Raphael, and by others to Mantegna. About the beginning of the 16th c., a complete revolution in the art of wood-engraving was accomplished by the genius of Albert Dürer. His productions exhibit not only correct drawing but a knowledge of composition and light and shade, and attention to the rules of perspective, which, with the judicious introduction of subordinate objects, elevated them to the rank of finished pictures. Dürer, however, in common with most of the German artists of his day, paid very little attention to the propriety of costume in his religious subjects; one of his drawings in the *History of the Virgin* (1511). for instance, representing the birth of the Virgin, shows the interior of a German burgomaster's house of his own day, with a number of gossips drinking from flagons, and otherwise enjoying themselves. There has been considerable discussion as to the probability of Dürer having also *engraved* his drawings. Most of the best authorities on the subject, including Bartsch, Jackson, and Firmin Didot, agree in the negative. Mr. Jackson, who speaks with the experience of a practical engraver, says: 'In most of the woodcuts supposed to have been engraved by Albert Dürer, we find cross-hatching freely introduced: the readiest mode of producing effect to an artist drawing on wood with a pen or a black-lead pencil, but which to the wood-engraver is attended with considerable labor. Had Albert Dürer engraved his own designs, I am inclined to think that he would have endeavored to attain his object by means which were easier of execution.' The reader is referred to the article DURER for an account of some of his numerous works. The best of Dürer's contemporary artists on wood were the painters, Hans Burgkmair (q. v.), Lucas Cranach (q. v.), and Hans Schäufflein. A series of works projected by the Emperor Maximilian, including *The Adventures of Sir Theurdank, The Wise King, The Triumphs of Maximilian*, &c., were illustrated by these artists; but they are not equal to those of Dürer.

During the first half of the 16th c., the publication of books illustrated with wood-engravings still increased, and prevailed to a greater extent than at any other time, with the exception of the present day. The superiority of talent, both in drawing and engraving, however, still remained with the Germans. In France, although their figure-subjects were inferior to those of their German neighbors, their ornamental borders in prayer-books, &c., of which a great number were printed at this time, were extremely beautiful. In Italy and England the art was very far behind. The most remarkable work published at this time was the *Dance of Death* (q. v.), issued at Lyon in 1538. The original edition of this curious work contained 41 engravings, representing the struggle between Death, generally in the form of a skeleton, and different individuals, such as the Pope, the Emperor, a Judge, Monk, Doctor, Duchess, Old Man, &c. The drawings, which are characterized by great vigor and skill, are generally understood to have been executed by Hans Holbein (q. v.); but whether he also engraved them, as has been alleged, is more than doubtful.

Towards the conclusion of the century, however, the art had made considerable progress in Italy, where some of the best productions of Germany were equalled, if not excelled. In England, it did not make much progress. John Daye published almost the only illustrated books of the time, notably Queen Elizabeth's Prayer-book, which contains a tolerably well executed portrait of Her Majesty. There is no certain knowledge about any of the artists or engravers, although John Daye is supposed to have engraved some of his cuts himself. At this time also, the practice of printing wood-engravings in colors from different blocks became somewhat common, although the attention of artists in that line was mostly confined to ornamental subjects. From the beginning of the 17th c., the decline of wood-engraving may be dated; Germany, the cradle of the art, being the first to forsake it; the only works worthy of notice were a series of blocks on various subjects—designed by Rubens, and engraved by Christopher Jegher of Antwerp, one of the best wood-engravers of that period—some of which are of great beauty. From this time, the art fell into a state of great neglect, not, apparently, for want of engravers, for wood-cuts of a certain kind were always produced, but for want of artists able, or willing, to make drawings worthy of preservation.

Nothing particularly deserving of notice occurred until 1766, when John Michael Papillon, an enthusiastic professor of the art in France, published an elaborate history of the subject in an unsuccessful attempt to restore it to its former importance. But it was not until the genius of Thomas Bewick (q. v.) was brought to bear on it, that wood-engraving received that impetus which has made it what it now is—one of the most important of the illustrative arts. Bewick's most important works are his *Histories of British Quadrupeds* (1790) and *British Birds* (1804); all the quadrupeds, and almost all the birds were drawn and engraved by himself. The birds, especially, are executed with a truthfulness and skill which has rarely if ever been equalled. These works are also famous for their collection of tailpieces, which display an infinite amount of humor and pathos. Fig. 5 is a reduced copy of one of them—a poor ewe, in the starvation of winter, picking at an old broom in front of a ruined cot—a scene, trifling as it seems, which tells a woeful tale of suffering. He entirely abandoned the

elaborate system of 'cross-hatching' which prevailed so much in the works of the older engravers, and produced his light and shade by the simplest possible means. The above example affords an excellent specimen of a wonderful effect being produced by a few simple lines.

Since Bewick's time, wood-engraving has continued to flourish without interruption. He left behind him several pupils, the most successful of whom were Nesbet, Clennell (who engraved some of the tailpieces in the *British Birds*), and William Harvey. Harvey, however, forsook the burin for the pencil; and his drawings illustrating Milton's *Paradise Lost*, Thomson's *Seasons*, &c.,

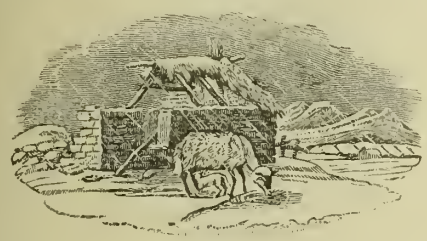


Fig. 5.

especially such as were engraved by John Thomson (perhaps the most skillful engraver that ever lived, and a pupil of Robert Branston, a self-taught engraver), still retain a first-class place as specimens of wood-engraving. The establishment of the *Illustrated London News* (1842) tended greatly to familiarize the public with the beauties of wood-engraving. In the pages of that periodical appeared the first drawings on wood of Messrs. John Gilbert and Birket Foster. The spirited figure-subjects of the former, and the exquisite landscapes of the latter, have done much to raise the art to the very high place it now occupies in England.

Of late years, the art has also made very great progress in France and Germany. The style of engraving, however, is quite different from the English, so much so, that a practised eye can distinguish a French wood-cut at a single glance. The professors of the arts of drawing and engraving on wood in the present day are so numerous, and their works generally so well known, that it would be needless, even if our space permitted, to attempt even to enumerate them.

Practice of Wood-engraving.—The wood used for engraving is boxwood, which has the closest grain of any wood hitherto discovered. It is principally imported from Turkey for the purpose, as the English box is too small to be of much use. It is cut *across* the grain in slices, which are dressed to the same height as type, for convenience in printing. Inferior kinds of wood, such as American rock maple, pear tree, plane-tree, &c., are used for coarser purposes; and for very large and coarse subjects, such as posting-bills, common deal is used, and cut on the *side* of the wood with chisels and gouges. When *blocks*—as the pieces of wood are termed—are required of a larger size than a few inches square, it is necessary to join two or more pieces together, as the amount of *sound* wood to be got out of even a large slice is extremely limited. There is, however, for all practical purposes, no limit to the joining process, as blocks have been printed consisting of from 50 to 100 pieces. The wood having been made very smooth on the surface, and squared to the required size, is prepared for the artist by being covered with a preparation of white (commonly water-color Chinese white); this gives a very good surface for the pencil to work on. The subject is then drawn in the ordinary way, the tints being generally washed in with India-ink, and the details filled in with pencil. When the drawing is finished, it is given to the engraver, who, previous to commencing, carefully covers the block with paper, fastened round the edges with bees-wax; this is necessary, to avoid rubbing the drawing out in the process. As the engraving proceeds, he gradually tears the paper off.

The tools or gravers necessary in wood-engraving are of three kinds—viz., gravers proper (fig. 6, *a*); tint-tools (fig. 6, *b*); and

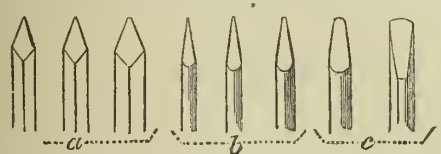


Fig. 6.

scoopers, or cutting-out tools for clearing out the larger pieces (fig. 6, *c*). They are arranged in different sizes, to suit the different portions of the work. Fig. 7 represents the method of using the graver. Most engravers use a glass of slight magnifying power, more for the purpose of relieving the eyes from the strain of fixing both eyes closely on a small object, than for magnifying the work. When gas or other artificial light is used, a glass globe filled with water, slightly tinted with blue (to neutralize the reddish glare of the light), is placed between the flame and the work: this serves the double purpose of concentrating the light on the block, and keeping it out of the eyes. When the drawing is in

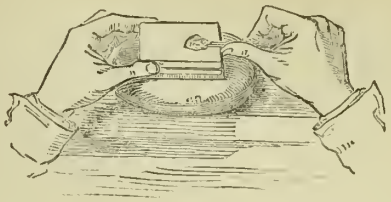


Fig. 7.

outline, or mostly so, the engraving is very simple: the process consists of engraving a line along each side of the pencil lines, which are, of course, to be left in relief, and afterwards cutting out the pieces between. It will thus be understood that every part of a woodcut which prints on the paper is the surface of the wood left untouched, and that every white part is cut or hollowed out. Fig. 8 represents a little subject *outlined;* fig. 9 is



Fig. 8.



Fig. 9.

the same subject *finished*. When it is complicated with much shading, trees, &c., it becomes much more difficult, and brings into play the artistic talents of the engraver to preserve the proper shades, or *color*, as it is technically termed, and texture of the different objects. Some engravers of the present day are celebrated for their power of producing beautiful pictures altogether by 'graver-work' from drawings made entirely with the brush. Skies and flat tints are engraved with tint-tools which, from their shape, are best adapted for cutting straight lines; and by the judicious use of the different sizes, the lines are left wider or closer, thicker or thinner, as the tint is wanted darked or lighter. As already mentioned, the tools are arranged in sizes—i. e., those for light tints are broader at the points than those for dark tints, so as to cut out more white. Trees, foregrounds, &c., are cut with *gravers*, which, as they are like a lozenge in shape, give more scope for freedom of handling.

When the drawing is all engraved, a proof is taken by inking the surface gently with printing-ink on a dabber (a ball of cotton covered with silk), and, a piece of *India-paper* being laid on it, by rubbing the paper with an instrument called a *burnisher*, until it is all printed. The engraver then sees what touching up is required before it is finished and ready for the printer.

When large blocks are to be engraved, the pieces of wood are joined with screw-bolts, and the drawing prepared in the usual manner; after which the pieces can be taken separate for convenience in engraving, and also for the purpose of getting it quicker finished, by having an engraver working at each piece—a matter of some consequence in many cases, as, for example, in the large engravings in the illustrated newspapers.

As wood-engraving, however, is at the best but a slow process, it is not surprising that many attemps have been made to introdnce a substitute for it. The point aimed at is to produce by some process of etching (see ENGRAVING), or otherwise, an engraving in relief, directly from the drawing of the artist, without the intervention of the engraver at all. Many processes have been invented for this purpose, being various modifications of Zincography (q. v.), Graphotype (q. v.), and Lithography (q. v.). The most successful plan is based on the method devised about 1860 by M. Gillot, and introduced into this country by Mr. Leitch (hence often called *Leitch's Process*). A *Gelatine Process* is now largely used in America. A photograph from an engraving or a drawing in lines is placed above a plate of gelatine, chemically sensitized. The parts of the gelatine exposed to the light become quite hard, and the rest is brushed away with warm water. From the plate an electrotype may be taken directly. Compare articles PHOTOGRAPHIC ENGRAVING, PHOTOGRAPHY.

See Hamerton's *Graphic Arts* (1882); Woodberry's *History of Wood-engraving* (1883); Marx's *Wood-engraving* (1881); Linton's

Wood-engraving in America (1882); Jackson and Chatto's *History and Practice of Wood engraving* (new ed. 1861); Papillon's *Traité de la Gravure en Bois* (1766); Bartsch's *Peintre-graveur;* Ottley's *Inquiry into the History of Engraving on Copper and Wood;* Firmin Didot *Essai sur l'Histoire de la Gravure sur Bois* (1863).

WOO'D-LOUSE (*Oniscus*), a Linnæan genus of Crustacea, now forming the family *Oniscidæ*, of the order *Isopoda*. The antennæ are four in number, but two of them are very short, consisting of two joints at most; the other two are long and slender. The tail is very short, but is composed of six segments. Wood-lice are terrestrial, and the respiratory organs are completely enfolded by plates developed from the abdominal members; the anterior plates being perforated by a row of small holes, through which the air has access to the gills. They frequent damp situations, and are generally found in dark and concealed places, under stones, in holes of walls, under the decaying bark of trees, &c. They feed on decaying animal and vegetable matter. They run with some celerity when apprehensive of danger, and sometimes also roll themselves up into a ball, so as to exhibit only the plates of the back. The eggs are enclosed in a pectoral pouch. The Common W. (*Oniscus murarius*) is very abundant in Britain, and is to be found in almost every locality suitable for it. It is popularly known in Scotland by the name of *Slater*.



Wood-louse (*Oniscus murarius*).

WOOD-OIL, the name commonly given by Europeans in India to a balsamic fluid, not really an oil, obtained from the trunks of trees chiefly of the order *Dipteraceæ* (q. v.). The wood-oils of Indian commerce are generally named from the countries or places from which they are brought, and it is not yet known what trees yield particular kinds, although it is certain that most of them are produced by species of *Dipterocarpus*. The name *Gurgina Balsam*, or *Goorjun Balsam*, is frequently given to one of the most common kinds, the produce of the Goorjun tree, *Dipterocarpus turbinatus*, and other species of *Dipterocarpus*. Wood-oil is produced chiefly on the Burmese coast, and in the more southern and eastern regions. It is obtained by tapping the tree, and applying heat to the incision; or by felling the tree, cutting a hole in the trunk, and kindling a fire in it, a groove being made for the exuded fluid to flow into pots placed to receive it. The trees which produce it being often very large, a single tree sometimes yields seven tons of oil. Wood-oil is used in medicine as a substitute for Copaiva (q. v.), and in the arts as a varnish, often in combination with colored pigments, and even as a substitute for tar in paying the seams of shipping. It is very effectual in preserving timber from the attacks of white ants. It is sometimes used in making lithographic inks.

Wood-oil has a fine aromatic odor, resembling that of cedar. When allowed to remain at rest for some time, it separates into two layers, the upper consisting of a clear chestnut-colored liquid balsam, and the lower a kind of resin in flakes. It is, of course, this resinous part only which remains when it is used as a varnish, and the varnish has dried.

WOO'DPECKER (*Picus*), a Linnæan genus of birds, now divided into a number of genera, and belonging to the family *Picidæ*, of the order *Scansores*. The toes are in pairs, two before and two behind, with sharp strong claws; the bill is rather long, straight, and wedge-shaped, with a hard tip, the tip and sides compressed; the tail is usually lengthened and rigid, although in some it is short and rounded; the vertebræ of the neck are greatly developed, and the last of the caudal vertebræ is very large, with a long ridge-like spinous process; the whole structure adapting these birds to run and climb with the greatest facility on the stems and branches of trees, in which they aid themselves by the tail, like Creepers (q. v.), and to seek their food, which consists chiefly of insects and their larvæ, by digging in the bark and wood of trees with their bill. In addition to the particulars already noticed, they have the tongue fitted to serve as an important instrument in obtaining their food; the branches of the hyoid bone being greatly elongated backwards, and in front moving as in a sheath; a peculiar arrangement and development of muscles enabling them to extend the tongue far beyond the bill; its tip being horny, and furnished with barbed filaments, whilst its surface is covered with a glutinous saliva, secreted by two large glands. Their powers of flight are very moderate, and the keel of the breast-bone is small. The Barbets (q. v.) and Wrynecks (q. v.) are referred to the family *Picidæ*.

Woodpeckers are diffused over almost all parts of the globe, but abound chiefly in warm countries. The species are very numerous. They are mostly solitary in their habits, and live in the depths of forests. They feed in part on fruits and seeds as well as on insects; but much of their time is spent in pursuit of these, and they may be heard at a considerable distance, tapping the wood of trees with their bill, to discover the place where an insect is lodged, and to get at it when discovered. The common notion, that they are very injurious to trees, is erroneous, as they do more good by preventing the ravages of insects than harm by their pecking. They strike out chips of wood with their strong bill, and



Green Woodpecker (*Picus viridis*).

in this way enlarge holes in decayed parts of trees for a roosting-place or a nest, carrying away the chips to a distance, especially in the case of a nest, as if for precaution that it may not be discovered. The nest consists of a mere hole in a tree, perhaps with a few chips in the bottom of it, but with no other lining. The plumage of woodpeckers is generally of strongly contrasted colors, black and white, or green and yellow, with red marks about the head. There are several well-marked groups of woodpeckers, differing in form, plumage, and habits, which also are of different geographic distribution, some of them being entirely, and some chiefly confined to particular parts of the world.

Only four species are found in Britain, and one of them, the GREAT BLACK W. (*Picus* or *Dryocopus martius*), is of rare occurrence. It is about sixteen inches long; black, with a red cap on the head. It is found in the pine-forests of many parts of Europe. —The GREAT SPOTTED W. (*P. major*), also called FRENCH PIE and WOOD PIE, is not uncommon in England, and is sometimes seen in Shetland. It is found on the continent of Europe from Norway to the Mediterranean. It is about nine inches and a half in length. The color is black, varied with white, the under parts grayish white; the back of the head in the male bright scarlet. The LESSER SPOTTED W. (*P. minor*) is not uncommon in the south of England. Its whole length is about 5 inches and three-quarters. It is widely distributed in Europe and the north of Asia. Its colors are similar to those of the last species, but differently arranged. It is frequently to be seen searching for insects on the moss covered branches of orchard trees.—The most plentiful of all the British species of W. is the GREEN W. (*Picus* or *Gecinus viridis*). It is found in the wooded parts of Scotland as well as in England, but is rare in Ireland. It is common on the continent of Europe from Scandinavia to the further south. It is about thirteen inches in length; and is mostly of a dark-green color, tinged with yellow; the feathers over the nostrils and round the eye, black; the crown and back of the head, bright scarlet, a black moustache extending backwards and downwards from the base of the lower mandible, with a brilliant scarlet patch along the middle of it; the edges and tips of the wings spotted, black and white. It chiefly inhabits elm and ash trees, making its roosting-place and nest in them in the manner already described. Among its popular English names are *Woodspite, Yaffle, Whetile,* and *Woodwall*. The Green W. belongs to a group or section of woodpeckers entirely confined to the Old Continent, and which are more frequently to be seen seeking their food on the ground than the more typical species.

The American species of W. are very numerous, and some of them, which want of space prevents us from describing, are amongst the best known birds of the United States and Canada; as the HAIRY W. (*Picus villosus*), which is to be found at all seasons in woods, orchards, fields, and even in the midst of cities, visiting farm-yards in winter to pick up grain—a lively, noisy, and active bird; the IVORY-BILLED W. (*Picus* or *Campelophilus principalis*), which inhabits the southern parts of the United States and Mexico; is called *Carpentero* by the Spaniards from the great quantity of chips which it makes; and is valued by the Indians for its ivory-like bill and scarlet crest, which they use as ornaments. The RED-HEADED W. (*Picus* or *Melanerpes erythrocephalus*) is very common in most parts of North America, and feeds much upon fruits and upon young heads of Indian corn, so that a reward is given for killing it. The largest species in the northern parts of America is the BLACK W., or LOGCOCK (*Picus* or *Dryotomus pileatus*), which is about eighteen inches long, the general color greenish black, with stripes of white from the eyes along the neck and sides.—The genus *Picumnus* is the type of a

group of *Picidæ* called *Piculets*, very small birds, with bill hard at the tip, broad rounded wings, and a short tail with broad rounded feathers, not used for support, departing from the typical characters of the family. They inhabit the warm parts of South America, India, and the Eastern Archipelago.

WOOD-PRESERVING. Several processes have been employed of late years for the purpose of preventing the decay of wood from damp, atmospheric action, or the destructive operations of animals and parasitic plants. The principle in all has been the same—viz., the injection into the vessels of the wood of some mineral material, which, by combining with the albumen of the woody tissue, prevents its decomposition, or gives it a poisonous character. The chief of the methods in use are that called Kyanising (q. v.), creosoting, in which the preserving material is the so-called creosote, or crude carbolic acid of coal-tar, and the Boucherie process, chiefly used on the continent. In this last, a solution of sulphate of copper is used. Whilst the tree is still growing, the head of the tree is cut off, and the top of the bare stem is hollowed into the form of a bowl, which is then filled with the solution, which is afterwards supplied as required. The liquid penetrates downwards, killing the tree as it goes, but giving to the wood a most remarkable degree of durability, particularly when applied to such purposes as railway sleepers, &c.

WOO'DRUFF (*Asperula*), a genus of plants of the natural order *Rubiaceæ*, containing a number of annual and perennial species, with whorled leaves, natives of the northern parts of the Old World, and distinguished by a funnel-shaped or bell-shaped corolla, a bifid style, capitate stigma, and dry didymous fruit. The SWEET W. (*A. odorata*) is common in shady woods in Britain and all parts of Europe. It has a creeping root, a stem 5—10 inches long, weak and suberect, four or five whorls of lanceolate leaves, 6—8 in the whorl, rough at the edge and keel, and small white flowers. The plant, when dried, has a very agreeable fragrance, similar to that of *Anthoxanthum odoratum* (see VERNAL GRASS) under similar circumstances. It forms an agreeable herb-tea, and enters into the composition of the popular *May drink* of the Germans. —DYER'S W. (*A. tinctoria*) is a native of the continent of Europe and of Siberia, a perennial, with reclining stems about a foot in length, whorls of six or four linear leaves, the upper leaves opposite, the flowers whitish. The root is used in Dalmatia and elsewhere instead of madder; but the crop obtained from a field is inferior in quantity to that of madder.



Woodruff.
(*Asperula odorata*).

WOODS AND FORESTS, AND LAND REVENUES, COMMISSIONERS OF. In ancient times, the principal part of the royal revenues of England consisted of the rents and profits of the crown-lands, which were composed of numerous lordships and honors, with forests and chases. The demesne lands reserved to the crown at the Conquest were at one time very extensive; but while they were often added to by forfeitures, they were also so largely encroached on by grants to subjects, that from the 12th to the 14th c., parliament had often to interpose to compel the resumption of grants thus made.

The confiscation of the property of the monasteries under Henry VIII., greatly increased the real estate of the crown; and, notwithstanding alienations by that monarch and by Queen Elizabeth, who disposed of part of the royal domains, to avoid application to parliament for supplies, the crown, at the accession of James VI., owned very extensive estates all over England. The profusion, however, of James and his successors reduced the royal estates to insignificance, and no effectual restraint was imposed on their dilapidation until statute 1 Anne, c. 1, prohibiting all alienations of the crown-lands, except by leases not exceeding 31 years, or three lives. From the reign of Henry VIII. to that of George III., the crown revenues were subjected to repeated changes of management; and under George III., the system was first introduced of surrendering the greater part of them to be consolidated with the rest of the public revenue, out of which the royal civil list is paid. The modern administration of the land revenues of the crown is founded on a statute of 1810, establishing a Board of not less than two, or more than three Commissioners, called 'The Commissioners of his Majesty's Woods, Forests, and Land Revenues.' The law relating to the management of the crown-lands was consolidated by act 10 Geo. IV. c. 50, which, repealing a number of previous enactments on the subject, placed the whole hereditaments of the crown in England, Wales, and Ireland, except advowsons and vicarages, under the management of the Commissioners of Woods and Forests, with large power of selling and leasing them; and provided that the annual land revenues should, subject to certain deductions, be carried to the Consolidated Fund during the king's life. This transfer to the Consolidated Fund, the result of a special agreement terminating with the life of the sovereign, has been renewed with his successors. Act 2 and 3 Will. IV. c. 112, empowered the Treasury to transfer to the Commissioners of Woods and Forests the management of the crown-lands of Scotland.

A large addition was made to the duties of the Commissioners of Woods and Forests by 2 Will. IV. c. 1, which, abolishing the office of Surveyor-general of his Majesty's Public Works and Buildings, intrusted to them the management of the public works. This union, however, was afterwards considered inexpedient, and act 14 and 15 Vict. c. 42, removed the department of Public Works from the Woods and Forests, and placed it under separate control. The act, 29 and 30 Vict. c. 62, introduced various alterations in the details of management. The Commissioners of Woods and Forests act under the control of the Treasury, and are required to transmit annual accounts of the receipt and expenditure of their department, to be audited by the Commissioners for auditing Public Accounts. The yearly receipts from this source amount to about £375,000. See WORKS BOARD OF.

WOOD-SORREL. See OXALIDEÆ.

WOO'DSTOCK, a small town and parliamentary borough, Oxfordshire, 8 miles north-north-west of the city of Oxford. The pop. (1881) of the borough (which includes several adjacent villages and hamlets) is 7027, and is much larger than that of the town, which contains only 1200 inhabitants. The manufacture of fawn-skin gloves gives employment to about 1200 persons, residing in the town and neighboring villages. W., or rather Old W., a little to the north of the present town, was a residence of the early English kings; but no remains of the ancient palace exist. Edward, the Black Prince, was born here; Elizabeth was held prisoner by her sister Mary; and Chaucer resided here for some time. W. is also famous in connection with Fair Rosamond, the celebrated mistress of Henry II. It is now doubted, however, if the labyrinth or maze which Henry is said to have constructed for her behoof ever existed. In the immediate vicinity is Blenheim Park, the seat of the Duke of Marlborough. W. returns one member to the House of Commons.

WOOD-SWALLOW (*Artamus*), a genus of birds, resembling swallows in many of their habits, but differing in the structure of their bills and feet, and belonging to the family of *Ampelidæ*, or Chatterers (q. v.). The bill is very broad at the base, and arched; the upper mandible thick, but not ridged; the gape furnished with bristles; the nostrils wide apart, naked; the feet short and strong; the wings very long and pointed; the tail short. Their flight is rapid. Their food consists chiefly of seeds. They are natives of the East Indies and of Australia. An Australian species (*A. sordidus*) is sometimes seen in great numbers, and is remarkable for the habit of suspending itself in clusters on dead branches, like a swarm of bees, one bird clinging to another, so that as many thus hang together as would fill a bushel.

WOOL is a variety of Hair (q. v.). The term hair is applied, in ordinary language, to a smooth, straight-surfaced filament like human or horse hair, without serrations of any kind on its surface. Wool, on the other hand, is always more or less waved, as in fig. 1; besides which, externally each woolly filament is seen under

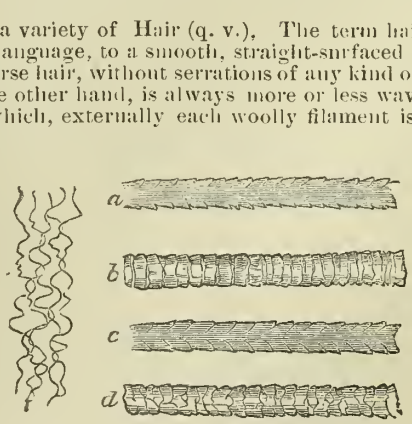


Fig. 1. Fig. 2.

the microscope to be covered with scales overlying each other, and projecting wherever a bend occurs in the fibre; fig. 2, in which one of the leading varieties of wool is shown both in its natural state (*a* in outline, and *b* complete) and after it has under-

gone the process of carding (*c* in outline, and *d* complete), in each condition both as a transparent and as an opaque object. Upon the minute points of difference here shown, the value of wool chiefly depends, especially with regard to the great variety of its applications. If each fibre were straight and smooth, as in the case of hair, it would not retain the twisted state given to it by spinning, but would rapidly untwist when relieved from the force used in spinning; but the wavy condition causes the fibres to become entangled with each other, and the little projecting points of the scales hook into each other, and hold the fibres in close contact. Moreover, the deeper these scales fit into one another, the closer becomes the structure of the thread, and consequently of the cloth made of it. This gives to wool the quality of *Felting* (q. v.). By combing, or drawing the wool through combs with angular metal teeth, some of the scales are removed, and the points of many more are broken off, so that wool which has been combed has less of the felting property, and is consequently better adapted for light fabrics; and yarn made of such wool is called *worsted*, and the cloths made of it *worsted goods*. But such is the variety of wools obtained by careful breeding and selection, that these differences can be got without combing, some wools being found to have naturally fewer serratures, and a less wavy structure than others. These are consequently kept separate, and are called *combing-wools;* whilst those which are much waved, and have many serratures, are called *carding-wools*, from their being simply prepared for spinning by carding-machines. The serratures or points of the scales are exceedingly small, and require the aid of a good microscope to see them. They vary from 1200 up to 3000 to an inch.

Wool is the most important of all animal substances used in manufactures, and ranks next to cotton as a raw material for textile fabrics. Its use as a substance for clothing is almost universal in the temperate regions of the globe.

Previous to 1791, British woollen cloths were made almost wholly of native-grown wools. At that time, the whole supply of the country could not have much exceeded 100,000,000 lbs. The merino wool of Spain then began to displace them in the best kind of goods, and the imports from that country reached their maximum in 1805, being in that year 7,000,000 lbs. Before 1820, the German wool had begun to supersede the Spanish, and was imported largely till 1841. After that, the cheaper wool of the British colonies to a great extent took the place of the German, and the latter is now chiefly used for only the finest cloths.

Wool varies in character according to the peculiar breed of sheep which yields it, and also with the nature of the soil, food, shelter, and climate. In a wool of first-rate quality, the fibres are fine, soft, elastic, sound, of good color, and free from deleterous or troublesome impurities: the commercial value of any sample depends, therefore, upon the extent to which it possesses these properties. If it be a combing wool, it will also depend upon its length of staple.

For technical purposes, shorn fleeces are divided into two classes, one called *hogs* or *tegs*, the other *wethers* or *ewes*. The former are the first fleeces shorn from the sheep, the latter are those of the second and succeeding years; but the meaning of these terms varies a little in different districts. The fleeces of yearlings are, as a rule, longer in the staple, and otherwise of superior quality to the wool of older animals. In the south of England, it is customary to clip lambs, and the wool so obtained is called *shorn lamb's wool*. Wool taken from the skins of slaughtered sheep is called *skin-wool* or *pelt-wool*, and is of a more variable quality than fleece-wool, on account of its being obtained in all stages of growth.

As long-stapled wools are used for worsted goods, and short-stapled for woollen goods, the various breeds which yield these two leading kinds are naturally divided into the long-woolled and short-woolled classes of sheep. The Lincoln, the Leicester, and the Cotswold breeds are considered good types of the former; and the Down, the Welsh, and the Shetland breeds, of the latter.

The following brief notice of the characteristic properties of the various native wools, is founded upon the description given of them in the Jury Report of the International Exhibition of 1862, Class IV.

Of the 'long wools,' the *Lincoln* has greatly risen in value of late years. It is coarse, of great length, and silky in appearance, so that it is well adapted for 'lustre' goods, in imitation of alpaca fabrics. *Leicester* wool is highly esteemed for combing. It is rather finer in the hair, but not usually so soft and silky in the staple as the last. *Cotswold* wool is similar to the Leicester, but somewhat harsher. It is not suited for lustre goods. *Highland* wool is long stapled, and of coarse quality, but known to be susceptible of great improvements. The practice of 'smearing' greatly depreciates its value. It is chiefly used for the coarsest kinds of woollen fabrics, as carpets, rugs, and similar articles. It is also used for Scotch blankets.

Of the 'short wools,' the different breeds of Downs partake very much of the same characters, but soil and climate so far affect them. The *South Down* is a short-stapled, small-haired wool, the longer qualities of which are put aside for combing purposes, and the shorter for the manufacture of light woollen goods, such as flannel. The *Hampshire Down* differs from it in being coarser, and in having the staple usually longer. The *Oxford Down*, again, exceeds the last in length and coarseness of staple. The *Norfolk Down*, on the other hand, when clean, is of a very fine and valuable character. The *Shropshire Down* is a breed increasing in importance, and is longer in the staple, and has more lustre than any of the other Down breeds. *Ryelands* wool is fine and short, but the breed is nearly extinct. The *Welsh* and *Shetland* wools have a hair-like texture, deficient in the spiral form, upon which depends the relative value of high-class wools. They are only suited for goods where the properties of shrinking and felting are not required. Shetland wool is obtained of various natural tints, which enables it to be used for producing different patterns without dyeing.

Of the intermediate wools, *Dorset* is clean, soft, and rather longer, and not quite so fine in the staple as the Down breeds. The *Cheviot* has increased very much of late years in public estimation. It is a small, fine-haired wool, of medium length, and is suitable for woollen and worsted purposes, for which it is largely used.

Some of the British colonies are very important wool-producing countries, Australia in this respect standing far in advance of all other countries whatever. The Australian wool has in general a beautiful, short, silky staple, well adapted for the manufacture of soft, pliable, and elastic fabrics. All the settled districts of this continent have been found well adapted to the growth of fine-wooled sheep, and the extraordinary increase in the flocks forms one of the most remarkable features of the colony. The breed has sprung from three merino rams and five ewes taken out by Captain M'Arthur in 1797. The alpaca wool grown in Australia since the creature was introduced some years ago is of inferior quality; but this is supposed to have arisen from rearing the animals too near the coast, and hopes are now entertained of succeeding better with it inland.

The wool of Cape Colony has of late years been greatly improved by the introduction of merinos, and, as will be seen from the table below, the exports from it are increasing very rapidly.

Among the imports from India, wool has of late become an important article, the quantity having risen from about 2,500,000 lbs. in 1840, to 29,190,049 lbs. in 1880; but the supply is rather fluctuating. A great deal of the Indian wool is coarse and hairy, and can only be used for low-class goods. We may state here that the most costly of all wools is obtained from the Tibetan goat, and is found next the skin, under the thick hair of the animal. From it, the far-famed Cashmere shawls are made. The highest price of any quality which is sold is from 6*s.* to 7*s.* per lb. in the native markets, but the Maharajah of Cashmere keeps a strict monopoly over the best kind.

Turning now to European countries, it is somewhat sad to think that Spain, the native country of the merino, which not so long ago sent all the wool for the best English cloths, has allowed its quality to degenerate, and its once large supply to dwindle away. The wool of Saxony, Silesia, and some parts of Austria, which is obtained from sheep of the merino breed, is the finest produced in any country; and notwithstanding the lower price and nearly equal quality of the Australian, German wool is still employed for the finest broadcloths, some kinds of ladies' shawls, and a few other purposes. Great attention is paid to the breeding and rearing of sheep in Germany, and large flocks are reared for their wool alone. In Austria, the number of sheep is estimated at 45,000,000, and the annual yield of wool at 100,000,000 lbs., most of it being of fine quality, and all of which is consumed in Austrian manufactures. France produces a large quantity both of fine and coarse wool. In Italy, the production of wool from mixed merino breeds has become a source of great wealth. Russia, as might be expected from its great extent, rears many qualities, from the finest merino to a very coarse kind. The wools of the remaining countries of Europe are of minor importance.

We must not omit to mention that the wools of South America are now attaining great importance, as will be seen by the table below, but it is necessary to state that besides the 2,909,121 lbs. imported in 1881, there were 2,601,993 lbs. of alpaca (including llama and vicuna) wool. See ALPACA. The wool of the alpaca is very fine, from 6 to 12 inches long, of various colors, and well suited for certain kinds of goods, which are noticed under WOOLLEN AND WORSTED MANUFACTURES. South American sheep's wool is of an inferior quality.

Much finer wool would be produced in Britain than is at present, if it were not that the demand for mutton, and the unfitness of the merino sheep for supplying that article of good quality, lead our farmers to choose breeds which are *primarily* mutton-producing.

The following table will show at a glance the remarkable changes which have taken place in the sources from which Great

Britain has derived its supplies of wool, and also the steady increase in the aggregate quantity imported:

There are two great classes of manufactures using wool as a raw material: in the one where carded wool is employed, the goods

IMPORTS OF WOOL FROM THE PRINCIPAL COUNTRIES.

Year.	Spain.	Germany.	Australia.	South Africa.	East Indies.	South America.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1810	5,952,407	778,835	167	....	....	Insignificant previous to 1833.
1816	2,958,607	2,816,655	13,611	9,623	....	
1820	3,536,229	5,113,442	99,415	29,717	....	
1830	1,643,515	26,079,882	1,967,279	33,407	....	
1834	2,343,915	22,634,615	3,558,091	141,707	67,763	
1840	1,266,905	21,812,099	9,721,243	751,741	2,441,370	4,378,274
1850	440,751	9,166,731	39,018,221	5,709,529	3,473,252	5,296,648
1860	1,000,000	9,292,000	59,166,000	16,574,000	20,214,000	8,950,000
1870	25,262	4,912,600	175,081,427	32,785,271	11,143,148	12,457,631
1880	1,576,097	7,708,864	300,626,654	51,385,839	29,174,745	7,900,268

To get the total imports for each year, we would require to add the amounts from countries of lesser importance, which are not given; but in the annexed statement we give the total annual imports for the three years 1872, 1874, 1880: (1872) 302,500,925; (1874) 340,288,032; (1880) 460,960,907. For several years past, about one-third of the imported wool has been re-exported. The estimated produce of home-grown wool in 1871 and the three preceding years was as follows:

1871.	Total of Animals slaughtered, 12,370,056, estimated at 2¾ lbs.=	lbs. 34,017,654
1871.	Net Clip of Wool	144,985,712
1870.	" "	149,516,679
1869.	" "	155,591,096
1868.	" "	165,549,735

Independently of the vast amount of home and foreign grown wool which finds its way into our markets as wool that is in the condition fit for spinning and weaving, considerable quantities are retained on the skins, and made into rugs or mats for house and carriage use. For this purpose, skins of the very best quality are chosen, and it is necessary that the wool should be very long in the staple. After being carefully curried, the long silky locks of wool are dyed usually some bright color, and combed. The skins are pared to shape, and form handsome rugs, which are not only in great favor in Britain, but are extensively imported. The chief seat of this trade is at Bermondsey, in London, but it is also carried on to a considerable extent in other parts of the kingdom. Large numbers of Astracan sheep and lamb skins, usually black, are also imported in the wool, and are dressed and used as furs, that is, for personal wear; and some of the Slink lambs' skins for this purpose fetch high prices.

With respect to the wool, or woolly hair, of animals other than the sheep, which we have not already mentioned, the only one of much importance is mohair, or the wool of the Angora Goat (q. v.). Of this material, there were about 7,000,000 lbs. imported in 1881. It is a white silky wool, with an average length of staple of from 5 to 6 inches. The demand for it is only of recent origin, and, as will be noticed in our next article, it is chiefly used for certain kinds of ladies' dresses. The hair of camels, bullocks, common goats, and several furs are also used to some extent for manufacturing purposes.

The grand total of wool, shoddy, and goats' hair employed in the woollen industries of Great Britain in 1881 cannot have been far short of 500,000,000 lbs. The total import of raw cotton in 1881 was over 1,679,068,384 lbs.; but of this 1,854,559 lbs. were re-exported.

WOOLLEN AND WORSTED MANUFACTURES. The spinning and weaving of wool was practised from an early period in Asia Minor, Greece, Italy, and some other countries. It is very probable that the first lessons which our ancestors received in this art were got from the Romans after the Conquest; but the origin of the manufacture as a great staple is generally supposed to date from the time of William the Conqueror, when some Flemish weavers came to England, and obtained the patronage of the queen. The trade, however, fell off during the troubles of succeeding reigns. In 1331, it revived again by another supply of Dutch weavers brought over by Edward III. In 1530, the introduction of the spinning-wheel gave a new impetus to the trade. French workmen, driven to England by the revocation of the Edict of Nantes in 1685, still further aided it by their skill in the making of fine cloth, and from that time to the present it has steadily prospered. It is hardly necessary to state that the woollen trade has shared, in common with other leading textile manufactures, the great advancement they have received from the spinning-jenny, the mule, and the power-loom.

are called 'woollen fabrics;' in the other, where combed wool is used, the goods are called 'worsted fabrics.' We shall first treat of the *Woollen Manufacture*.

As our articles on SPINNING and WEAVING are general, we shall here briefly state the chief stages in these processes, as applied to the manufacture of woollen cloth. A fleece of wool is first sorted by experienced sorters into several qualities, as first sort, or 'pick-locks;' second sort or quality; third sort or quality; and so on. Sometimes, it is only divided into three, sometimes into as many as six kinds. The 'scouring' is the next step, and consists in immersing the wool in an alkaline lye, which forms a soap with the natural grease of the fleece. This of course acts as a detergent, and cleans the wool thoroughly when it is washed in water. Upon the perfection with which the scouring is performed, depends in great part the beauty of the dye. It is often dyed at this stage, and is then said to be *wool-dyed;* if not dyed till it is woven, the cloth is said to be *piece-dyed*. For some purposes, it is dyed in the yarn.

Scoured wool, whether dyed or not, next undergoes the operation of 'willying.' The 'willy' is a machine used to cleanse the wool from dust and other loose impurities. In many cases, seeds with hooked scales like burs are so thickly entangled in the wool, that it requires to be passed through a 'burring'-machine, and afterwards examined by 'pickers.' This is especially the case with South American wool, including that of the alpaca. After this, the wool is sprinkled with olive oil, which renders the fibres soft, flexible, and better fitted for later operations. The next process consists in tearing open the matted portions, and separating the wool into small tufts by means of a machine called a *teaser, tucker*, or *devil*. It has a large cylinder studded over with iron pikes, which performs from 1000 to 2000 revolutions per minute, teasing the wool as it revolves, and throwing it out like flakes of snow.

The two next operations are called *scribbling* and *carding*, and are performed by two somewhat similar machines, the essential parts of which will be understood by referring to figs. 6, 7, and 8 in the article SPINNING. Each machine consists of a large cylinder surrounded by several small rollers, all covered with wire cards or brushes. These, acting like fine tooth combs, open out, mix, and blend the fibres into a uniform and continuous sheet or lap, in which state it leaves the *scribbler;* but in the *carder* the sheet is at length converted into small rolls, say from a quarter to half an inch in diameter, which are afterwards joined together, and form the basis of the thread. In the next machine, called the *slubbing-billy*, these rolls are drawn out, slightly twisted, and, in short, half converted into yarn. The spindles upon which these *slubbs* or *slubbings* are wound pass them to the *spinning-mule*, where they are converted into finished yarn.

Comparatively recent improvements have made the operations of scribbling, carding, and slubbing continuous, mainly through the introduction of Apperly's patent feeder, and of a modification of the carding-machine called a *condenser*, which does away with the use of the slubbing-billy; so that what with the older machines is three separate processes, with the newer may be said to be only one. Each of the foregoing operations occasions a certain amount of 'waste' wool, which is worked up again into inferior goods. It was, in fact, to such waste that the name *shoddy* was originally applied. In the spinning process, the warp yarns, having to bear the strain of the loom, are made in a different way from those for the weft, and they are besides hardened with size.

The difference between woollen and worsted fabrics is owing in great part to the way the yarn for each is spun. Yarn for woollen cloth is very slightly twisted, so as to leave the fibres as free as possible for the felting process; worsted yarn, on the contrary, is hard spun, and made into a much stronger thread. On account of the feebleness of woollen yarn, it is more difficult to

weave it by power-looms than either worsted, cotton, linen, or silk. Woollen cloth is now woven chiefly by power-looms. See LOOM and WEAVING. When the cloth is taken from the loom, it has a bare look, and is called the *raw thread*. It first requires to be *brayed* or *scoured*, to remove the oil added to the wool before spinning, and the size added to the warp. This is done by immersing it in some ammoniacal detergent liquid, such as urine and hog's dung, and squeezing it between rollers, or beating it in the fulling-stocks, and then rinsing it in clean water. The cloth then passes to the *burler*, who removes any knots or burls, and helps any imperfections. The next process to which it is subjected is the *milling* or *fulling*, and it is a very important one. In some mills, this is still done by beating the cloth in the *fulling-stocks*, which are heavy wooden mallets, raised by wheels with projecting cams; but a newer *fulling-machine* has come into use, in which the cloth is felted by passing it in a confined space between heavy rollers.

With either machine, a thick solution of soap is used, and in the fulling-stocks an ordinary broadcloth will take 60 hours to mill, but a considerably shorter time suffices in the fulling-machine. The result of the operation is, that the fibres of wool become so interlocked—so thoroughly felted—as to leave no appearance of thread. The shrinkage of the cloth in the milling is sometimes nearly a half in the width, and about a fourth in the length. Another scouring follows the milling, and after that the nap or pile of the cloth is *raised* by Teasels (q. v.). These curious thistle-like heads are set in frames, which are arranged upon a large cylinder—the whole apparatus being called a *gig-mill*. As the cylinder revolves, the spines of the teasels raise the nap, which is afterwards cut by a process termed *shearing*. For this purpose, a cutting-machine with spiral blades arranged round an iron cylinder, is used; and when it revolves, the spiral cutters, acting against a straight steel blade, shear off the nap of the fabric like scissors. The cloth is then boiled, or 'scalded,' to impart a lustre to it, and to prevent spotting with rain. After this it is dyed (if this is not previously done in the wool), and finally it is pressed between polished iron plates in a powerful hydraulic press. With respect to the dyeing of black cloth, it may be as well to explain that the term *woaded colors*, so commonly used in the trade, originally meant that Woad (q. v.) was used in conjunction with indigo as the basis of the color—a combination which produces the best and most durable color. Of late years, however, the name has been applied to the color of the fabric when indigo itself has been used as its basis. It is only the finest cloths that are now dyed in either of these ways—logwood, a salt of iron, and galls being much more generally employed to produce a black.

Names are given to various kinds of woollen cloths according to the style in which they are finished, the special material of which they are made, and the purpose for which they are intended. *Broadcloths* are classed into 'superfines,' running from 54 to 62 inches wide; 'mediums' from 54 to 58 inches; 'double milled' from 54 to 56 inches; and Venetians, which are twilled fabrics, from 54 to 58 inches. The general term broadcloth also includes the following varieties, which, for the most part, have less highly-finished surfaces—viz., meltons, beavers, pilots, cloakings, china striped cloths, India cloths, elastics, lustres, and union cloths which have cotton warps and woollen wefts. *Narrow cloths*, which average about 27 inches wide, include cassimeres, a thin, fine, twilled fabric; doeskin, also twilled, a strong, smooth-finished, sometimes treble-milled cloth, now usually dyed black for trouserings; Tweeds (q. v.), which have very much taken the place of fancy doeskins; and several other varieties. Then there are special kinds both broad and narrow—such as army cloths, rifle cloths, police cloth, upholstery cloth, carriage cloth, coffin cloths, and many more. Flannels, blankets, and some kinds of shawls, are also included among woollen goods.

The public taste has changed very much of late years with respect to the finish of woollen cloths. Formerly, a firm, close, and hard fabric, with a highly-dressed or glossy surface, was in demand; now, a softer and more pliable finish, without gloss, is in favor. Foreign manufacturers think, however, that a soft, rich, elastic cloth is apt to lose in strength what it gains in appearance, and do not finish so highly as the English. The desire for fancy woollens is another marked feature of the taste of the present day, and compels manufacturers to expend considerable sums in the preparation of designs and colors. It has also led to the enlargement of old, and the establishment of new art-schools in both the woollen and worsted centers in Yorkshire.

Of all the changes, however, which the present generation has witnessed in this trade, the most remarkable is doubtless the production of cheap cloths by the use of shoddy; although cotton warps have also done much in the same direction. Prepared shoddy is obtained, for the most part, by tearing up woollen rags by a *swift*, with ten or twelve thousand iron spikes upon it, revolving inside an iron cylinder. Shoddy now enters to a greater or less extent into the composition of all but the very finest woollen cloths. It began to be used about 60 years ago, but the prejudice against it is scarcely yet overcome. In spite of this feeling, it has become so necessary, that to stop the supply, would be to shut one-third of the woollen mills in the kingdom. The excellent finish now given to woollen cloths containing a large proportion of shoddy, and also cloths with cotton warps, is quite surprising; and, moreover, their cheapness has brought comfortable clothing within the reach of the humblest classes. Cloths with too large an amount of shoddy in them are easily torn; but if a judicious admixture of pure wool has been employed, they wear comparatively well. Formerly, the only use of woollen rags was to make flocks for wall-papers, for saddler's stuffing, and some minor purposes—the greater part being used as manure.

In the British Islands, the various branches of the woollen manufacture are very extensively diffused. According to a factory return made in 1871, it was carried on in 22 counties of England, 12 of Wales, 27 of Scotland, and 16 of Ireland. The principal seat of the manufacture of superfine broadcloth is the west of England—Gloucestershire and Wiltshire especially—where it has existed for centuries. But Yorkshire is the great seat of the woollen manufacture, if we take in all the kinds, Leeds and Huddersfield being the great centers. One-half of all the operatives in the woollen factories of the kingdom are employed in Yorkshire, and here, too, the trade has increased most rapidly, both in the last and in the present century, owing mainly, it is believed, to the success of the manufacturers in producing cheap goods. Blankets are made chiefly at Witney, in Oxfordshire; at Dewsbury, in Yorkshire; and some places in the South of Scotland. Halifax and the surrounding district is the chief center for flannels, but they are also made largely in Wales. In Scotland, the woollen manufacture is a very extensive one, but it has, for the most part, been already described under TWEEDS.

The following statistics of the woollen industry of the United Kingdom are for the year 1875:

NUMBER AND EFFECTIVENESS OF WOOLLEN FACTORIES.

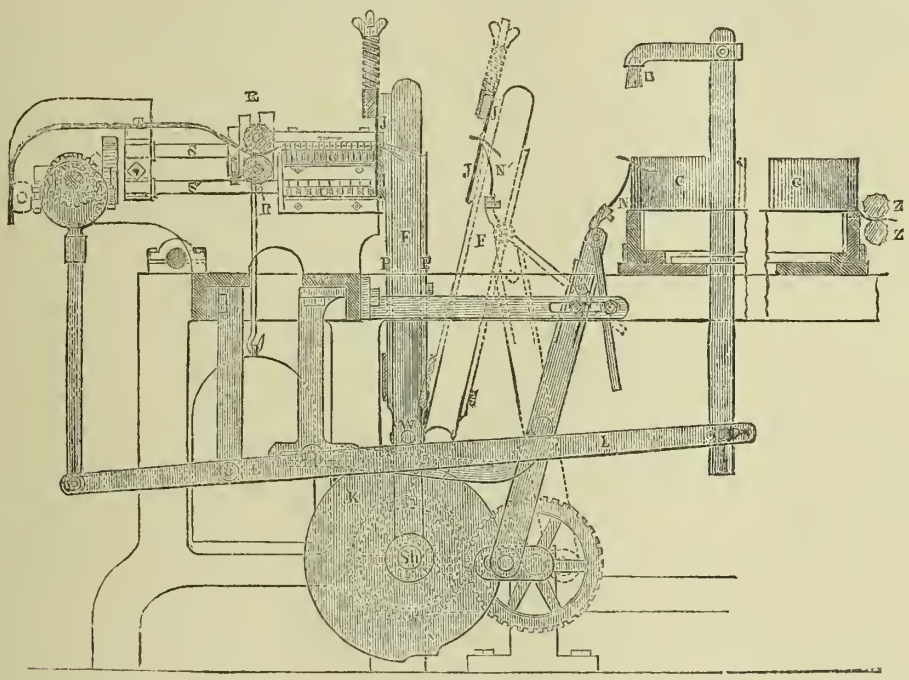
	Number of Factories.	Total Number of Spindles.	Total Number of Power-looms.
England and Wales—			
Factories employed in spinning	480	563,512	....
Factories employed in weaving	45	....	1,875
Factories employed in spinning and weaving	771	2,248,551	43,150
Factories not included in either of the above descriptions	187	....	....
Total	1483	2,812,063	45,025
Scotland—			
Factories employed in spinning	102	228,119	....
Factories employed in weaving	40	....	7,326
Factories employed in spinning and weaving	105	378,444	4,432
Factories not included in either of the above descriptions	10	....	....
Total	257	606,563	11,758
Ireland—			
Factories employed in spinning	35	10,780	....
Factories employed in weaving	....	....	....
Factories employed in spinning and weaving	25	30,076	307
Factories not included in either of the above descriptions	....	....	....
Total	60	40,856	307
Grand total of woollen factories	1800	3,459,482	57,090

NUMBER OF OPERATIVES EMPLOYED.

	England and Wales.	Scotland.	Ireland.	Total.
Males—under 13	4,391	579	7	4,977
" 13 to 18	10,726	2,770	194	13,690
" above 18	39,002	8,467	581	48,050
Total	54,119	11,816	782	66,717
Females—under 13	2,841	446	2	3,289
" above 13	48,411	15,466	722	64,599
Total	51,252	15,912	724	67,888
Total, Males and Females	105,371	27,728	1,506	134,605

This does not give a full idea of the vast number of persons to whom this great industry gives employment, but only those engaged in spinning and weaving. A very large number are occupied in sorting and stapling, and other operations before the wool goes to the mills and factories, and also in dyeing and scouring it, either as wool or as woollen yarn and cloth; and in many districts much work is done by hand-loom workers in their cottages. None of these come under the operations of the Factory Act, and are consequently omitted in the returns.

The imports of woollen and worsted yarns (not distinguished in the returns) were in 1861, 1,577,000 lbs.; in 1880, 14,947,679 lbs. . The exports of woollen and worsted goods in 1872 and 1880 were as follows: Woollen and worsted yarns, 39,734,924 lbs. in 1872, and 26,464,300 in 1880; woollen and worsted cloths, &c., 385,703,913 yards in 1872, and 239,940,700 in 1880; flannels, blankets, carpets, &c., 26,830,023 yards in 1872, and 22,414,800 in 1880. The total value was £37,028,628 in 1872, and £20,609,917 in 1880. The progress of the woollen manufacture has been less rapid and extensive than that of other textile fabrics, which is believed to be owing to its processes being more numerous and complex, to the greater variety of machines and of workpeople required, and to the high price of the raw material.



Wool-combing Machine.

Worsted Manufacture.—Worsted yarn, as has been already said, is spun in a different way from woollen yarn. In the former, the fibres are arranged as parallel as possible; in the latter, they are crossed in every direction, so as to assist the felting or milling of the cloth. For worsted the wool is first combed, and this was formerly done by hand-combs, a process which has only recently been entirely given up. The introduction of machines for combing wool has formed quite an epoch in the worsted trade. They are of two kinds—those used for combing long, and those used for combing short wool. Heilmann's machine, made in 1846, was the first which did its work successfully.

Lister's machine, now much used for combing long-stapled wool, is an improvement upon Heilmann's. It is shown stripped of some of its details in the annexed cut. At G there is a series of gill-combs, which, by means of a screw on the upper gill-shaft S, travels from left to right, and as each gill-comb reaches the jaws J, J, it drops to the lower shaft S′, which has also a screw. On this the gill-combs travel in the opposite direction, each being in turn raised to the upper gill-shaft by a cam. These gill-combs, which are heated by gas, are thus traveling in a circuit so to speak. The arrangement of toothed gearing by which the movements of the machine are regulated, we shall pass over, and trace the course of the wool. It is fed to the grooved rollers R. R, from which it passes to the gill-combs at G. As each gill travels forward to the jaws J, J, these close, detach from it a 'handful' of wool, and move forward on their frame F to the position shown by the dotted lines. At the same instant, the carrier-comb N′ takes up the position shown also by dotted lines, lifts from the now opened jaws the 'handful' of wool, and carries it forward to the large circular comb C, into the teeth of which it is pressed by the brush B. The comb C moves slowly round to the right till leather bands and rollers at Z, Z, remove the combed wool or 'top' in a continuous sliver. Another arrangement strips the comb of the 'noil' or short wool.

The remaining processes in worsted spinning closely resemble those for cotton, and are sufficiently described under SPINNING; the products of these are: 1. Fleece (Lincoln wool). 2. Combed 'top.' 3. Noils, or short wool. 4. Sliver from first drawing-frame, 5, 6, 7, 8, 9, and 10. Sluddings from second, third, fourth, fifth, sixth, and seventh drawing-frames. 11. Roving from roving-frame. 12. Spun Yarn.

Figured worsted yarns are woven by various kinds of looms (see JACQUARD LOOM and LOOM); plain kinds are woven in looms like those for woollens. Unlike woollens, when worsted goods leave the loom, they require only a superficial dressing.

Worsted stuffs are usually classified according to the materials of which they are composed, viz.: 1. Fabrics composed entirely of wool. 2. Fabrics composed of wool and cotton. 3. Fabrics composed of wool and silk. 4. Fabrics composed of wool, silk, and cotton. 5. Fabrics composed of alpaca and mohair mixed with cotton or silk. The *first* of these classes includes the fabrics so well known under the name of 'merinos,' and so called because they were first made of Spanish wool: for the 'double-twilled' kinds, the French still maintain their superiority; but for the 'single-twilled,' the Yorkshire makers are considered the best. This class also comprises shalloons, says, serges, lastings—all stout and heavy fabrics—besides durants, buntings, moreens, damasks, reps, Russells, camlets, and many others, both for dress and furniture. Mousseline de laine was, as its name implies, originally all wool, but it is now more generally mixed with cotton, and printed.

The *second* class includes two fabrics, of which the consumption for female dresses has been immense—viz., Coburg and Orleans cloths, the former being twilled, and the latter plain. Many of the names used in the all-wool class are retained in this, with the addition of the word 'union,' as union merino, union shalloon, union damask, &c. Winceys, now so popular for ladies' winter dresses, on account of their warmth, are made of wool and cotton, from yarns of a heavier and coarser kind than those used for cloths like Coburgs. Winceys are largely made at Aberdeen Perth, Glasgow, and other places in Scotland, as well as in Yorkshire.

The *third* class includes the rich Poplins (q. v.), and Tabinets (q. v.), made chiefly in Dublin, and giving employment there to about 1200 hands. Paramatta or Henrietta cloth, Canton cloth, and others, are made both of silk and wool, and cotton and wool. Some Coburgs, Orleans, Russells, and Damasks are likewise made with silk warps.

The *fourth* class—viz., mixed goods, in which silk, wool, cotton, and sometimes linen are used—includes peculiar kinds of some of the fabrics named above, and also vestings, linings, cravats, shawls, scarfs, quiltings, boot and shoe cloths, barèges, &c.

The *fifth* class includes alpaca lustres and mixtures—plain, twilled, and figured; alpaca poplins, umbrella and parasol cloth; mohair lustres, glacés, Verona serges, barèges, &c.

The term 'worsted' is said to have derived its origin from a village of that name in Norfolk, where this manufacture was first carried on. Up to the end of last century, worsted goods were a staple trade of Norwich; but the neglect of the factory system there led to its being transferred to Bradford, which has become renowned as the metropolis of the worsted manufacture. It is also extensively carried on at Halifax and other places in Yorkshire.

The following statistics of the worsted manufacture are gathered from the government inspectors' reports for 1875, and refer to that year:

NUMBER AND EFFECTIVENESS OF WORSTED FACTORIES.

Divisions.	Number of Factories.	Number of Spindles.	Number of Power-looms.
England and Wales—			
Yorkshire	520	1,981,086	65,789
Other counties	128	147,804	9,802
Total	648	2,128,890	75,591
Scotland	43	53,330	6,156
Ireland	1	572	....
Total—United Kingdom	692	2,182,792	81,747

NUMBER OF OPERATIVES EMPLOYED.

	England and Wales.	Scotland.	Ireland.	United Kingdom.
Males—under 13	14,074	95	..	14,169
" 13 to 18	10,694	564	1	11,259
" above 18	29.227	2.393	2	31.622
Total	53,995	3,052	3	57,050
Females—under 13	15.394	265	..	15.659
" above 13	62.441	6,938	9	69.388
Total	77,835	7,203	9	85.047
Total	131,830	10,255	12	142.097

The same remarks apply here as in the case of the return of persons employed in the woollen manufactories, given under that head, and with still greater force, for there are a very great number of small trades connected with the worsted manufacture. As the numbers at the top of page 813 show, the imports of both worsted and woollen yarns have greatly increased of late years, and is no doubt greatly owing to the ingenuity of the Belgians in spinning good yards from cheap wools, Belgium being the country from which by far the greater portion comes. In 1877, woollen and worsted cloths to the value of about £5,236,000 were imported.

With respect to the exports, the following will show the increase which has taken place from 1860 to 1874: 1860—Worsted yarn, 26.455.000 lbs. (£3.578.000); worsted stuffs, 148,685.000 yards (£7,013.000). 1865—Worsted yard, 30.221.000 lbs. (£5,074.000); worsted stuffs, 233,078.000 yards (£13,361,000). 1874—Worsted yarn, 34,263.916 lbs. (£5,472.612); worsted stuffs, 261,135.081 yards (£11.888,072). In 1880, the exports had seriously declined—worsted yarn, 25 612.500 lbs. (£3,237,818); worsted stuffs, 189,940.700 yards (£7.241,156).

The rapid increase of the worsted manufacture as compared with the woollen, is no doubt to be ascribed to the greater simplicity of the processes, to the recent introduction of combing-machines, but most of all to the introduction of cotton-warps in 1835, which not only cheapened the goods, but vastly increased their variety.

Information regarding such special branches of the woollen and worsted industries as carpets, shawls, hosiery, tartans, bonnets, &c. will be found under their separate heads. We may state here that the Scotch bonnet-trade, carried on at Kilmarnock and Stewarton, employs from 2000 to 3000 hands, and sends out about 500.000 bonnets annually.

WOOLLETT, WILLIAM, one of the most eminent of English engravers, was born in the year 1735 at Maidstone. He went early to London; studied his art under a practitioner of the name of Tinney, now only remembered as having taught him little or nothing; taught himself, however, a good deal, notwithstanding the aid of Tinney, and developing a manner of his own, soon became known as one of the most accomplished engravers of his time. In recognition of his merit, he was erelong appointed engraver to George III. As to his life, except as he is proved to have existed by his works, familiar at this day to every one, nothing is known. He died in London, in the year 1785, after a life of continuous and conscientious labor, as reward of which, a monument was erected to him in Westminster Abbey. His works, more especially in landscape, continue to be much prized by connoisseurs.

WOOLSACK, the name given to the seat of the Lord Chancellor of England in the House of Lords, which is composed of a large square bag of wool without either back or arms, and covered with red cloth. The woolsack was first introduced in the House of Lords as the Chancellor's seat in the time of Elizabeth, as a memento of an act which was passed against the exportation of wool, that commodity being then the main source of the national wealth of England.

WOOLSTON, THOMAS, a heterodox divine of the English Church, equally remarkable for ingenuity and learning, and for the singularity of his opinions, was born at Northampton in 1669. He was educated at Sidney Sussex College, Cambridge; was elected a Fellow of his college; entered into holy orders, and in due course proceeded to the degree of Bachelor of Divinity. Gifted with a lively fancy, he became a diligent and appreciative student of the works of Origen, and by them seems to have been first imbued with a taste for the allegorical interpretation of the Scriptures. That he was disposed to carry this principle of interpretation much too far for his contemporaries, appeared at once from his first work, published in 1705. This was, *The Old Apology for the Truth of the Christian Religion against the Jews and Gentiles revived*. In this work, W. maintained that Moses was only an allegorical person, and all his history typical of that of Christ; that the miracles of the Pentateuch were allegorical, and the miracles attributed to Christ and the apostles pure allegory too; and he stigmatized as atheists and apostates all who received the Scripture narratives as literally, historically true.

In subsequent publications, he went further in the same direction; also maintaining that the Quakers approached more nearly in doctrine and organization to the primitive church than any other religious body; and denouncing clergymen, because they made a profession of the pastorate, as 'hireling priests,' worshippers of the Beast, and ministers of Antichrist. In 1721, he published *The Moderator between the Infidel and the Apostate*, dialogues tending to show that the gospel miracles, by themselves, could not prove Christ to be the Messiah. This work occasioned great scandal; it abounded in expressions considered indecent and blasphemous; and it was only through the intervention of Whiston, who was friendly to him, and in favor of toleration in matters of opinion, that the author escaped a prosecution. Up to 1720, W. had continued to live in his college, leading a studious and blameless life, and showing great kindness to the poor. In 1720, he went to live in London; and in 1721, his college, upon some pretext—really on account of the scandal made by his writings—deprived him of his Fellowship. The views set forth in the last-mentioned work, W. developed more fully in a series of six discourses during the years 1727, 1728, 1729, republished under the title *Discourses on the Miracles of Christ*. He maintained—representing himself, as in all his works, as the defender of true Christian doctrine—that Christ's miracles, in themselves, were open to the gravest doubts; that, in fact, the gospel narratives, if they were to be taken literally, were only a tissue of absurdities; and that the authority of the ancient church was against the literal, and in favor of an allegorial acceptation of them. These views were supported with a good deal of warmth, and mixed up with them were fierce denunciations of the order of clergy.

The free-thinkers, both in England and on the continent, were now triumphantly quoting W. in their favor; and people who had previously been disposed to treat him as a maniac, whose rhapsodies were too wild to call for refutation, began to think it time to rescue the Christian faith from so dangerous and dubious a defender. No less than sixty answers were made to the *Discourses*. Now, too—Whiston no longer intervening—an indictment, at the instance of the Attorney-General, was brought against W., on account of the blasphemous and irreligious character attributed to his works. He was tried before Chief-justice Raymond at Guildhall, found guilty, and sentenced to be imprisoned for a year, and to pay a fine of £100, and ordered to find securities to the amount of £2000 that he would not repeat his offence. He was imprisoned in the Queen's Bench Prison; and being unable to pay the fine, and both unable and unwilling to provide the requisite securities, the remainder of his life was spent within the rules of the prison. It was not long protracted. He died on the 27th January 1731. His death-bed scene has often been described as if it supported the supposition that W. was insane, but surely without good reason. It is stated that as he felt death approach-

ing, he closed his eyes with his own fingers, saying to the turnkey who attended him, that he desired to die decently; and his last words were: 'This is a struggle which all men must go through, and which I bear not only patiently, but willingly.' His body was interred in the churchyard of St. George's, Southwark.

WOO'LWICH, a market-town and parish of Kent, the seat of the chief government arsenal of Great Britain, stands on the south bank of the Thames, about nine miles east of London. It stretches along the bank of the river for two miles, and reaches back from the river for half-a-mile, as far as the brow of the hill, where are the Royal Artillery Barracks and Hospital. The general appearance of the town has little to recommend it; but the southern suburbs are handsome and regular. There are numerous places of worship—established, Roman Catholic, and dissenting, and there are numerous schools, a theater, &c. Its dockyard, its government manufacturing establishments for the production of matériel of war of every description (except gunpowder), and the fact that it is a great dépôt for naval and military stores, and also the headquarters of the great corps of Royal Artillery, combine to render W. a place of great importance. A royal dockyard existed here as early as 1515, and the *Henrye Grace de Dieu*, which conveyed Henry VIII. to the Field of the Cloth of Gold, is said to have been built here, though this statement has been disputed. The *Royal George* (q. v.) was built here in 1751. The royal dockyard and ship-building establishment was, however, closed on the 1st October 1869. The yard comprised large dry docks, and a basin 400 feet long by 300 feet wide, and was furnished in every respect with the newest and most efficient apparatus. The Royal Arsenal, the largest in Britain, contains not only the largest stores of all kinds—shot, shells, cannon, &c.—which are required for our armies, navies, and forts, but it comprises also establishments for manufacturing them, and for constructing gun-carriages, and preparing ammunition for cannon and small-arms. These works are carried on in the three departments called respectively the Gun Factories, Carriage Department, and Laboratory. On the common, south of the town, is the Royal Military Academy, for the education of cadets destined for the Artillery and Engineers. See MILITARY ACADEMY, ROYAL; and GUN FACTORIES, ROYAL. Pop. (1881) 36,600.

WOONSO'CKET, a township of Rhode Island, U. S., on the Blackstone River, 16 miles north-by-west of Providence, containing a central and several smaller villages, numerous cotton-mills, woollen-mills, machine-shops, iron-foundries, sash, blind, and planing mills, factories of thread, silk, gold pencil-cases, jewelry, musical instruments, tin-ware, marble works, 7 churches, high school, and 2 newspapers. Pop. (1870) 11,527; (1880) 16,053.

WOO'RALI POISON. Since the original publication of the article CURARI, which is one of the synonyms of this substance, the physiological action of this fearful poison has been carefully studied by Drs. Weir, Mitchell, and Hammond, of the United States; and the Essay in which their joint labors are recorded is published in Hammond's *Physiological Memoirs* (1863). This Essay is so valuable, and contains so much original matter regarding two other allied poisons whose native names are *Corroval* and *Vao*, that we shall give a brief abstract of its contents; premising that, for the best account of the history of this remarkable poison, the reader should consult Bernard's *Leçons sur les Effets des Substances Toxiques* (1857, p. 238). We shall notice the physical and chemical properties of this poison before describing its physiological action. The best of the earlier investigations of the poison is that of Roulin and Boussingault in 1828, who obtained from the crude 'woorala' an alcoholic extract, to which they gave the name of *curarin*. This curarin was a solid transparent mass, of an excessively bitter taste, and possessed in an eminent degree of all the virulence of the woorali.

Heintz has subsequently examined the precipitate which tannic acid throws down from the watery solution of the poison, but only found that it contained no nitrogen, and was composed of apparently inert substances, as sugar, gum, resin, extractive matter, tannic and gallic acids, &c. He sought in vain for strychnine in it. Amongst the chief experimenters on the subject may be mentioned De la Condamine (*Mem. de l'Académie des Sciences*, 1745, t. 62, p. 391); Brocklesby (*Philosophical Transactions*, 1747, vol. xliv. p. 408); Herissant (*Philosophical Transactions*, 1751—1752, vol. xlvii. p. 75), who killed a bear with a poisoned arrow in less than five minutes; and nearly killed himself and a small boy who was evaporating an aqueous solution of the poison; both, however, recovered under the influence of fresh air, a pint of wine, and a quantity of sugar; Fontana (1781), who showed that (notwithstanding the above experiment) the vapor is not deleterious, and that the state of the stomach at the time when the poison was inhaled modified the result, an animal with a full stomach being able to resist the action of a dose that would prove fatal to one of the same size when fasting; Brodie (*Philosophical Transactions*, 1811—1812); Virchow and Münter (published in vol. i. of Schomburgk's *Reisen in Britisch Guiana*), who, *inter alia*, showed that the poison, even after being kept dry for five years, is still intensely active—that its physiological action corresponds with the result of analysis in showing the absence of strychnine, and that it rather



Woorali or Curari Plant (*Strychnos toxifera*).

belongs to narcotic than to tetanic poisons—and that death takes place not from any direct result of the poison, but indirectly, by causing the cessation of the respiratory process; Bernard and Pelouze (*Compt. Rend.*, 1850, t. xxxi. p. 534); Vulpian (*Compt. Rend.*, 1854, t. i., second series, p. 73); and Kölliker (*Proceedings of the Royal Society*, 1857), who, amongst other important conclusions, arrives at the following: (1) That the *urari* (as he terms it) causes death very rapidly when injected into the blood or inserted into a wound; and that when introduced by way of the mucous membrane, its effects are slow, and require a large dose for their production; when applied to the skin of frogs, it is inoperative—(2) it acts through the blood, and destroys the excitability of the motor nerves, while the sensory nerves are hardly at all affected—(3) when artificial respiration is carried on in animals under its influence, many of the secretions are increased, owing to the paralysis of the vascular nerves, and the consequent dilatation of the vessels—(4) that in mammals, the poison causes death by the paralysis of the respiratory nerves and suppression of the respiration, which brings on convulsions as a collateral effect.

The late researches of Weir, Mitchell, and Hammond, on the two hitherto undescribed varieties of the poison, named *Woorara, variety Corroval*, and *Woorara, variety Vao*, lead to the following results. The corroval, which is asserted to be the strongest arrow-poison, but of whose mode of manufacture they could learn nothing, was in large lumps of a brownish black color, resembling vegetable extracts of that tint. From its aqueous solution they obtained a substance possessing all the qualities of an alkaloid, and in an eminent degree the poisonous properties of the corroval, to which they assign the name *Corrovalia*. Hence it differs materially in its chemical composition from ordinary woorali. From a large number of experiments on living birds, mice, cats, frogs, and alligators, they find (1) that corroval differs essentially from any variety of woorali hitherto described in its physiological results; (2) that it acts primarily on the heart through the medium of the blood producing an arrest of the heart's action; (3) that the annihilation of voluntary and reflex movements is a secondary result of its action, depending primarily on the cessation of the heart's action; (4) that it acts upon the nerves from the surface to the center, and abolishes both the sensory and motor functions; (5) that it destroys muscular irritability; (6) that it paralyses the sympathetic nerve, this being one of its primary effects; (7) that it is absorbed both from the intestinal canal and skin of frogs; and (8) that its poisonous effects are due to an alkaloid hitherto undescribed. The authors devote 42 pages to a history of their experiments on *Vao* or *Bao;* but as they are of opinion that vao is only a weaker variety of corroval, it is unnecessary to follow their researches in this direction. It is obvious that in corroval and vao we have a fearful poison, quite distinct from ordinary woorali; and we have entered into further detail on this subject than we should otherwise have done, because, so far as we know, they have not yet been noticed by any English author.

WOOTZ is a finely damasked hard cast steel, which is obtained from India. Faraday found aluminium in a sample which he analyzed, and referred its peculiar properties to the presence of this metal; but other chemists have failed in finding aluminium in wootz.

WO'RCESTERSHIRE, one of the west-midland counties of England. The conterminous counties are those of Warwick and Stafford on the N., Warwick and Oxford on the E., Gloucester on

the S., and Hereford and Salop on the W. Area, 472,453 acres, whereof about 400,000 are cultivated. Its greatest length is 38 miles, and greatest breadth, 26. The surface is undulating, and there are depressed valleys and hilly ranges; two of the latter are of considerable extent, and adorn its eastern and western sides. On the west, the range terminates in the Malvern Hills, one of the highest points of which is the Worcestershire Beacon, about 1100 feet above the level of the sea. Its name is derived from its shape, a cone towering beacon-like above the lesser eminences of the chain; but the highest peak of the range is named the Herefordshire Beacon, which stands within the county of Hereford. The eastern range is the Bredon Hills, which form part of a chain extending from Bromsgrove Lickey, near Birmingham, to the Cotswold Hills, near Gloucester. The county is well watered, and finely timbered, especially with fruit-trees. The elm grows very luxuriantly, and indeed is so common in every corner as to have obtained the name of 'the weed of Worcestershire.' The oak, beech, and other timber trees thrive well, and of late the larch has been much planted. The principal rivers are the Severn, the Teme, and the Avon. Other streams there are, such as the Stour, the Salwarp, &c., but except in flood-times, these are mere brooks, and scarcely deserve the name of river. The Severn is navigable for vessel of 80 tons as high as Worcester, and for those of 60 tons to Stourport, 14 miles farther; and smaller boats can reach Shrewsbury, the river being navigable for 180 miles. There are three canals communicating with the Severn—viz., the Staffordshire and Worcestershire at Stourport; the Droitwich, a little way above Worcester; and the Birmingham and Worcester, in the immediate neighborhood of the city.

The W. portion of the Vale of Severn is about 30 miles long; the climate is mild and healthy; but the rainfall is comparatively small, and nearly the minimum of England. There are mineral springs at Malvern, Evesham, Dudley, and Kidderminster. Nearly the whole of the county is on the red sandstone formation, but the Malvern and Lickey Hills are of igneous origin. The soil consists of almost every variety suitable for vegetation, from strong deep clay and rich vegetable mould, to light friable sandy rye-land, with tracts of alluvial deposit, marl, and loam. The Vale of Evesham is dependent on the Avon for its fertility, which has long gained for it the reputation of being the garden of the mid-west. It produces abundance of table-fruit, and vegetables of the finest quality. The agriculture of W. has been greatly improved during the last thirty years, and high-farming is now much in vogue. Excellent crops of wheat and other grains, turnips, and potatoes are raised; a large portion of the land remains in the form of meadow, and much of it ancient pasture.

Hop-gardens are plentiful in the western division of the county, and their produce ranks, in the estimation of brewers, next to that of East Kent. W. is *par excellence* a perry county, as Herefordshire and Devonshire are cider counties. Its pear orchards are very beautiful in the time of blossom; and there is a splendid variety, called the 'black pear of Worcester,' which attains a great size, and is supposed to be the traditional pear blazoned on the county's shield of arms.

There is no distinctive local breed of stock, either cattle or sheep. The cattle in most favor are Herefords and Shorthorns; and among sheep, the favorite varieties are Shropshire Downs, Leicesters, Cotswolds, and cross-breeds. Pigs are abundantly bred and fed. The markets are well supplied with butcher-meat, bred and fed in the county; and London, Birmingham, and the 'Black Country' draw large supplies from Worcestershire. Poultry are raised in considerable quantity, and the W. farmer's wives have deservedly obtained a good name for the condition and neatness in which they are sent to market. The county possesses great mineral wealth in coal, iron, salt, lime: the first three are found in the north-eastern quarter of W., but lime is very generally distributed. Coal and iron mines are largely worked in the neighborhood of the populous borough of Dudley. Iron-works abound between it and Stourbridge, where glass manufactures of an ornamental character, on a large scale, have taken root; and there are abundance of coal-mines in the neighborhood. Quarries of limestone are largely wrought near Evesham and Pershore.

The textile fabric manufactures are nearly confined to carpet-weaving, which has long been carried on successfully at Kidderminster; but the town has almost ceased to produce that description of goods known by its name, 'Brussels' and 'tapestry' being principally manufactured. At and in the neighborhood of Worcester a considerable number of persons are engaged in glove-making. W. china, which has gained a world-wide reputation, is also produced upon a large scale in the capital city. At Redditch, the needle and fish-hook manufacture is carried on to a greater extent than in any other place in England; nail-making has been practised for centuries at Bromsgrove; and at Droitwich, about six miles from Worcester, salt has been manufactured for many centuries from an inexhaustible supply of brine. Pop. (1881) 380, 291, of whom about 200,000 are connected with mines and manufactures, and the remainder are engaged in agriculture, or dependent on trade. Of the above number, upwards of 8000 are engaged in hardware manufactures; a large proportion in nailmaking, the rest in the manufacture of iron and steel, glass and porcelain, needles, fish-hooks, tools, fenders, fire-irons, shovels, screws, rivets, swords, cutlery, and steel toys. The county is in the Oxford circuit, and in the district of the Birmingham court of bankruptcy. The county sends four knights of the shire to parliament, and six members for the boroughs of Evesham, Kidderminster, Droitwich, Dudley (one half of which is in Staffordshire), Bewdley (and Stourport united), besides two for the city—making a total of twelve members from Worcestershire.

WO'RCESTER, a city, capital and assize town of the county of the same name, and a county of itself, stands almost in the center of the Severn Valley, and is situated principally on the eastern bank of the river, about 26 miles south-west from Birmingham. W. is of great antiquity; there are abundant traces of ancient iron-smelting works on the banks of the river, adjudged by antiquaries to belong to the times of the Roman occupation; and the frequent discovery of other remains proves that the city was a Roman station. The chief object of antiquity now existing is the cathedral, which is beautifully placed on a gentle elevation on the east bank of the river, and stands within its own precinct, but which, since the passing of the act abolishing the isolation of 'peculiars' and 'non-parochial places,' has been incorporated in the city parish of St. Michael. A cathedrad dedicated to St. Peter, was founded here as early as the 7th c.

In 1084, Bishop Wulstan laid the foundation of a new cathedral, many portions of which remain in the present structure, such as the crypt (one of the oldest and most interesting in England), the bases of and fragments in many of the walls, chapter-house, refectory, and cloisters. In the Civil Wars, much damage was done to the building, but none of its leading features were destroyed. It is now distinguished by the simplicity, if not plainness, of the exterior, but which is amply compensated by the fine perspective, the lofty roof, and generally charming effect of the interior. A thorough restoration was commenced in 1855 under the late Sir G. G. Scott, and completed at a cost of about £100,000. The tombs of King John, and of Arthur, Prince of Wales (eldest son of Henry VII.), are the chief ancient monuments in the building. The Episcopal Palace in the city has been transformed into the Deanery; and the bishop of W., since the ecclesiastical commissioners assumed the management of the episcopal and capitular estates, has his residence at Hartlebury Castle. The bishop of W.'s revenue has been fixed by the ecclesiastical commissioners at £5000; and the livings in his gift are numerous and of considerable value. Worcester chapter consists of the dean, 4 canons, 24 honorary canons, and 4 minor canons, including the precentor. Besides 10 chorister boys, there are 40 other boys on the foundation at the College or Cathedral School, who receive gratuitous education, and about 60 non-foundation boys. There is also a city Grammar School founded by Queen Elizabeth, and largely attended. The parish churches of the city, eleven in number, are poor specimens of architecture. The city does not shine in public buildings. Next to the cathedral, the most important are the Shire Hall, the Guildhall, and the county prison; but there are also the city library, the W. Museum, a corn-exchange, and music-hall.

The battle of W., fought in 1651, is memorable in history, and Charles II., to commemorate the fidelity of the citizens to his cause, granted the motto to the city arms: 'Civitas in bello et in pace fidelis.' Pop. of the city (1881) 40,421. The people are employed in glove-making, including leather dressing and staining; in porcelain factories; iron-works, including locomotive-engine factories; tanning and currying, horse-hair weaving, vinegar, British wine and sauce making, and coach-building. Chemical manures and agricultural implements are also manufactured on a considerable scale. Glove-making is still considered the staple manufacture of the city; but one large factory has absorbed a large portion of the business, and now there are not above two dozen of master-glovers, great and little, whereas 40 years ago there were nearly 100 in the trade. There are two porcelain factories, and the number of hands employed by them in all departments is about 500. The Royal Porcelain Works are celebrated for fine taste in designing, and the beauty of execution of the highest class of productions; while the specialty of the other factory, Messrs. Grainger & Co.'s, is utility, combined with purity of design and excellence in workmanship. The glaced semi-porcelain is also famous. Hops are grown in the neighborhood; there is a trade in malt, corn, and coals. There are a daily and four weekly newspapers, one of the latter the oldest provincial paper in England (founded 1690). The city is on the Midland and Great Western Railways. W. sends two members to parliament, and is governed by a corporation consisting of a mayor, 12 aldermen and 36 councilors. It has also a recorder and sheriff.

WORCESTER, a city of Massachusetts, U. S., the center of a fine agricultural district, 45 miles west-south-west of Boston, with several diverging railways, in a valley surrounded by beautiful hills, with delightful sites for residences, broad shaded streets, and famed for its political and philanthropical conventions. Among its institutions are, the American Antiquarian Society, with a library of 50,000 volumes, and cabinet; the State Lunatic Asylum, which, in 13 years, out of 2306 patients, discharged 1000 cured; Oread Institute, for young ladies; high, grammar, intermediate, and primary schools, considered the model-schools of New England; also, manufactories of cotton, woollen, carpets, hollow-ware, pistols, wire, paper, saddles, locks, musical instruments, &c. There are 12 periodicals, 3 daily. Pop. (1870) 41,105; (1880) 58,295.

WORCESTER, Edward Somerset, second Marquis of, celebrated as an inventor, was born about 1601, and during the Civil War, was a zealous defender of the Royalist cause. Although regarded as a mere speculator by his contemporaries, W. invented the first working Steam-engine (q. v.), which could raise a column of water 40 feet in height, and was set up at Vauxhall, near London. This is described in his *Century of Inventions*, which dates from 1655 (reprinted in Dirck's *Life and Times of Marquis of W.*, 1865); also in his *Exact and True Definition of the Most Stupendous Water-commanding Engine*, &c. He died 3d April 1667.

WORCESTER COLLEGE, Oxford, was founded like Trinity and St. John's, on the site of an old monastic college. The ancient institution was known by the name of Gloucester College, because it belonged to the Benedictine Monks of that city. After the dissolution of the monasteries, it passed through various hands; and latterly, was a hall attached to St. John's College. In 1701, however, Sir Thomas Cookes left £10,000 for the purpose of endowing some existing College or Hall. This bequest led to the erection of Gloucester Hall into a College, for a provost, six fellows, and six scholars, by letters-patent of Queen Anne, 1714. Various fellowships and scholarships were afterwards added, until the number of fellows became 21, of scholars 16, but almost all restricted to certain counties, or to founders' kin. The Commissioners in 1855 reduced the number of fellowships to 15, open without restriction, except those on the Eaton foundation. The scholarships are now 16 in number. Most of the scholarships are of the value of £75, tenable for five years. There are also six exhibitions. There are ten benefices in the gift of this College.

WORD, in time of peace, a signal notified in the orders of the day, in virtue of a knowledge of which a sentry will allow the utterer to pass. In the field, the officer commanding fixes daily upon a word and countersign (for which any arbitrary terms are taken), and communicates them to the sentries on guard, and to such other persons only as he may choose to permit to pass through the lines. Any person then approaching a sentry without knowing the *word*, has a fair chance of being shot; if he knows not the countersign, the sentry will take him into custody, and deliver him to the officer of the guard. Care has to be taken that the 'word' should not suggest the 'countersign.' Any arbitrary combination is therefore adopted.

WORDE, Wynkin de. In returning to England about 1477 to introduce the art of printing, William Caxton (q. v.) brought with him Wynkin de Worde, a native of Lorraine, whose acquaintance he made at Cologne. De W. superintended Caxton's printing-office till the latter's death, and afterwards succeeded him. He made great improvements in the art of printing, and especially in that of type-cutting, which then formed a branch of the profession. He is said to have first introduced Roman letters into England, using them as we now use italics. In some of his books he even introduced a sprinkling of Greek, Hebrew, and Arabic, which were produced in wood-cut. He also made extensive use of engravings, which, however, appear to have been mostly obtained from the continent. The books printed by him are generally distinguished by their neatness and elegance, and far exceed in number those of his predecessor, being 408 distinct works against 99 by Caxton. De W. died in London about 1534.

WORDSWORTH, William, a distinguished English poet, was born on the 7th April 1770, at Cockermouth, in Cumberland. He was the second son of John Wordsworth, attorney, and agent on the estates of the first Earl of Lonsdale. He was sent to school at Penrith, where his parents had gone to reside; and after the death of his mother in 1778, was transferred to Hawkshead, in Lancashire, at the public school of which his earlier education was completed. In 1783, his father died, leaving his family in some difficulty. By Lord Lonsdale, a considerable sum was due to them; but his Lordship, a man of most eccentric character, saw fit to resist the claim, with all the vexatious impediments which the law so plentifully affords. Enough, however, remained, with some little assistance from relatives, to carry forward the education of the children. W. remained at Hawkshead till 1787, in which year he was entered at St. John's College, Cambridge. Here he remained four years. In the studies proper to the place, his interest was slight; but in his own fashion he was a diligent student; and poetry became more and more his favorite pursuit. In January 1791, he left Cambridge, after taking his degree as Bachelor. During the autumn of the previous year, he had, along with a fellow-student, made a pedestrian tour through France, then in the early fervors of its great Revolution; and thither, after leaving college, he returned. His sympathy with the aims of the Revolution was passionate; and with the party of the Gironde he seems to have cultivated relations of a somewhat intimate kind, which, in the end, might have seriously compromised him had not circumstances, probably of the pecuniary sort, determined his return to England some little time before his friends were sent in a body to the scaffold. The republican principles which at this time he held, he lived to renounce in favor of a reasoned conservatism; and opposed as he was, in its earlier stages, to the war waged against France, no one more patriotically urged it, when the struggle became in effect a life and death grapple on the part of England with the military despotism of Napoleon.

In 1793, W. came before the public as an author, in two poems, entitled *An Evening Walk, addressed to a Young Lady;* and *Descriptive Sketches, taken during a Pedestrian Tour among the Alps.* These pieces abound in touches of refined and original observation of nature, but otherwise are not in themselves specially remarkable; and they failed to make any impression, except on a few minds, such as that of Coleridge, then at Cambridge, who afterwards professed to have discerned in them the seeds of a great undeveloped genius. W. was now in a position of much perplexity; his little finances were almost entirely exhausted: for the church, which his friends would fain have had him enter, he had at this time an obstinate aversion; poetry had become with him a passion, to which he longed to wholly dedicate himself; and unhappily it appeared that *his* poetry would not in the least *pay*. As a poet cannot live like a singing-bird by pecking about the hedgerows, it became necessary for him to bethink himself of some means of support; and he was on the point of proceeding to London, to do liberal politics for the newspapers, when unexpected relief came to him in the shape of a legacy. The name of Raisley Calvert deserves to be remembered with that of Wordsworth. An intimate friend of the poet, he had formed a high opinion of his genius; and at his early death in 1795, he was found to have bequeathed to W. the sum of £900, expressly that leisure might for some years be allowed for the undisturbed development of his powers. Seldom has money been better bestowed; and small as the sum may seem, to a man of the poet's simple tastes and entire singleness of aim, it could suffice over a term of years. With his only sister, Dorothy, his attached companion through life, and always a devout believer in the brother, no little of whose genius she shared, he now settled himself at Racedown Lodge, in Dorsetshire, removing in 1797 to Alfoxden, in Somersetshire, in order to be near Coleridge, who had established himself some three miles off at Nether-Stowey. Out of the intimacy thus begun, came the famous *Lyrical Ballads*, published in 1798 by Cottle of Bristol, as a joint adventure of the two poets. The volume had no success; but probably no man ever lived more serenely self-appreciative than W.; and he did not allow himself to be disheartened by the neglect meantime of the world.

After a short tour in Germany, along with his sister and friend, he returned to his native Cumberland, which he never again permanently left. He settled himself first at Grasmere; in 1808, he removed to Allan Bank, in the vicinity; and in 1813, he transferred his household to Rydal Mount, the place which, of all others, remains specially associated with his memory. On the death of the old Lord Lonsdale, the justice of the claim of the Wordsworths against the estates was admitted; and in 1802, a sum of about £8000 was by his successor made over to the family. To W. and his sister, their moiety of the money may have been acceptable, as by this time, one should say, they must needs have been seeing pretty nigh to the end of Raisley Calvert's convenient £900. Henceforth, a modest competence was secure to them; and W. was wedded within the year to Mary Hutchinson, a cousin of his own, with whom he had been intimate from his childhood. In 1813, by the kindness of Lord Lonsdale, he was appointed Distributor of Stamps for the county of Westmoreland, a situation which brought him, without much to do for it, a salary of £500 a year. When, the year after, he published his great poem, *The Excursion*, he dedicated it to Lord Lonsdale, in a sonnet, expressive of 'high respect and gratitude sincere' for this comfortable increase to an income sufficient, perhaps, but certainly not excessive, for a man who had now a family growing up round him. Meantime, and pending the appearance of this elaborate work, the reputation of the poet had been surely, if slowly rising. In 1800, he had published, in two volumes, a second edition of the *Lyrical Ballads*, disjoining his own from those of Coleridge, and adding a quantity of new matter; and in 1802 and 1805, further editions had been issued. To these succeeded, in 1807,

a new collection, under the title of *Poems, in Two Volumes*. In these earlier writings, there was a good deal which almost willfully seemed to invite ridicule; and for a good while, W. was merely the laughing-stock of reviewers, more particularly of Jeffrey, who, as editor of the great *Edinburgh*, at this time figured as chief Aristarchus of the day. The more to popularize the ridicule, a nickname was invented; and 'the Lake School,' as it was called, which, with W., included Coleridge and Southey, who chanced to reside in the same district, passed current as an easy name of scorn. It could not be long concealed, however, that these volumes of W., despite an occasional eccentricity in the choice of mean and impracticable subjects, contained a large body of true poetry of a singularly fresh and original kind.

A select circle of passionate admirers, including men like Leigh Hunt, De Quincey, and Wilson, eagerly pressed the true claims of the poet; and after the publication of the *Excursion*, a volume of high and serious verse, gravely defective in plan, and at times heavy and tedious, but with little or no trace in it of the earlier oddities of the writer, it came more and more to be felt that the laughers were getting the worst of it, and that W., however he might now and then indulge himself in whimsical tricks, was really a man of true and lofty genius, against whom ridicule could not permanently avail. Their occupation was not yet, indeed, quite gone; and the subsequent appearance, in 1819, of *Peter Bell*, a poem not without profound merits, but unhappily with a donkey for the hero of it, allowed them to resume their advantage a little. But, on the whole, the day of idle jeer was over; the tide of genuine appreciation had set in, and it continued to flow steadily, till, long before his death, W. found himself recognized almost *nem. con.* as at the head of the poetical literature of his country. His later days were passed serenely in honor. In 1839, the university of Oxford conferred on him its honorary degree of D.C.L. In 1842, a pension of £300 per annum was assigned him by government; on receipt of which he ceded, in favor of his son, his situation as Distributor of Stamps; and on the death of his friend Southey, in 1843, he succeeded to the vacant laureateship. On the 23d April 1850 he peacefully closed a life so pure, serene, and priest-like in its consecration to a lofty purpose, that we must go back to Milton in order to find its parallel. It remains only to enumerate the publications of W. not included above. In 1815, appeared *The White Doe of Rylstone*, which was followed by *The Waggoner*, and a series of *Sonnets on the River Duddon*. In 1822, he published a volume entitled *Memorials of a Tour on the Continent;* some years after, his *Ecclesiastical Sonnets;* and in 1835, *Yarrow Revisited, and Other Poems*, the fruit of a tour to Scotland, memorable by his mournful parting, at Abbotsford, with the dying Scott, which he records in a beautiful sonnet. In 1842, he issued a collected edition of his works, rearranged as we now have them, in a somewhat fanciful fashion of his own. Shortly after his death, a long autobiographical poem, in blank verse, was published, entitled *The Prelude*.

By remanding it to truth and simplicity of natural feeling as its basis, W. did more than perhaps any other writer of his time to forward the great revival of English poetry which distinguished the opening of the century. But he was scarcely the originator of the movement; the new influence was, so to speak, 'in the air;' already Cowper in England, as in Scotland Burns, had preluded to the melodious outburst which was to follow; and to the last of these more particularly, as his early guide and exemplar, W. has expressly recorded his obligations in a stanza which, so far as we are aware, has hitherto escaped quotation:

> 'I mourned with thousands, but as one
> More deeply grieved, for *he* was gone
> Whose light I hailed when first it shone,
> And showed my youth
> How verse may build a princely throne
> On humble truth.'

With the charm of natural simplicity of manner, common to him with these his predecessors, W., however, combined a depth of philosophic meditation peculiarly his own; there was born with him, moreover, a passionate susceptibility to effects of beauty in the material world, such as few men can ever have been gifted with; and out of these blended elements arose that mystical communion with Nature which pervades the whole body of his poetry, and constitutes its truest claim to originality. By diffusion of this, and otherwise, his influence on our subsequent poetry has perhaps been as profound as any of the kind ever exercised, and it has been almost wholly beneficial. Yet we need not admire all we find in him. The early ridicule directed against him, though it sinned by excess and disproportion, was really to a great extent deserved. Had he gone on writing nothing but the 'Betty Foys' and 'Alice Fells' which Jeffrey laughed at, we should not have had in this place to do a biography of him. It is despite of a good deal of this kind of perverse drivel, besides indifferent matter otherwise, and not in the least because of it, that he continues, and must long continue, to be remembered.—See the memoir by his nephew, Bishop Wordsworth; and criticisms by Coleridge, Shairp, Hutton, and others.

WORK. To do work is to overcome resistance. If we try to lift a ton-weight, however we may fatigue ourselves, we cannot move it, and therefore we do no work. But we can lift with ease a hundred-weight, and then we do more work in proportion as we raise it higher. In lifting coals from a pit, the work done is evidently in proportion to the depth of the pit, and to the weight of the coals raised. This and numberless other instances are too well known to need further description. We may therefore at once define the *work done by a force* as *the product of the force into the space through which it moves its point of application in its own direction*, and it is usually measured by engineers and others who do not require absolute accuracy, in *foot-pounds*, the work required to raise a pound one foot high. If the motion of the point of application be in the *opposite* direction to that of the force, the work is done against the force. If the motion be perpendicular to the direction of the force, no work is done by or against the force. Thus, the work spent in projecting a curling-stone, in opening a massive gate, or in turning a large fly-wheel or grindstone, has nothing whatever to do with the force of gravity—the body moved, in all these cases, is, as a whole, neither raised nor lowered as regards its distance above the earth's surface. If the direction of the force be oblique to the direction in which the point of application moves, we must resolve the force, by the law of the Parallelogram of Forces (see COMPOSITION OF FORCES), into two components, one *in* the direction of motion, the other perpendicular to it. The former is the working component; the latter, as we have just seen, does no work. A good illustration of this is found in the case of raising stones from a quarry by carting them up a series of inclined planes, as contrasted with hauling them up vertically. The work done in either case is measured by the product of the weight of the stones, and the height through which they have been raised; and thus, for the same load of stones, it will be the same whichever process is adopted. This is evident from the property of the inclined plane—viz., that the force required to support a body resting on the plane (which is the force that has to be overcome when we haul it up the plane) is to the weight of the body as the *height* of the plane to its *length*. Hence, this force, multiplied into the length of the plane, gives the same product as the whole weight into the height of the plane; and these are the two quantities of work we are comparing.

When work is done upon a body, there is always an increase of velocity, unless other forces act on the body, so that it does an equal amount of work against them. Thus, if we push a movable body, such as a cart, along a road, the velocity gradually increases, and would increase indefinitely were there no friction and no resistance of the air (forces against which work has to be done), and could we move fast enough to keep continually pushing it, however great its velocity may become. If on the other hand, by means of a rope and pulley, we raise a stone, if once started, it will ascend uniformly, so long as we pull with a force just equal to its weight, because, then, as much work is done on the stone by the hand as it does against gravity. If we pull with a force greater than its weight, we do more work on the stone than it does against gravity, and the upward velocity increases; if with a force less than the weight, the stone has to do more work against gravity than is done on it by the rope, and its velocity upwards becomes less. The measure of the excess of work done on a body over that which it does against resistance is *the increase of the product of half the mass into the square of the velocity*—i. e., of what was formerly called the *Vis-viva* of the body, what is now called its *Actual*, or preferably, its *Kinetic Energy*. See FORCE. Hence, as it is evident that if a body, or system, be acted on by a set of forces which are in equilibrium, it will have no tendency to lose or to acquire velocity, its kinetic energy will remain unchanged, and therefore *as much work must be done upon it by some of the applied forces, as it does against the rest, in any displacement so slight as not to change the circumstances of the particular arrangement*. That is, when forces are in equilibrium on a body, if the body be slightly displaced, the sum of the products of each force by the effective component of the displacement of its point of application is zero—the product being positive when the force does work, negative when work is done against it. This is the celebrated principle of *Virtual Velocities*, the term virtual velocity having been, very inconveniently, applied to what we have called above the effective component of the displacement of the point of application of a force. It was often employed as the basis of the whole of Statics, and very curious attempts have been made to give proofs of it (independent of the laws of composition of forces), especially by Lagrange.

But the principle of work, or Energy, of which that of Virtual Velocities is a mere particular case, and which is at once applicable to the whole range of Dynamical Science, is distinctly enunciated by Newton in a Scholium to his Third Law of Motion. See MOTION, LAWS OF. His words are memorable, and should be universally known—*Si æstimetur agentis actio ex ejus vi et velocitate conjunctim; et similiter resistentis reactio æstimetur conjunc*

tim ex ejus partium singularum velocitatibus et viribus resistendi ab earum attritione, cohæsione, pondere, et acceleratione oriundis; erunt actio et reactio, in omni instrumentorum usu, sibi invicem semper æquales. Newton has defined what he means by the velocity of an agent —viz., the component of the velocity of its point of application which is in the direction of the agent. He has also shown what is the measure of resistance arising from acceleration (see VELOCITY); so that, merely using modern terms instead of those employed by Newton, but in nowise altering the scope of the above remarkable passage, we have the following version of it: *Work done upon any system of bodies* (literally, *the parts of any machine*) *has its equivalent in work done against friction, molecular forces, or gravity, if there be no acceleration; but if there be acceleration, part of the work is expended in overcoming the resistance to acceleration, and the additional kinetic energy developed is equivalent to the work so spent.*

When work is expended in overcoming the resistance to acceleration, i. e., the *Inertia* of a body, we have its equivalent in additional kinetic energy. When it is expended against gravity, as in raising a weight or bending a spring, we have it stored up in a dormant form as *Potential Energy*. See FORCE. When it is expended in overcoming friction, there appears at first sight to be no equivalent—but the comparatively recent researches of Joule (q. v.) and others have satisfactorily accounted for its disappearance, by proving its quantitative transformation usually into heat, sometimes into other forms of molecular energy. But to pursue this point would lead us again to questions already treated at some length in the article FORCE. There is one remark, however, which it is important to make. In compressing a gas, in the receiver of an air-gun for instance, we can never recover as useful effect all the work expended. The reason is, that a gas is *heated* by compression, so that part of the work spent is converted into this heat, conducted through the metal, and by the principle of *Dissipation of Energy* lost, at least in part, to man. Had we a gas which could not be heated by compression (take the imperfect analogy of a space filled with fine spiral springs), we should recover, by allowing it to expand, all the work expended in the compression.

One other remark remains to be made. It will be noticed that Newton speaks of the action of an agent as the product of the agent and the component *velocity* of its point of application. This is what we now call *Rate of doing Work*, or *Horse-power*. Watt estimated a horse-power at 33,000 foot-pounds per minute, or 550 foot-pounds per second. This is probably too high; but it is constantly employed in engineering calculations. A curious quantity, sometimes employed as regards steam-engines, especially those employed for pumping mines, is the *duty*, which is measured by the number of foot-pounds of work done by a hundred-weight of coals supplied to the furnace. A similar mode of comparison is now applied to steam-engines for agricultural purposes, &c.

The quantity of work which can be got out of any machine, human, animal, or other, depends in many cases on the rate at which it is done, or the horse-power actually exerted. An average man can easily work at the rate of a horse-power for a few minutes at a time; but if he were to work at no other rate, he would do very little work in a day. Various singular investigations have been made, both theoretically and experimentally, as to the most profitable rate of doing work, and their results are highly interesting. But to discuss them properly would require more space than we can afford. The following table, due to Poncelet, gives at least approximate notions of the horse-power employed, and the whole work done, in a working-day, by men and animals variously applying their exertions.

DESCRIPTION OF WORK.	Weight raised.	Velocity per Second.	Unit of Work per Second.	Length of Working Day.	Total work in a day.
	Lbs.	Feet.	Lbs. × feet.	Hours.	Lbs. × feet.
A man mounting an easy staircase, or an incline, without a load, his work consisting simply in moving the weight of his own body	143	0·5	71·5	8	2,059,200
A man raising weights by means of a cord and pulley, which renders necessary the return of the cord without a load	39·6	0·66 (say 0·67)	26·53	6	573,048
A man raising weights by his hands	44	0·56	24·64	6	532,224
A man carrying a weight on his back up an easy incline, and returning without a load	143	0·13	18·59	6	401,544
A man raising materials by a wheel-barrow, on an incline of 1 in 12, returning unloaded	132	0·065	8·58	10	308,880
A man throwing earth by a spade a height of 5 feet 4 inches	5·94	0·66 (say 0.67)	3·98	10	143,280
A man working a pin-wheel or a drum—					
1st, at the level of the axle	132	0·5	66	8	1,900,800
2d, at bottom of wheel	26⅔	2·34	61·8	8	1,779,840
A man walking and pushing, or drawing horizontally, in a continuous manner	26·4	2	52·8	8	1,520,640
A workman acting upon a winch	17·6	2·5	44	8	1,267,200
A workman pushing and pulling alternately in a vertical direction	13·2	2·5	29	10	1,044,000
A horse harnessed to a carriage going at a walking pace	154	3	462	10	16,632,000
" " " at a trot	96·8	7·22	699	4 5	11,323.800
A horse in a mill, at a walking pace	99·0	3	297	8	8,553,600
" at a trot	66·0	6·56	433	4·5	7,014,600
An ox in a mill, at a walking pace	132	2	264	8	7,603,200
Mule " "	66	3	198	8	5,702 400
Donkey " "	30·8	2·67	82·24	8	2,368,512

WO'RKHOUSE, the name given to municipal institutions, in England, in which paupers are supported and maintained. The earliest mention of them is to be found in stat. 13 and 14 Car. II. c. 12, authorizing workhouses to be erected in the cities of London and Westminster, to which rogues and vagabonds might be committed, by any two members of the 'Workhouse Corporation,' a Board created by the act, with the view of restraining them from predatory habits, and compelling them to work for their living. The provisions of this act were, for the first time, carried into effect in the reign of William and Mary, when a corporation, headed by the Lord Mayor of London, fitted up a house in Bishopsgate Street as a workhouse, one part of which, called the Keeper's Side, was devoted to the purpose contemplated by the act of Charles II.—viz., the reception of vagrants and disorderly persons, committed by two governors; while, in the other part, called the Steward's Side, poor children were lodged, and taught various employments and branches of education. A very few workhouses were afterwards erected by local acts; but their general adoption throughout England was first provided for by act 9 Geo. I. c. 7, by which the churchwardens and overseers of the poor, in any parish or town, were empowered, with consent of the majority of the inhabitants, to establish a workhouse, where the poor were to be lodged and maintained.

Two or more parishes might unite in having one workhouse, and one parish might contract for the maintenance of its poor in the workhouse of another. Under this statute, buildings began to be erected and hired all over the country, with great zeal for workhouses, in which the whole poor were housed, industrious and profligate alike. Out-door relief, which had been prohibited by the above statute, was reintroduced by 36 Geo. III. c. 23, and before long, became the rule under a variety of systems, by which assistance was carried so far as to be a bounty on indolence. The poor-rates rose immensely, and it became the subject of general complaint, that the able-bodied out-door pauper enjoyed a degree of comfort which destroyed all stimulus to exertion. The result was the passing of statute 4 and 5 Will. IV. c. 76, which has remodeled the whole administration of the poor-law, and greatly extended the workhouse system. The Commissioners appointed by that act, and the public Board substituted for these Commissioners in 1848, and made permanent in 1867, have been empowered, under certain restrictions as to consents, to order

workhouses to be built, altered, or enlarged as they see fit, and may make by-laws for their government, which the justices are to enforce. The various workhouse officers, including master, matron, schoolmaster, schoolmistress, nurse, porter, and superintendent of out-door labor, have all their proper functions assigned them. Persons having an order, either from the Board of Guardians, the relieving officers, or the overseers, are at all times entitled to admission; and in cases of necessity, applicants must be admitted without an order. If the house be full, the master is bound to refer the applicant to the relieving officer, whose duty it is to find him relief elsewhere.

Casual poor wayfarers, admitted by the master or matron, are to be kept in a separate ward; and by 34 and 35 Vict. c. 108, the guardians of every union are bound to provide within their respective unions casual wards with such fittings as furniture as the Poor-Law Board, in their judgment—regard being had to the number of casual paupers likely to require relief—shall consider necessary. There are various statutory enactments regulating the discipline of workhouses. Refusal to work at any suitable employment, intoxication, or other misconduct, is punished with imprisonment and hard labor, not exceeding 41 days. A pauper absconding with clothes or other property belonging to a workhouse, is liable, under 7 Vict. c. 101, and 13 and 14 Vict. c. 101, to imprisonment and hard labor. The usual rule, in accordance with which man and wife are separated, is, by 10 and 11 Vict. c. 109, relaxed when they are above 60 years of age. By 11 and 12 Vict. c. 110, persons professing to be wayfarers or wanderers are to be searched on admission, and any money found on their persons is to be applied to the common fund of the union; and an applicant for relief concealing such money, is to be punished as a disorderly person.

In every workhouse, a register is to be kept of young persons under 16 years of age who are hired as servants or bound apprentices, and the relieving officer is bound to visit them twice a year, and enquire into their food and treatment. By 31 and 32 Vict. c. 22, a register of religious creeds is to be kept in every workhouse. By 29 and 30 Vict. c. 113, the Poor-Law Board is empowered to direct the guardians to provide proper drainage, sewers, ventilation, fixtures, furniture, and medical and surgical appliances in every workhouse.

Workhouses are of various sizes. One of ordinary dimensions comprehends accommodation for 450 to 700 inmates of both sexes and different ages; others, in populous neighborhoods, as near Manchester, will accommodate 1500 inmates. Classification as regards sex and age is an important particular, and is usually well attended to. In some situations, the able-bodied inmates work at field-labor within boundary walls. There is no going in and out at pleasure. A workhouse is a sort of prison under stern, though not unkind discipline, and the leading principle always held in view is, that the offer of being accommodated shall act as a terror to idly-disposed persons, who are inclined to seek parish relief. The establishment of a workhouse really has this salutary effect; where there is no workhouse, the pressure on the poor-rates is generally excessive. A half-empty workhouse is thought a proof of good poor-law management.

In Scotland, the name workhouse is sometimes given to institutions for the support of paupers, but their correct legal designation is POORHOUSE. Previous to act 8 and 9 Vict. c. 83, establishments for the reception of paupers had been erected in many of the larger towns of Scotland, and the expense connected with their maintenance was considered a proper charge on the funds. Admission to these almshouses was granted, as a matter of favor, to the more deserving of the aged, infirm, and friendless poor. No system of discipline was enforced, as any improper conduct could at once be checked by expulsion of the delinquent.

Act 8 and 9 Vict. c. 83, which made a complete change in the poor-law system of Scotland, affords powers for the erection of new poorhouses, and for the enlargement and greater efficiency of those that previously existed. The classes of poor for whom they are designed are described as 'the aged and other friendless and impotent poor,' and 'those poor persons who, from weakness or facility of mind, or by reason of dissipated or improvident habits, are unable to take charge of their own affairs.' The Parochial Board of any parish, or combination of parishes, which contains above 5000 inhabitants, may erect a poorhouse as soon as a resolution to that effect has been approved by the Board of Supervision. Two or more contiguous parishes, with the concurrence of the Board of Supervision, may build a poorhouse for their common use; but no poorhouse can be built, nor any existing poorhouse enlarged or altered, until the plans have been approved by the Board of Supervision. The Parochial Boards of parishes, or combinations of parishes, in which there is a poorhouse, may receive poor persons from other parishes at rates approved by the Board of Supervision. When two or more parishes unite to build a joint poorhouse, the expense of its erection and maintenance is apportioned as determined by the parishes; and for the purpose of erecting, altering, or enlarging a poorhouse, power is given on certain conditions to borrow money on the security of the future assessments of the parish or combination.

Parochial Boards were empowered by the above act, under the sanction of the Board of Supervision, to frame regulations for the management and discipline of poorhouses. But the Board of Supervision has found it expedient, for the sake of greater efficiency and uniformity of management, to frame a general code of regulations, which, with a few modifications for peculiarly circumstanced parishes, now form the existing rules by which the Scottish poorhouses are administered. The management of each poorhouse is committed to a house-governor and a matron, subject to the orders of a committee of the Parochial Board or Boards of the parish or parishes to which the poorhouse belongs. There are minute provisions for the classification of inmates according to age and sex, the discipline, medical attendance, religious instruction, diet of the inmates, and the duties of the different officers. Each poorhouse is to be visited at least once a week by a committee of two or more members of the Parochial Board, who are to institute an inquiry regarding a number of specified particulars, the answers to which inquiries are to be submitted to the House Committee at each meeting. There were 63 poorhouses in Scotland in 1880, in connection with 429 parishes, with accommodation for 14,962 inmates.

WORKING-DRAWINGS are the large plans prepared by engineers and architects to guide the workmen in executing the design. Many of these are on a large scale, all mouldings and ornamental work having to be drawn out of the actual size of the work.

WORKING-PARTY, a body of soldiers told off, by command, to perform certain work or labor foreign to their ordinary duties. A small extra pay, called 'working-pay,' is allowed, averaging about 4*d*. a day.

WO'RKINGTON, a market-town and seaport of Cumberland, about a mile from the mouth of the Derwent, 7 miles direct north of Whitehaven, and the same distance by railway. Its harbor, furnished with a breakwater and several quays, is safe and commodious. To the coal-mines in the vicinity the town chiefly owes its prosperity—great quantities of coals being exported—but iron-foundries, malt-kilns, flour-mills, shipbuilding yards, rope and sail-cloth factories, breweries, and chemical works are in operation. Salmon fishery is carried on in the river. Railways run north, south, and east from W., establishing communication in all directions. In 1880, 1407 vessels, of 191,614 tons, entered the port, and 1319, of 179,330 tons, cleared. Besides coals, the exports are pig and malleable iron, and the imports timber, &c. Pop. (1861) 6467; (1881) 13,305.

WORKS, BOARD OF. By 46 Geo. III. c. 142 (altered by 50 Geo. III. c. 52), the management and control of public works and buildings, of which the expenses are defrayed from the crown revenues or parliamentary grants, were intrusted to an officer called the Surveyor of his Majesty's Works and Public Buildings, whose duties included the superintendence of the erection and repair of royal palaces, and buildings used for the various branches of government, and the management of public museums and parks. In 1832, the duties of this officer were transferred to the Commissioners of Woods, Forests, and Land Revenues (see WOODS AND FORESTS); but this arrangement eventually resulted in a complaint that the crown revenue was applied too easily to the execution of public works and improvements, by which means the Exchequer was deprived of the funds which were due to it in exchange for the Civil List, and parliament was unable to exercise the proper control over an important branch of public expenditure. The department of Public Works was therefore again separated, in 1851, from that of the Woods and Forests, and placed under the management of a new Board, called the Board of Works and Public Buildings, composed of a First Commissioner, specially appointed, who is a political officer, and has a seat in the cabinet, together with the Secretaries of State, and the President and the Vice-president of the Board of Trade, who are *ex-officio* commissioners. In addition to the control over public works and buildings, possessed by the former united Board, the Board of Works has also the management of the parks in the metropolis, including the public parks formed under recent acts, and of Richmond, Greenwich, Bushy, Phœnix, and Holyrood Parks, and the public gardens at Kensington, Kew, and Hampton Court. Among the duties of the Board are, the providing of public walks, and access to the national buildings and collections—a branch of administration which has, of late years, assumed a prominence which it did not formerly possess. The Board is also charged with many arrangements and responsibilities connected with the making of new streets and roads, in London and elsewhere, and the erection and repair of public statues. The Board of Works is under control of the Treasury, to whose sanction all large estimates for public works must be submitted. The Treasury appoint the secretary, clerks, and other officers of the establishment; and with the sanction of the Treasury, the

Commissioners appoint or employ such architects, surveyors, &c. as may be necessary. The salaries and expenses of the department, and the charges for all her Majesty's public works, are annually voted by parliament.

WORKSHOP REGULATION ACT, 1867. See article FACTORY ACTS.

WO'RKSOP (anciently *Wirkensop*), a town of Nottinghamshire, England, 24 miles north from Nottingham, on the right bank of the Ryton, a branch of the Idle, and near the Chesterfield Canal, which communicates with the Trent. It is situated near the northern extremity of Sherwood Forest. The town is generally well built, and great sanitary improvements of drainage and sewerage have recently been effected. There is a fine old church in the Norman style, with two lofty towers. W. was formerly noted for its Augustine monastery, of which there are now few remains. Much barley is grown in the neighborhood, and malting is carried on to a great extent. There is some trade in flour, timber, &c. W. is a station on the Manchester, Sheffield, and Lincolnshire Railway. Pop. (1881) 11,625.

WORM FEVER is a popular name for the affection more scientifically known as *Infantile Remittent Fever*. Although it is a disease which presents great differences in its course and symptoms, according to the circumstances which have given rise to it, its characteristic symptoms will be found to point (as Sir Henry Marsh, the eminent Dublin physician, long ago observed) to the mucous membrane as the original seat of morbid action. The disease seldom occurs during the first year of life; but from the second to the twelfth year, it is an affection often met with. Premonitory symptoms usually occur, and may last for some days. These symptoms are thus described by Dr. Evanson: The child looks ill, and loses his color; he is languid or fretful; complains of pain in the head or belly, is drowsy, but rests badly, starting in his sleep, or grinding his teeth. The appetite fails, the tongue becomes loaded, and the breath offensive. Fever now sets in; or the attack may commence with high febrile symptoms, and be ushered in by a cold fit. When once established, the fever is remarkable for the distinctness of the exacerbations, the daily number of which varies in different cases. There is, however, usually one well-marked exacerbation, occurring in the evening, and lasting till morning, and followed by a profuse sweat. Three is a common number—namely, one in the morning, one in the afternoon, and a third at night.

However cool and lively the child may at other times be, it becomes fretful, hot, and heavy, as the exacerbation approaches. During the febrile period, all the symptoms become aggravated. As the period of remission approaches, these symptoms gradually become less severe, and more or less perspiration appears. As the general disease declines, the intermissions become lengthened, while the exacerbations diminish in duration and in intensity. Worms are often present in remittent fever, and give rise to many of the above-named symptoms; but as the symptoms often remain after worms have ceased to be expelled, the latter cannot be regarded as being always the sole cause of this disease.

With regard to the treatment of remittent fever, the first point is to improve the condition of the intestinal canal, and to correct the morbid secretions poured into it. 'From the deranged state of the secretions,' says Dr. Evanson, 'the occasional use of a mercurial is often very beneficial; and it may be given combined with an aperient or a diaphoretic, according to the circumstances. The powder of jalap, simple or compound, is that which we prefer, and the addition of some ipecacuanha increases the effect.' He recommends the following formula: Powdered jalap, 30 grains; powdered ipecacuanha, 5 grains; calomel, 5 grains; white sugar, 10 grains. From 2 to 5 grains of this powder may be given every three hours, till the bowels are freely moved. He adds that, to give cool drinks, and keep the body cool by light clothing and the use of an airy apartment (while we enjoin quietness, and occasionally exclude the light), is essential to recovery. When the bowels are not irritable, a solution of crystals of tartar (bitartrate of potash) given cold, in the form of *Imperial* (see TARTARIC ACID), possesses many advantages, as it acts on the kidneys, while it allays thirst, and tends to keep the bowels open. In the more advanced stages, when debility sets in, we have found the mineral acids useful. They can be employed much sooner than quinine; but the latter may occasionally be prescribed at the close of the complaint. If there are decided signs of intestinal inflammation, leeches must be applied to the abdomen; when there is mere intestinal irritability, Dover's Powder and the warm bath will give relief.

If diarrhœa cannot be checked by other means, turpentine, in doses of one or two drops, rubbed up with gum-water, may be tried. In relation to diet, the great point is to avoid giving such food as leaves a bulky, indigestible residue. When convalescence begins, change of air often affords remarkable benefit.

WORM-GRASS. See SPIGELIA.

WORMS, or VERMES (COMPARATIVE ANATOMY), were till lately treated as a subdivision of the ARTICULATA; now they are usually a separate main division (see ZOOLOGY). Huxley confines the synonymous terms ARTICULATA and ARTHROPODA to the Insects, Myriapods, Arachnidans, and Crustaceans; and places the higher worms, or *Annelids*, with the above classes, in a primary division, or sub-kingdom, of ANNULOSA; and the less highly organized worms, *Scolecids* (in which he includes the *Rotifera* or wheel-animalcules, the *Trematoda* or flukes, the *Tæniadæ* or tapeworms, the *Nematoidea* or thread-worms, the *Acanthocephala* and the *Gordiacea*), in a sub-kingdom, to which he applies the term ANNULOIDA. The main reasons of his placing the worms under two great subdivisions are—(1) that the Annelids resemble the Arthropoda in the arrangement of the nervous system, which constitutes a ganglionated double chain, traversed at one point by the œsophagus; (2) none of the Scolecids possess any characters in common with the Arthropoda generally, or the Annelids, other than those which they have in common with all animals. No scolecid has a definitely segmented body, or bilaterally disposed successive pairs of appendages, nor has it a longitudinal chain of ganglia. These grounds of difference outweigh, in his opinion, the many points of resemblance between the Annelids and the Scolecids—as (1) the resemblance between the ciliated larvæ in many cases; (2) the resemblance between the forms of the mature bodies of many Scolecids with that of one of the most familiar of Annelids, which is so close as to have acquired for the Scolecids the popular name of 'worms;' and (3) the fact, that in the Annelids we see the representatives of that singular system of vessels which attains a perfect development in the 'water-vascular' apparatus of many Scolecids. The final settlement of the classification of these animals must be decided by further investigation.

With regard to the general characters of worms, it is well known that they are usually of a very elongated form. In the higher groups, the division of the body into a number of segments is very distinct; while in some of the lower forms no segmentation can be detected. The segments, when present, are usually homonomous, or, in other words, are mere repetitions of one another. The soft and contractile body may be cylindrical or slightly compressed, or it may be flat and broad, and usually presents a distinct dorsal and abdominal surface. The lateral region is often provided, in the higher forms, with special appendages, resembling minute stumps, which take part in the respiratory process. Amongst the cuticular appendages must be mentioned the bristles (*setæ*), hairs, hooks, &c., which are often seen. The nervous system of the highest worms—the Annelids—has been already sufficiently described in our notice of Professor Huxley's views. From this condition it appears in the Scolecids to become more and more rudimentary, till in the parasitic worms it totally disappears. The mouth is absent in the lower forms, but in the higher lies in the mesial line of the abdominal surface, in close approximation to the chief nervous (pre-oral) ganglion, from which most of the organs of the senses derive their nerves, as the eye, the auditory apparatus, and the organs of touch (especially the lips). Some of the parasitic worms, as the tapeworms, &c., are totally devoid of an intestinal canal; others, as the Turbellaria (with few exceptions), and the Trematoda, have an intestine, but no anal aperture; while the rest have an intestine provided with both mouth and anus. The latter, when present, lies on the posterior part of the body, and sometimes (as in many Turbellaria) on the dorsal surface. Except in the Gephyrea or Sipunculacea, the intestine, when present, is simple, and devoid of convolutions, but is often, as in the leech, provided with lateral blind sacs. The vascular system in the most highly organized worms consists of a closed system of arteries and veins, presenting modifications in different genera. A large vessel which runs beneath the dorsal integument may be seen under a microscope to contract and propel the blood forward, thus fulfilling the functions of a heart, and being the homologue of the dorsal vasiform heart of insects; while a corresponding venous trunk conveys the blood in an opposite direction, and runs along the under surface of the body.

These great trunks are united at each segment by transverse vessels, which carry the blood from the ventral vein to the dorsal artery. In the Nematelmia, or parasitic round-worms, the system is much simpler; and in the lowest worms, no trace of true blood-vessels is discernible. None but the Annelida (q. v.) or highest worms, possess special respiratory organs. These occur in various forms. Thus, in the leech and earthworm, a series of pores on each side of the body lead to as many simple sacculi formed by an inward folding of the integument. In the tubicolous Annelids, such as the *Serpula* (a common inhabitant in the aquarium), the respiratory organs are in the form of long flattened branchiæ, radiating from the head, and generally disposed in a spiral form. When not filled by the red circulating fluid, which the Annelids generally possess, they are often beautifully tinted with purple, green, and yellow colors, and form a gorgeous crown. In the *Arenicola piscatorum* (figured in the article ANNELIDA), the respiratory organs are seen lying as lateral tufts in the middle part

of the body (fourteen or sixteen in number on each side). In the lower worms, there are no definite respiratory organs, the process being carried on partly by the surface of the skin generally, and partly by the water-canals, noticed in the article TAPEWORM. As a general rule, the worms are hermaphrodites, only one of the five classes into which they are divided—viz., the *Nematelmia*, having the sexes separate. A large number of the lower kinds are parasitical; the others are inhabitants of sea, and fresh water, mud, earth, &c.

The worms are arranged by V. Carus into the five following classes: (1.) *Annulata*, corresponding to the *Annelids* of Owen, and described in the article ANNELIDA. (2.) *Gephyrea*, including the Sipunculus and its allies. (The term is derived from the Greek *gephyra*, a bridge, because the animals included in it form a connecting link or *bridge* between the Echinoderms and the true articulate animals.) In the article SIPUNCULUS (q. v.), in which, according to the old view, that animal is regarded as an echinoderm, there is a figure of a British species, the *Sipunculus Bernhardus*. (3.) *Chætognatha* (signifying *shaggy-jawed*, from the Greek *chaiteeis*, shaggy, and *gnathon*, a jaw), including the single genus *Sagitta*, which was formerly erroneously placed among the Nucleo-branchiated Molluscs. As the Sagitta is not elsewhere described in this work, we may notice that it is a little fish-like animal with a distinct head, the mouth armed with several pairs of lateral hook-like jaws, with an elongated body furnished with one or two pairs of fin-like organs, and with a broad and usually bilobed caudal fin. The sagitta (so called from its arrow-like appearance) is of small size, swims with great rapidity, and is common



Sagitta.

in the Mediterranean and in the North Sea. (4.) *Nematelmia* (from the Greek *nema*, a thread, and *helmins*, a worm), which are described in a special article. (5.) *Platyelmia* (from the Greek *platys*, flat, and *helmins*, a worm), or *Flat-worms*, which are divisible into the three orders: (1) *Turbellaria*, including the Planarias, &c.; (2) *Trematoda*, including the Flukes; and (3) *Cestoidea*, including the Tapeworms. These orders are described in special articles.

For further information on the subject of this article, the reader is referred to the various works and Memoirs of Milne-Edwards, Grube, De Quatrefages (especially his *Rambles of a Naturalist*), Schmarda, Blanchard, Leuckart, Williams of Swansea (in the Reports of the British Association), &c. The British worms were not till quite recently described by any competent naturalist, although the labors of Williams of Swansea and Johnston of Berwick are excellent as far as they go. Mr. Darwin's book on *The Formation of Vegetable Mould through the Action of Worms* (1881) contains much as to the habits of earthworms (see EARTHWORM). Dr. Johnston's *Catalogue of the British Non-parasitical Worms in the British Museum* (1865) is valuable, but partly out of date. The most complete work is the *Monograph of British Annelides*, published under the auspices of the Ray Society by Dr. Mackintosh of Murthly, one of the most distinguished of the younger generation of Scottish naturalists.

WORMS, AS A DISEASE OF INFANCY. As we have elsewhere (see ASCARIS, ENTOZOA, TAPEWORM, and VERMIFUGES) treated of the natural history of the worms infesting the human subject, and of the remedies to be employed for their expulsion, we shall mainly confine ourselves in this article to the symptoms which are usually considered to be indicative of the presence of worms in children. These symptoms are, however, in reality, only evidence of irritation of the mucous membrane of the intestinal canal, which may be due to other causes than worms, as, for instance, the presence of indigestible matter, unhealthy secretions, or the existence of a morbid condition of the membrane itself. 'Indeed, the latter,' says Dr. Evanson, 'would seem necessary, in many instances, for the production of any symptoms, although worms were present; as they have been passed by children in perfect health, who experienced no inconvenience on their account. Even the evacuation of worms does not prove that the symptoms present were caused by them, though doubtless they are likely to have been aggravated thereby. The worm *may* have been but an accidental accompaniment—a morbid condition of the mucous membrane being the true source of the symptoms.'—*On the Diseases of Children*, 4th ed. p. 345. Although all the symptoms commonly referred to the presence of worms may exist without them, yet there is a group of symptoms which pretty certainly indicate their presence, and which, when occurring together, should, at all events, excite our suspicions. These symptoms are divisible into (1) those dependent directly on the presence of worms in the intestines; and (2) those connected with the sympathetic relations of the digestive organs, and due to some form of reflex nervous action.

(1.) 'Worms,' says Dr. Evanson, 'may be suspected to be present when a child looks pale and grows emaciated, while his belly swells and becomes hard—a gnawing, pungent, or twisting pain being felt in the stomach or about the navel. The appetite is usually precarious, at times voracious; the breath is fetid; and the bowels often deranged, being alternately purged or costive, and much mucous passed in the stools. There is commonly picking of the nose, or irritation (often excessive itching) is felt in the lower part of the bowels; and when a child is old enough, he may complain of a sense of sinking or fainting, which seems to attend particularly on the irritation caused by worms. When symptoms are present, and cannot be accounted for by the existence of disease of the mucous membrane or of the mesenteric glands, we have good reason for believing that worms are their cause.'—*Op. cit.*, p. 347.

(2.) Amongst the most marked sympathetic symptoms are those of the head. The sleep becomes unquiet, and the little patient is liable to start up suddenly from slumber; grinding of the teeth is common; the pupils are often dilated, and there may be headache, and sometimes convulsions—symptoms painfully like those of Hydrocephalus (q. v.), but often disappearing on the expulsion of worms. A dry cough, unaccompanied by any signs of disease of the thoracic organs, is regarded as a sympathetic or reflex symptom of worms; and vomiting, hiccough, diarrhœa, tenesmus, and bloody stools often accompany their presence. The Round-worm (*Ascaris lumbricoides*) may be present in the small intestine (its ordinary seat) in large numbers without occasioning any disturbance; but when it does give rise to symptoms, the most prominent are sharp colicky pains about the navel, faintness, great emaciation, and voracious appetite. The Thread-worm (*Ascaris* or *Oxyuris vermicularis*) chiefly occurs in the rectum, where it often exists in large numbers, looking like bits of cut thread. In a recently voided stool, they are seen to be in rapid motion; hence they are called *Ascarides* (from the Greek *askaridzein*, to jump), and hence also, in all probability, the great distress which they occasion as compared with the quiet round-worms. The characteristic sign of the presence of these thread-worms is the itching and irritation felt in the rectum.

WORMS, an ancient and interesting but decayed town of Hesse-Darmstadt, in a highly fruitful district on the left bank of the Rhine, 20 miles south-east of the town of Darmstadt, and communicating with Mainz and Mannheim by railway. Pop. (1875) 16,597. Among its churches, the chief is the cathedral, a massive building in the Byzantine style, with four towers, founded in the 8th, and completed in the 12th century. On a hill near the church called the Liebfrauenkirche, a highly esteemed wine, called *Liebfrauenmilch*, is grown. The manufacture of polished leather employs 1200 hands; tobacco is also manufactured, and a trade in the wines and the agricultural produce of the vicinity is carried on. W. is one of the oldest cities of Germany, and is the scene of the *Nibelungen-Lied* (q. v.). It was occupied by the Romans, destroyed by Attila, and afterwards rebuilt by Clovis. It was frequently the residence of Charlemagne and his Carlovingian successors, was the place of convocation of many German diets, and was erected into a free imperial city by the Emperor Henry V. The most famous diet held here was that at which Luther defended himself before Charles V. and the princes of the empire (commemorated by an imposing monument to Luther erected at W. in 1868). The industry and commerce of W. were great during the middle ages, and its pop., as far back as the time of the Hohenstaufens, averaged 60,000, and even amounted to 30,000 at the close of the Thirty Years' War, but it was almost wholly destroyed by the French in the destructive war of 1689; and though soon after it was rebuilt on a smaller scale, it has never recovered its former prosperity. The site of the old town is only partially occupied by the present one, the rest being laid out in gardens. Here, in 1743, an offensive and defensive alliance was entered into by Great Britain and Austria with Sardinia.

WORMS, an island with an area of about 36 sq. m., belonging to the Russian government of Esthonia, and lying to the east of Dagö. It is flat and generally well-wooded in the interior, and throws out numerous steep promontories, round which strong currents run, so that, often for months together, it is cut off from all intercourse with the neighboring islands of Oesel, Dagö, Runö, &c., as well as with the mainland; and thus the inhabitants, who are of Swedish origin, have remained unmixed with foreign elements. A stranger is a rare and astonishing phenomenon on this island; and he, in his turn, is not less surprised at the peculiar old Swedish dialect, the architecture, and the manners and customs of this small, poor, but happy insular people.

WORM-SEED is the popular name for santonica, from which Santonin (q. v.) is extracted.

WORMWOOD is the popular name for *Artemisia absinthium*. It not only acts as an anthelmintic, as its name implies, but it likewise possesses tonic and stimulant properties, which prevent the reproduction of worms after their expulsion. An *Infusion of Wormwood*, made by pouring a pint of boiling water over an ounce

and a half of the dried plant, letting it stand for an hour, and straining, taken in doses of a couple of ounces once or twice a day,



Wormwood (*Artemisia absinthium*).

is a very good domestic tonic, and may be prescribed with advantage even in cases where worms are not suspected.

WORSAAE, Jens Jacob Asmussen, a distinguished Danish archæologist, was born in 1821 at Veile, in Jutland, where his father held the post of *justitsraad*, or councilor of justice. W. received the rudiments of his education at the Gymnasium of Horsens, from whence he proceeded, in 1833, to Copenhagen, with the intention of studying theology. Having, however, soon exchanged his theological studies for law, and again as speedily relinquished the latter, he turned his whole attention to the history and archæology of the north, which had from an early age presented special attractions to his mind; and in 1838 he obtained the place of assistant in the Royal Museum of Northern Antiquities at Copenhagen, which was then under the direction of the able Danish archæologist, C. J. Thomsen, to whom this most valuable collection owes its origin and its present state of excellence. In 1844, appeared W.'s important work, entitled *Runamo og Bravalla Slaget*, in which he, with consummate skill and profound erudition, definitely settled the long-pending doubts as to the authenticity and character of the Bleking rock inscriptions, and satisfactorily showed, that the supposed runes were no runes at all, but the mere weatherings of the rock; and consequently, that the interpretation given by the great Icelandic scholar, Finn Magnussen (q. v.), had no existence but in the mind of its author. This bold but conclusive solution of a long-pending problem, which, from the days of the great Danish historian, Saxo Grammaticus, had occupied the attention of the most learned men of the north, at once placed W. in the foremost rank of northern archæologists; and the numerous works and monographs which have appeared from his pen since then, have fully justified the high promise given by his early labors.

During the ten years intervening between this period and his nomination in 1854 to the honorary rank of Professor in the university of Copenhagen, W. made repeated visits to the other Scandinavian lands, to Great Britain, Germany, France, and other parts of Central Europe, which retained traces of the former presence of the Northmen. The Danish government defrayed the expenses of several of these journeys, the results of which have been the publication of numerous works and papers of interest, among which we may instance his *Minder om de Danske og Nordmænderne i England. Skotland og Irland* (Copenhagen, 1851); or Memorials of the Danes and Norwegians in England, &c., of which an English translation appeared the following year; and his treatise *Om en forhistorisk saakaldet tysk Befolkning i Danmark* (Copen. 1849); &c. Some of the most important of his works on the archæology of his native country are his *Danmarks Oldtid oplyst ved Oldsager* (Copen. 1843); *Blekingske Mindesmärker fra Hedenold*, 1846; *Danevirke*, 1848; *Den Danske Erobring af England og Normandiet* (1863); *Om Slesvigs Oldtidsminder* (1865). W. has always shown himself a warm patriot, and a strenuous opponent of the spread of German tendencies in the duchies, and his views in this direction were forcibly enounced in his *Jylland's Danskhed*, a treatise published in 1850, and especially directed against Jacob Grimm's exposition of the question of German national law. W.'s merits have been fully recognized by his countrymen; and the Danish government has constantly shown its sense of the estimation in which he was held, by placing him at the head of all important commissions connected with the archæology of the country, appointing him to important posts in connection with the University and Antiquarian Museums, and bestowing upon him various other marks of confidence and respect.

WO'RSTED. Besides the application of this term, explained under Wool and Woollen Manufactures (q. v.), it is also applied to the thick loose woollen yarn used for knitting stockings, &c., known in trade as fingering yarn.

WORT. See Beer.

WÖRTH, a village of Alsace-Lorraine, situated at the confluence of the Sauer and the Salzbach, about 10 miles S.W. of Weissenburg. Here, on the 6th August 1870, the French, under MacMahon, were outflanked and defeated with great loss by the Germans, commanded by the Crown Prince, who took 4000 prisoners. W. suffered considerably during the battle, hand-to-hand fighting taking place in its streets. Pop. over 1000, mostly Protestants.

WO'RTHING, a fashionable and rapidly-rising watering-place on the Sussex coast, ten miles west of Brighton. Pop. (1861) 5805; (1881) 10,976. Its importance began with the century, as, prior to that date, is was merely a small unvisited fishing-village. The climate is much milder than that of Brighton, the town and its immediate neighborhood being encircled on the north and north-east by almost an amphitheater of hills, which greatly shelter it from northerly winds, and render it one of the best places for a *winter* resort on the south coast. The town has no noxious trades or manufactures, but is essentially a place of resort for pleasure-seekers and invalids. It has one of the finest and longest sea-parades in the kingdom, being nearly two miles in length. The town has an excellent system of drainage, and is well supplied with water; whilst its mortality tables show a rate of only 14·5 per 1000. It is the neighborhood of W. that Dr. Richardson chose as the site of the ideal Hygeia or City of Health shadowed forth by him in 1875.

WOUNDS may be defined to be divisions of soft parts produced by external mechanical force. They have been classified by surgical writers in various ways, but the most useful arrangement is that which is adopted by Mr. Paget, in his admirable Memoir on 'Wounds,' in Holmes's *System of Surgery*, and is based on their mode of infliction. They are thus divided, first, into *open* and *subcutaneous* wounds: the former including those in which the outer part of the wound is almost or quite as extensive as the deeper part; and the latter, all those in which the outer part of the wound is very much smaller than the deeper part. These wounds (especially those of the first kind) may be further divided into (1) *incised wounds*, such as cuts or incisions, including those which remove a portion of the body; (2) *punctured wounds*, such as stabs; (3) *contused wounds*, in which the divided parts are bruised or crushed; (4) *lacerated wounds*, in which there is tearing of the tissues; (5) *poisoned wounds*, in which some poison or venom is inserted; and to these may be added, as a special variety, (6) *gunshot wounds*.

Simple, open, incised wounds will be more fully noticed than any of the others, because they have been most fully studied, and in their surgical relations are the most important. In a clean cut, whether made accidentally or in a surgical operation, three things are chiefly to be observed—viz., the opening or gaping by the retraction of their edges, the bleeding, and the pain. The *gaping* of a wound is caused by the retraction of the various tissues which are divided. Of the various tissues, the skin exhibits the greatest degree of retraction, and then (in the order in which they stand) elastic tissue, cellular or connective tissue, arteries, muscles, fibrous tissues, nerves, and cartilages. In addition to the immediate gaping of fresh wounds, many wounds, if they be not prevented, will continue to retract for a long time. For example, in stumps that heal slowly, the limb terminates in a cone, in consequence of the prolonged retraction of the muscles. The *bleeding* from an incised wound depends chiefly on the size and number of the divided vessels, and on their connection with the surrounding parts, but to a certain extent on the previous condition of the wounded part, or on the peculiar constitution of the patient. Gradually, with or without surgical help, the vessels cease to bleed; and then, if the wound be left open, there is an oozing of blood-tinged serous fluid, succeeded gradually by a paler fluid, which collects like a whitish film on the surface, and contains an abundance of white or colorless blood-cells, imbedded in a fibrinous (and therefore spontaneously coagulating) fluid. The nature of the *pain* cannot be made clear by any description to those who have not felt it; and it is more than probable that a similar wound inflicted on two or three persons would occasion different degrees of pain in each. There are also differences, as Mr. Paget has pointed out, 'in both the kind and degree of pain, according to the place and manner of the wound. Thus, in regard to the skin, wounds of the face and of the extremities of the fingers and toes, seem to be amongst the most painful; those of the back amongst the least so; and wounds cut from within are

less painful than those from without, The skin appears far more sensitive to wounds than any of the deeper structures, except the nerves of sensation themselves; but any part (as periosteum or tendons) may become, by disease or distention, highly sensitive.' —*Op. cit.*, p. 581.

The *local consequences* of an incised wound are indicative of inflammation. In the course of an hour or more, the edges of the wound and the adjacent parts becomes swollen and abnormally sensitive, feel hot and aching; the sutures (if any have been inserted) become tighter, and the edges and intervening spaces gape in consequence of the swelling. These symptoms gradually subside in two or at least four days, unless there is some abiding source of irritation. Except in very severe wounds, no *general consequences* are apparent. In these exceptional cases, as in amputations, for example, a shock and subsequent reaction (both of which are described in the article SHOCK) are observed. The duration of this feverish reaction or traumatic fever does not seem to bear any fixed relation to the severity of the injury. Sometimes it subsides within twenty-four hours; more often, after large wounds, it does not subside for three or four days, when the pulse and breathing gradually return to their natural standard, and the skin becomes soft and cool. The beginning of suppuration often coincides with the subsidence of the fever. If the fever should last more than four or five days after the receipt of the injury, there is probably some persistent irritation or some morbid complication.

The *healing* of open incised wounds may be accomplished, according to the high surgical authority from whom we have already quoted, in five different ways, if we include those in which the process is assisted by treatment—viz. (1) by immediate union, or (in surgical language) by union by the first intention; (2) by primary adhesion, or union by the adhesive inflammation; (3) by granulation, or by the second intention; (4) by secondary adhesion, or the third intention—i. e., by the union of granulations; and (5) by scarring under a scab, the so-called subcutaneous cicatrization. *Healing by immediate union* takes place when the wounded parts being placed and maintained in contact, first stick together, and then become continuous, without the formation of any new material as a connecting medium. For example, a flap of skin is raised by dissection in the removal of a tumor or a mammary gland, and is then replaced on the subjacent parts. In three days at most, the union may be complete, without any indication of inflammation, there being no evident efflux of blood, no exudation of reparative material, and no scar.

In *healing by primary adhesion*, lymph exudes from both cut surfaces, becomes organized, gradually connects the cut surfaces, and at length forms between them a firm layer of connective tissue, covered with a thin shining cuticle. These steps are well seen after the operation for hare-lip, for example. In *healing by granulation*, the wound becomes coated over with the white film, containing colorless blood-cells, as already described. If these glazed surfaces are brought and kept together, they will probably unite, the film becoming organized, and contributing to form a bond of union; but if the wound be left open, the film increases, and takes part in the formation of Granulations (q. v.). We cannot enter into the life-history of these granulations, and can only remark, that they are finally developed into a scar, consisting of fibro-cellular or connective tissue, with a superficial layer of epidermis. The completion of the healing is accomplished by the gradual improvement of the scar, in which the connective tissue becomes more perfect in its character, and the cuticle becomes thicker and more opaque. *Healing by secondary adhesion*, or by third intention, 'is accomplished by the union of two granulating surfaces (e. g., those of two flaps after amputation) placed and maintained in contact. In this state the two surfaces simply unite, or else new material, produced from either or both surfaces, adheres to both, is organized into continuity with both, and then unites them.'—Paget, *op. cit.*, p. 586. *Healing by scabbing*, or under a scab, is, according to the same authority, the most natural, and in some cases the best of all the healing processes. In animals, it is often observed that if a wound be left wide open, the blood and other exudations dry on its surface, and form an air-tight covering, under which scarring takes place, and which is cast off when the healing is complete. In man, this process is less frequent, because, in the first place, exudations seem to be more often produced under the scab, which detach it, and prevent the healing; and secondly, surgical interference seldom allows this method to have a fair trial.

Such are the several modes of healing of simple, incised, and all open wounds. We have now to consider the nature of the processes therein concerned. Every wound is followed by more or less tendency to an inflammatory process. This tendency may not proceed beyond an increased sensibility of the part and a slight efflux of blood, and there may be no inflammatory exudation; and this is the best condition for healing by immediate union in which no new material is required; or the inflammatory process may go on to the production of lymph, and then cease—a condition essential to healing by adhesion. In healing by granulation, a very low degree of inflammation (such as is requisite for the effusion of the first materials for granulation) is best; while for healing by secondary adhesion or by scabbing, inflammation must be altogether absent. The due understanding of these relations of inflammation and the healing processes of open wounds, affords important aid as to the *mode of treatment*. Nothing should be done to excite or increase inflammation. So much as may be necessary for some of the modes of healing, is sure to occur spontaneously, and more will only do harm; on the other hand, the inflammation excited by the wound does not require special treatment, except in the case of organs (such as the eye, the peritoneum, the lungs, the large joints, &c.) in which serious mischief may be very rapidly induced by inflammation. The position of the wounded part is a subject of considerable importance. 'When comfort has, as far as possible, been secured, the next object should be that the wounded part should be relaxed, so that the edges of the wound may come near or together; that no part, and especially no muscle, should be on the stretch, and that the direction of the wound may be such as will allow fluids to flow away from some part of it.'

In the great majority of cases, healing by immediate union, or by primary adhesion, is most desirable, and should be aimed at—the exceptional cases being wounds through many structures, and exposing considerable surfaces of deep-seated bones; deep wounds whose depth far exceeds their length; wounds of which the deeper portions of the sides cannot be kept in good contact; wounds through parts in a very inflamed or otherwise disordered state; and those which are likely to be troublesome from secondary hæmorrhage—in all of which there is a fear of the collection of blood and other fluids under the closed integuments. In attempting to induce healing by either of these modes, the points to be attended to are—the arrest of the bleeding, the cleaning of the wound, the exact apposition of its edges, and their maintenence in this position, and the exclusion of the whole wound from the air. If the bleeding arise from vessels of considerable size, they must be tied, twisted, and pressed (according to Simpson's plan) or crushed at their ends; but all these means, and especially ligature, should be avoided if possible, because they are impediments to exact union; and spontaneous closure of the vessels by the action of cold air or water, and pressure with dry lint, is preferable. The cleaning of the wound is best effected by allowing a gentle stream of water to flow over it. Soft sponges are sometimes useful for this purpose; but they must be used as dabbing (not as scrubbing) agents, and the greatest attention must be paid to their cleanness: the sponge used for the wounds or sores of one patient should *never* be applied to those of another. Apposition is effected by padding and bandaging, Sutures (q. v.), and adhesive plasters—the former being useful in deep wounds, while the latter two serve for more superficial wounds.

Although a simple incised wound, after its sides have been thus brought into complete contact, may be left exposed to the air, some covering to exclude the air is deemed preferable. Whatever is used should be light, not adhesive, and not prone to decomposition—its object being to protect the wound probably from a deleterious action of the air, and more certainly from sudden change of temperature, friction, and dust. Nothing is better for this purpose than lint soaked in oil, or simple cerate on perforated linen. The following remarks on the dressing of wounds are condensed from Mr. Paget's Memoir. No general rule can be laid down regarding the time at which any or the whole of the dressings should be removed. In small wounds about the face, union may be complete in two days; but it is not so firm as to be safe from probable accidents, and metallic sutures possess the advantage of exciting so little irritation, that they may be left in their places for any length of time, till union is perfectly secure. They should therefore not be removed for four days, or, in the case of large wounds, for a week, or longer. They should not all be removed at once, and those that are removed should be replaced by strips of adhesive plaster; the union or scar must be cleaned most gently, and protected from the plaster with oiled lint. If, on the first dressing, the union or adhesion of the wound is progressing favorably, then it will usually be sufficient to dress it subsequently on every second day; and if all goes well, the union of small wounds may be regarded as safe at the end of a week, and that of larger ones at the end of ten days or a fortnight.

The rules which we have here given for inducing healing by immediate union or by primary adhesion may, in an emergency, be carried out by any intelligent reader, and ought to be generally known. We do not enter upon the modes of inducing the forms of healing by granulation and by secondary adhesion, as they ought to be carried on under surgical superintendence; nor do we notice the last mode—that of healing under a scab—because it is simply leaving the wound to nature; the most that is required in this case in the way of auxiliary treatment being to cover the scab with dry cotton-wool, to protect it and the subjacent surface from any causes that may excite inflammation.

Of the other varieties of wounds, it is sufficient to notice the most important points severally peculiar to each variety. Of *punctured wounds*, the most serious are those which are made with blunt-pointed instruments, such as nails, pitch-forks, iron spikes, &c., for by these the injured parts are not so divided as that they may retract, but are pressed aside with much bruising, and can close again as soon as the instrument is withdrawn; and in this lies the chief danger of these wounds, because blood or other fluids are likely to extravasate into them, and cannot readily escape. These fluids, by decomposing or by mere pressure, may excite inflammation, and thus cause deep and confirmed suppuration, and great destruction of tissues. Some of the worst forms of these wounds are those produced by sharp teeth, probably (as Mr. Paget suggests) because of the force with which, as they tend to meet, the teeth crush the intervening parts. In *contused wounds*, the great question is, whether their union should or should not be attempted. If union is to be attempted, the rules given for the treatment of incised wounds must be followed, especial attention being paid to their careful cleaning, the removal of clots of blood, and their warm covering with some soft material, as cotton-wool. When it would be useless, from the extent of the bruises, &c., to attempt union, the following rules, as laid down by Mr. Paget, should be adopted: 'The part should be kept at rest, and as nearly as possible, at its natural temperature. For the latter purpose, and for protection, an excellent dressing is lint or cotton-wool thoroughly soaked in olive oil, and completely fitted to the part. Dry cotton-wool may be applied over this, or oiled-silk. Water-dressing may be similarly applied, or warm poultices, but they are generally less comfortable. Irrigation is, in some cases, very soothing, especially in ragged wounds, but it should be with tepid water. The methods of the dressing, after the first, may be almost the same as for incised wounds.'—*Op. cit.*, p. 598. The treatment of *lacerated wounds* is almost precisely the same as that of contused wounds. *Poisonous wounds* are sufficiently discussed in the article VENOMOUS BITES; and there is a special article on GUN-SHOT WOUNDS, which are, in reality, only an important variety of contused wounds.

In conclusion, it must be mentioned that various kinds of wounds are liable to certain complications, of which some are local, and others general or constitutional. Among the former are recurring or secondary bleeding, pain, spasmodic muscular movements, and the presence of foreign bodies; whilst the latter include defect or excess of reaction, traumatic delirium, fever, erysipelas, pyæmia, &c. Some of these complications are treated of in special articles of this work; and for the treatment of the remainder, we must refer to Mr. Paget's Memoir, from which most of the details of the present article are borrowed.

WOUVERMANS, PHILIP, a Dutch painter of note, was born in 1620 at Haarlem. From his father, Paul Wouvermans, a historical painter, he inherited a taste for art. He studied first with his father, and afterwards with John Wynants. He passed his entire life at Haarlem in the assiduous practice of his art, and died in the year 1668. Though his pictures are now highly valued, he is said to have had little immediate success, and to have lived in poverty, pretty much in the hands of the picture-dealers. His pictures are, for the most part, landscapes of small size, with figures profusely introduced, commonly in energetic action. His battle-pieces, in particular, are greatly admired for their spirit and vigor. He had two brothers, also painters, JOHN and PETER, who executed subjects somewat similar, and whose works have not unfrequently been attributed to him; but though both artists of considerable merit, they are plainly much inferior to Philip.

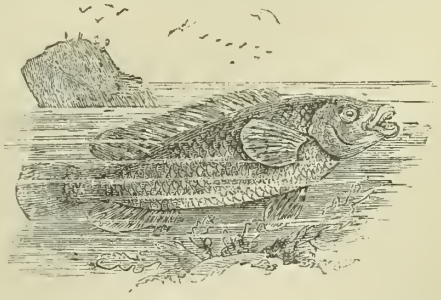
WRACK, or SEA-WRACK, a name sometimes applied indiscriminately to many of the larger *Algæ* of the sea-shores, but also employed to designate the species of the genus *Fucus* (see FUCACEÆ), some of the most abundant of which are employed on the British shores for the manufacture of Kelp (q. v.), and are also much used as a manure. The genus *Fucus* has a leathery, dichotomous, generally flat, linear frond, usually furnished with large air-cells, which are included in the substance of the frond; the spores arranged in tubercles, imbedded in mucus, and collected in *receptacles*, through the pores of which they are finally discharged. *F. vesiculosus*, popularly known as *Sea-ware*, *Kelp-ware*, and in Scotland as *Black Tang*, is extremely abundant on all the rocky shores of Britain, growing between high and low water mark, and most plentifully near high-water mark, often struggling for existence on the very upper line, and even found among grass and moss in marshy ground occasionally overflowed by the tide. It is the species chiefly employed in the kelp manufacture, because it is more easily collected than any other. It is of a dark olive-green color, sometimes two or three feet in length; the frond flat, entire on the margin, with a central rib; the air-cells spherical, in pairs, sometimes as large as hazel nuts; the receptacles solitary, terminal, turgid, compressed, mostly elliptical. Oxen, sheep, and deer eat it, and seek it on the sea-shore in winter when other feed is scarce. In Gothland, it is boiled and mixed with a little coarse flour as food for hogs. It has been used medicinally in glandular affections, probably owing its value to the iodine which it contains.—*F. nodosus* is another very common British species, sometimes called KNOBBED W., growing nearer to low-water mark than the last, and therefore not so often and easily accessible, but esteemed the very best species for the manufacture of kelp. It has veinless fronds, branched in a somewhat pinnated manner, with large solitary egg-shaped air-cells, in the central line of the frond. It sometimes attains a length of six feet.—*F. serratus* is also very common, and is easily distinguished by its serrated fronds, and the want of air-cells. It is sometimes called BLACK WRACK. It is less useful for kelp than the other species. In Norway, it is used as food for cattle, generally sprinkled with a little meal. It is preferred to other species for packing crabs and lobsters to be sent to market, as it keeps them moist, whilst, having less mucus than the other species, it is less apt to ferment and putrefy. Some other species of *F.* are common British *Algæ*, although much less abundant than these. The use of W. for manure is of great advantage to farmers on the sea-coast. This kind of manure is better adapted for light than for clay soils. The effect is beneficial for almost all kinds of crop. The W. ought not to be allowed to lie long in a heap, as it is injured by fermentation, but as quickly as possible applied to the land, and covered by the plough.

Some of the *Fuci*, as *F. vesiculosus* and *F. serratus*, on receiving injury by which any part of the frond is broken, throw out a cluster of young sprouts from the injured part.

WRANGEL LAND, an island or tract of land of unknown extent in the Arctic Ocean, lying north of the eastern extremity of the Asiatic coast, and intersected by the meridian of 180° E. long. It was discovered by the American Long in 1867, and named after the Russian explorer Wrangell (1795—1870), who sought to reach it.

WRANGLER, the name given at the university of Cambridge to those who have attained the first class in the public mathematical honor examinations. The word wrangler is derived from the public disputations in which candidates for degrees were in former times required to exhibit their powers. The examination is confined to mathematics, pure and mixed; it is conducted by two moderators and two examiners, with an additional examiner. The honor men who compose the mathematical *tripos* number usually about 100, and are divided into three classes—*wranglers*, *senior optimes*, and *junior optimes*, each candidate being placed in order of merit. The head of the tripos is called the *senior wrangler*. Heretofore this was the final result of the tripos, and this still holds for the first two parts of the examination; but it has been decreed that from 1882 onwards, the third part of the examination coming six months afterwards, is to have the effect of subdividing the *wranglers* into three classes, the members of each class being arranged alphabetically. See CAMBRIDGE, UNIVERSITY OF.

WRASSE, or ROCK-FISH (*Labrus*), a genus of fishes of the family *Labridæ* (q. v.), of the section having cycloid scales, *Cyclolabridæ* of Müller. They have spiny fins, large thin scales, and an uninterrupted lateral line. The mouth is protrusible, with thick fleshy lips, folded so as to appear double. The teeth on the jaws are simple, in one or more rows; the lower pharyngeal bones are



Ballan Wrasse (*Labrus bergylta*).

completely fused together, and have broad grinding teeth. The form is somewhat perch-like, with the back more straight. There is a single long dorsal fin, the spines of the anterior portion of which are surmounted by short membranous filaments, the posterior portion having short and split rays. The ventral fins are under the pectorals. The colors are generally very brilliant. The species are numerous, abounding in tropical seas, but several of them are found on the coasts of Britain. They chiefly frequent rocky shores, and are generally seen in small shoals, often hiding under sea-weeds. They feed on crustaceans, molluscs, and marine worms. They are often caught by bait intended for other fish, but their flesh is not much esteemed. The BALLAN W. (*L. bergylta*, or *maculatus*) is one of the most common British

species. It attains a length of about 18 inches, and a weight of more than three pounds. It is bluish green, paler on the belly, all the scales margined more or less broadly with orange red, the blue prevailing in some specimens, and the orange in others. The COOK W. (L. *mixtus* or *variegatus*) is not unfrequent on the southern shores of England. Its prevailing color is orange, striped transversely with blue, particularly in the male, the colors of the sexes differing so much that the female has often been described as a distinct species, and is generally known as the RED WRASSE. There are several other British species of this and closely allied genera, as the CORKWING (*Crenilabrus, melops.* or *tinea*), about six inches long, and of a greenish blue color, varied with yellow. The colors quickly fade after the fish is taken out of the water.

WREATH, WREATHED, in Heraldry. A wreath is a twisted garland of silk of different colors, otherwise called a torce, on which it has, since the 14th c., been usual to place the crest. The side-view of a wreath thus drawn exhibits six divisions, which are generally tinctured with the livery colors—that is, the principal metal and color of the shield. Every crest is now understood to be placed upon a wreath, except when it is expressly stated to issue out of a chapeau or coronet. A wreath, when represented alone, shows its circular form. A Moor's head is sometimes encircled with a heraldic wreath. A wreath is always understood to be the twisted garland of silk above explained, unless otherwise specified; but wreaths of laurel, oak, ivy, &c. sometimes occur, and savages used as supporters are often wreathed about the head and middle with laurel. Ordinaries are occasionally *wreathed*, otherwise called *tortillé*, in which case they are represented as if composed of two colors, twisted as in the heraldic wreath; as in the coat of Carmichael, argent, a fess wreathed azure and gules.


Wreath.

WREDE, KARL PHILIPP, PRINCE OF, a Bavarian field-marshal, was born at Heidelberg 29th April 1767. Belonging to a noble family, he early obtained official employment, and in 1792 was assessor to the high court of Heidelberg; in 1793, was elected 'civil commissary' in the Palatinate, and in this latter capacity accompanied for five years the armies of Wurmser, Duke Albert, and the Archduke Charles, in Italy and Germany; and frequently took a direct share in military operations. In 1799, his military career may be said to have commenced by his leading a body of Bavarian volunteers to join the Archduke Charles, and for his distinguished conduct in that campaign he obtained, 15th May 1800, the grade of major-general. After the peace of 1800, he devoted much time and labor to the organization of the Bavarian army; and when war was renewed, found himself at the head of the Bavarian contingent, well disciplined and thoroughly equipped, fighting side by side with his former foes the French, and took a prominent part in most of the campaigns against the Austrians, Prussians, and Russians till 1813. But, after the retreat from Russia, offended at some real or fancied insults which had been offered to him, he returned to Munich, joined the anti-French party, which was headed by the queen and crown-prince; and though his intrigues were put a stop to by the victories of Lützen and Bantzen, he soon after succeeded in bringing about the treaty of 8th October 1813, by which Bavaria joined the coalition against France, and before the end of the same month, was at the head of 70,000 men.

Attacked by Napoleon with an inferior force, he was, after a bloody and protracted contest, defeated at Hanau. He was chosen soon after to command the fourth corps of Schwarzenberg's army, and though unsuccessful in most of his petty conflicts, contributed considerably to the successful advance on Paris. His services were rewarded by the dignities of field-marshal (7th March) and prince (9th June 1814), and by the gift of the domain of Ellingen. On the brief renewal of the contest during the 'Hundred Days,' W. was preparing to invade Lorraine, when the battle of Waterloo put an end to the strife. After this period, W. was employed on many important missions, and was charged with the pacification of Rhenish Bavaria during the revolution of 1830. He died at Ellingen, 12th December 1838.

WREN, SIR CHRISTOPHER, a renowned English architect, was born at East Knoyle, in Wiltshire, on the 20th of October 1632. His father, Dr. C. Wren, was Dean of Windsor, and his uncle, Dr. M. Wren, was Bishop successively of Hereford, Norwich, and Ely. At an early age, young W. was placed at Westminster School, under the celebrated Dr. Busby, and while yet only in his fourteenth year, was entered a gentleman-commoner of Wadham College, Oxford. Here he made considerable progress in mathematical studies, and attracted the notice of the cultivators of physical science—whether resident at the university or visitors—by his inventions of certain mathematical instruments, and his general zeal and enthusiasm in the pursuit of experimental philosophy. In 1650, he took his degree of B.A., and in 1653, that of M.A., having been previously made Fellow of All Souls. He now also became a member of a society established at Oxford for the improvement of natural and experimental philosophy; and in 1654, is spoken of by Evelyn, in his *Diary*, as 'that miracle of a youth;' also, in his *Sculptura*, as 'that rare and early prodigy of universal science.' The acquaintance thus begun, ripened into a firm friendship between W. and Evelyn.

In 1655, W. greatly assisted in perfecting the barometer, then only recently invented. In 1657, he left Oxford for London, where he became Gresham Professor of Astronomy. In May 1661, however, he returned to Oxford, as Savilian Professor of Astronomy. The same year, he received the degree of D.C.L. Before leaving London, W. had, in conjunction with Lord Brouncker, the Hon. Robert Boyle, Mr. Bruee, Dr. Wilkins, Sir Robert Moray, and others, who used to meet together at Gresham College, laid the foundation of the future Royal Society. Before the Society was formally incorporated, the members felt much the absence of W. from their meetings, and one of their first proceedings was to get the king to lay his commands upon him to perfect a design he had in hand of a globe of the moon, and to 'proceed in drawing the shapes of little animals as they appear in the microscope.' The lunar globe was finished much to the satisfaction of his Majesty, who placed it in his cabinet of rarities. He also summoned W. from Oxford to assist Sir John Denham with his advice on architectural subjects; the poet Denham having been appointed Surveyor-general of his Majesty's buildings, but possessing little or no knowledge of the subject.

The study of architecture was one to which W. had given great attention, while still a very young man, notwithstanding his devotion to mathematics, astronomy, chemistry, and even anatomy. In 1663, in his capacity of Assistant Surveyor-general, he was offered a large salary to go to Tangier, to survey and direct the works at the mole, harbor, and fortifications; but this commission he declined. In the same year, W. was engaged by the Dean and Chapter of St. Paul's to make a survey of the cathedral, with a view to certain projected repairs in that vast fabric. He accordingly drew up a very careful and elaborate account of the state of the building, with suggestions for its improvement, and accompanying drawings and designs. All of these were laid before the king; but before any further steps were taken for the restoration of St. Paul's, that building was levelled to the ground by the memorable fire of 1666, and W. was destined to be the architect of the new cathedral, instead of the restorer of the old.

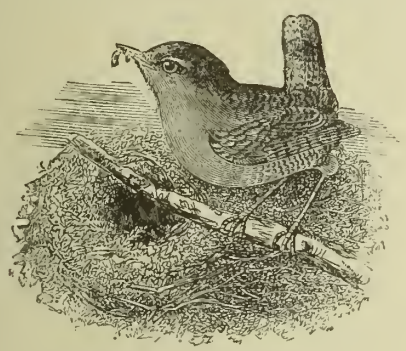
The first work actually built from a design by W. was the chapel at Pembroke College, Cambridge, in 1663. But in the same year he designed the Sheldonian Theater at Oxford, which was commenced in 1664, and finished in 1669. In 1664, W. also designed some valuable additions to the buildings at Trinity College, Cambridge; particularly the beautiful western quadrangle known as Nevile's Court. To this he added, in 1666, the Library of Trinity College, said by Gwilt to be 'one of his finest productions, and one with which he himself was well satisfied. It consists of two orders; a Doric arcade below, open to a basement supported by columns, which has a flat ceiling. . . . The principal story is decorated with three quarter columns of the Ionic order, well proportioned.'

In 1665, W. visited Paris, where he made the acquaintance of Bernini, architect of the Louvre, and of other distinguished men. In the following year, he returned, to find the Royal Society earnestly engaged in searching out the causes of the great plague, so soon to be succeeded by the great fire which laid London in ashes. This disaster at once opened a wide field for the exertion of W.'s genius. He formed a plan, and drew designs for the entire rebuilding of the metropolis, embracing wide streets, magnificent quays along the banks of the river, and other well-considered improvements. In rebuilding London, however, few of W.'s recommendations were adopted. He was certainly chosen to be the architect of new St. Paul's, one of the finest non-Gothic cathedrals in the world; besides which, he designed more than fifty other churches in place of those destroyed by the fire. The great church of St. Paul, built on the model of St. Peter's at Rome, was begun in 1675, and completed in 1710, when the last stone was laid upon the lantern by the architect's son, Christopher. Besides the numerous churches mentioned, W. built the Royal Exchange, London, in 1667; Custom-house, London, in 1668; Temple Bar in 1670; the Monument in 1671—1677; the College of Physicians in 1674—1698; the Royal Observatory, Greenwich, in 1675; the Gateway Tower, Christchurch, Oxford, in 1681—1682; Chelsea Hospital, 1682—1690; Ashmolean Museum, Oxford, 1683; Hampton Court, 1690; Morden College, Blackheath, 1692; Greenwich Hospital, 1696; Buckingham House, 1703; Marlborough House, 1709; the towers at the west front of Westminster Abbey in 1713; besides the unfinished palace of Winchester, in 1683.

In 1672, W. received the honor of knighthood. In 1674, he married Faith, daughter of Sir John Coghill, by whom he had a son, Christopher, who survived him; and his wife dying, he married, in 1679, Jane, daughter of Viscount Fitzwilliam, by whom he

had issue, a son and daughter. In 1680, W. was elected President of the Royal Society. In 1684, he was made comptroller of the works at Windsor Castle; and in 1685, he was elected Grand Master of the order of Freemasons. He was also elected a member of the House of Commons for New Windsor in 1689, and being unseated on petition, was immediately re-elected for the same place. In 1698, he was appointed Surveyor-general of the Works and Repairs at the Abbey of St. Peter, Westminster; and in the same year, was again elected Grand Master of the Freemasons. W. died in his chair after dinner, on the 25th of February 1723, aged 90 years, and was buried in St. Paul's Cathedral, where the appropriate inscription of 'Si monumentum requiris, circumspice,' marks his tomb. During his declining years, he was treated with neglect and even injustice, by the court of England; 'one Benson' was appointed by George I. to supersede him in the office of Surveyor-general; and some private individuals carped at his works in a most malevolent spirit. Steele, however, vindicated the fame of his friend in the *Tatler*, in which W. is introduced in the character of Nestor; and few have been found since that time hardy enough to call in question the well-merited reputation of Sir C. W. as a distinguished architect, mathematician, and scientific observer.

WREN (*Troglodytes*), a genus of birds of the Creeper family (*Certhiadæ*), having a slender, slightly curved, and pointed bill, the edge of the mandibles entire; the wings very short and



Wren and Nest (*Troglodytes vulgaris*).

rounded; the tail short, and carried erect; the legs slender, and rather long. Their plumage is generally dull. They are natives chiefly of the northern hemisphere, and most of them are American. They live on or near the ground, seeking for insects and worms amongst low bushes, and in other similar situations.

The COMMON or EUROPEAN W. (*T. vulgaris*) is found in all parts of Europe, and in the north of Asia. It is more abundant in the northern than in the central and southern parts of Europe, and is found even in the arctic regions. It is a very small bird, only about four inches long, reddish-brown above, with narrow transverse streaks of dark brown, yellowish white below, the greater wing-coverts with three or four small bead-like spots of white. From its peculiarity of form, and its active, lively habits, it is one of the most familiarly known of British birds. It frequents gardens, hedges, and thickets. Its flight is not long sustained; it merely flits from bush to bush, or from one stone to another, with very rapid motion of the wings. It sometimes ascends trees, nearly in the manner of creepers. The male has a loud sweet song. The nest is large for the size of the bird, oval, domed above, with an opening on the side, and is composed of hay or moss, lined with feathers, and generally of materials such that it resembles in color the objects beside it, and is not easily discovered. It is often placed under the thatch of a building, under the turf of a turf-topped wall, against the side of a moss-covered tree, or under an impending bank, always so as to be sheltered from rain. The eggs are usually from seven to ten in number, and the male is assiduous in his attentions to the female in supplying her with food during incubation, and afterwards assists her in the care of the young. Two broods are produced in the season. In severe winter weather, a number of wrens often take shelter together in an old nest, or in a hole of a wall; sometimes they roost in byres, to enjoy the warmth proceeding from the cattle. When driven from bushes, the W. is easily run down; and the hunting of wrens on St. Stephen's Day is an old custom in the south of Ireland. In general, however, the W. is almost as much a popular favorite in Britain as the Redbreast. The name *Kitty Wren* is popularly given to it in many parts of the country.—The North American species of W. are numerous; some of them, however, have recently been placed in new genera. —The HOUSE W. (*T. ædon*) is larger than the European W., being about five inches long. It is reddish-brown above, barred with dusky, and pale fulvous white below, with a light brownish tinge across the breast. It is abundant in the eastern parts of the United States. It is less shy than the European W., and often builds its nest near houses, and in boxes prepared for it. The nests are made to fill the boxes; and to effect this, a large mass of heterogeneous materials is sometimes collected. The song of the House W. is very sweet. The male is a very bold, pugnacious bird, readily attacking birds far larger than itself, as the bluebird and swallows, and taking possession of the boxes which they have appropriated for their nests. It even attacks cats when they approach its nest.—The WINTER W. (*T. Hyemalis*) is so similar to the European W., that it is not easy to state a specific difference. It is common throughout North America, from Labrador to Louisiana, and partially migratory. Several other species are common in North America, as the CAROLINA W. (*Troglodytes* or *Thryophorus Ludovicanus*) and the MARSH W. (*Troglodytes* or *Cistophorus palustris*), both of which are found chiefly in the vicinity of water. All of them agree very nearly in their habits with the Common Wren.

WRE'XHAM, a municipal and parliamentary borough in Denbighshire, and one of the most important towns in North Wales, 11 miles south-south-west of Chester, on an affluent of the Dee. The town is handsome and lively, and the church, a handsome edifice in Perpendicular, was built about the year 1470, though its tower, 135 feet in height, was not completed till 1500. This church contains a monument and two medallions by Roubilliac. In the vicinity are several collieries, which, together with lead-mines, iron-works, paper-mills, and breweries, give employment to the inhabitants. It is also of very considerable importance on account of its markets and fairs, one of which, in March, lasts for fourteen days, and is attended by traders of all descriptions, and from great distances. W. unites with Denbigh, Holt, and Ruthin in sending a member to Parliament. It is a station on the Chester and Shrewsbury Railway. Pop. (1861) 7562; (1881) 10,928.

WRIGHT, THOMAS, an English antiquary and historian, was born near Ludlow, in 1810, and was educated in the grammar-school of that town. From school, he proceeded to Trinity College, Cambridge, where he took his degree of A.B. in 1834, and subsequently that of M.A. At an early age, W. showed considerable literary talent, and while still at the university, contributed to *Fraser's Magazine*, the *Gentleman's Magazine*, the *Literary Gazette*, and other periodicals. In 1836, he came to London, and at once commenced the career of a man of letters; and from that time till his death he was continually before the public in the capacity of author, editor, or translator. In 1837, he was elected a Fellow of the Society of Antiquaries; and in the following year, published his first considerable work, entitled *Queen Elizabeth and her Times* (2 vols. 8vo). In this year also, he was one of the two founders of the Camden Society, for which he edited various works at different times, such as the *Latin Poems of Walter Mapes*, *Letters on the Dissolution of the Monasteries*, &c. He was also for some years Honorary Secretary of the Camden Society. In 1843, W., in conjunction with his friend, Mr. Roach Smith, founded the British Archæological Association. He also took an active part in the formation of the Percy and Shakspeare Societies, and for each of these, from time to time, edited volumes. Upon the death of the Earl of Munster in 1842, W. was elected to succeed him as Corresponding Member of the Institute of France, an honor never before attained by one so young. There were several candidates; but W. was chosen by a large majority, among whom were two ministers of state, MM. Guizot and Villemain. W. was also a member of the Society of Antiquaries of France, of the Ethnological Society of Paris, of the Royal Society of Northern Antiquaries of Copenhagen, and of other learned societies on the continent and in America.

Of W.'s various works—said to exceed 100 volumes in number, including, of course, translations and works edited for Societies—the following may be regarded as the principal: *Biographia Britannica Literaria*, 2 vols., of which the Anglo-Saxon period appeared in 1842, and the Anglo-Norman in 1846; *Essays on Subjects connected with the Literature, Popular Superstitions, and History of England in the Middle Ages* (2 vols. 1846); *The Archæological Album, or Museum of National Antiquities—the Illustrations by F. W. Fairholt* (1845); *England Under the House of Hanover, Illustrated from the Caricatures of the Day* (2 vols. 1848); *Narratives of Sorcery and Magic* (2 vols. 1851); *History of Ludlow* (1852); *The Celt, the Roman, and the Saxon: a History of the Early Inhabitants of Britain down to the Conversion of the Anglo-Saxons to Christianity* (1852); 2d. ed. 1861); *History of Ireland* (3 vols. 1854); *Wanderings of an Antiquary* (1854); *Cambridge University Transactions* (2 vols. 1854); *Dictionary of Obsolete and Provincial English* (2 vols. 1857); *History of France* (3 vols. 1856—1862); *Guide to the Ruins of the Roman City of Uriconium, at Wroxeter, near Shrewsbury* (1859); *Political Poems and Songs relating to English History Composed during the Period from the Accession of Edward III. to that of Richard III.* (2 vols. 1859—1861). These volumes form part of the series of works published, under the direction of the Master of the Rolls, in illustration of

the medieval history of England; *Les Cent Nouvelles Nouvelles* (2 vols. 1858); being a collection of medieval tales from the only known manuscript of the same, discovered by W. in the library of the Hunterian Museum, Glasgow; *Essays on Archæological Subjects* (2 vols. 1861); *History of Domestic Manners and Sentiments in England during the Middle Ages, with Illustrations by F. W. Fairholt* (1861); *A History of Caricature and Grotesque in Literature and Art, with Illustrations by F. W. Fairholt* (1865). To these may be added his *Womankind in Western Europe* (1869); *Uriconium: a Historical Account of the Ancient Roman City* (1872); and his translations of Pauli's *King Alfred* and of Napoleon's *Julius Cæsar*. He died 23d December 1877.

WRI'GHTIA, a genus of plants of the natural order *Apocynaceæ*, containing some of the greatest twining shrubs of the East Indies, such as, attaching themselves in the first instance to trees for support, become themselves at last of tree-like thickness, as well as height, and kill the supporting trees by their choking embrace. The corolla is salver-shaped, with scales in its throat: the fruit consists of two erect follicles. The leaves are



Wrightia tinctoria.

simple, generally ovate, or nearly so. The timber of some species, as *W. mollissima* and *W. coccinea*, is valuable. *W. antidysenterica*, a native of Ceylon, yields CONESSI BARK, a valuable astringent and febrifuge; *W. tinctoria*, common in many parts of India, yields excellent indigo, and was strongly recommended for cultivation on this account by Dr. Roxburgh, the produce being large, and the plant less dependent on rain than the species of *Indigofera*.

WRIT is a general term much used in the law to denote a formal document proceeding in the Queen's name, or the name of a judge or other officer of the law. Such is a writ of summons commencing an action at law. In nearly all actions and proceedings, writs of various kinds are issued, which are named from the nature of the particular act to be done.

WRITER, a term vaguely applied in Scotland to a law practitioner or his clerk; in provincial towns more definitely to a law agent practising before the sheriff, and acting as factor in the management of private affairs.

WRITER TO THE SIGNET, or CLERK TO THE SIGNET, the name of an important body of legal practitioners in Edinburgh, who derived this designation from having been originally clerks in the office of the Secretary of State, where the different writs that passed under the king's signet were prepared. Act 1537, c. 39, establishing the College of Justice, mentions the Clerks to the Signet as a previously existing body; and though no charter of incorporation is extant, the society is considered entitled to all the privileges of a corporation. The Keeper of the Signet, an officer appointed by the crown, appoints one of the members of the Society of Writers to the Signet, his deputy, who is in use to preside at meetings of the Society, and, along with certain other members named by him as commissioners, to manage its affairs. Admission to the Society must be preceded: (1) by attendance during two different sessions, or two full winter courses of lectures on the faculty of Arts of a Scottish university; (2) by a five years' apprenticeship; (3) by attendance on four courses of law in the university. Previous to admission, the candidate is examined in scholarship and in law. The whole expense of admission to the Society, including the apprentice-fee of £200, is £410, 15*s*. 6*d*. The writers to the Signet have long been the principal body of law agents practising before the supreme courts of Scotland; and the individual members of the body are also entitled to practise before the Sheriff Court in all matters which have been transferred by statute from the supreme courts to the Sheriff Court, as proceedings in bankruptcy. They possess the exclusive right of preparing the warrants of charters of land flowing from the crown, of signing summonses citing parties to appear in the Court of Session, and all other writs that pass the Signet, as diligences for affecting the person or estate of the debtor. A very considerable proportion of the conveyancing business of Scotland is in their hands, and they are largely employed as factors in the management of private affairs. Most of them are notaries-public. They posesss a large and valauble library.

Act 36 and 37 Vict. c. 63 has transferred to a newly-created body, called 'Law Agents,' the exclusive right of practising before both the supreme and the inferior courts of Scotland. Admittance to this body must be preceded by a five years' apprenticeship, which, if entered on after 1873, must be under an indenture duly recorded and intimated to an officer, called the Registrar of Law Agents, within six months from its commencement. A three years' apprenticeship is to be held sufficient in the cases of a person who has been five years clerk to a law agent, is a graduate in law or arts, an advocate in Scotland or barrister in England, or an enrolled attorney or solicitor in England. The applicant is admitted by the Court of Session after an examination by examiners appointed by the court. Persons who, prior to February 1874, were members of the Society of Writers to the Signet, or of the Society of Solicitors before the Supreme Courts, or Procurators before the Inferior Courts, are entitled, on application, to be enrolled as law agents. For three years, from August 1873, the qualifications for admission were relaxed in favor of persons in course of qualifying as procurators, under the Procurators Act, 1865. Before being allowed to practise before the Court of Session, or any inferior court, a law agent must subscribe the roll of that court. Any law agent may, on application to the Court of Session, be admitted a notary-public.

WRITERS' CRAMP, or SCRIVENERS' PALSY, is a peculiar kind of local spasm, in which every attempt to write instantly calls forth uncontrollable movements in the thumb, the index and middle finger, so that the pen starts up and down on the paper, and instead of a legible handwriting, a mere scrawl results. 'The more,' says Romberg, 'the patient persists in his attempt, the more the difficulty of using his pen increases; and to the visible and sensible contractions of the muscles of the thumb, contractions of the forearm, and even of the upper arm, are often superadded. Abnormal sensations, especially of a sense of weight and constriction of the hand, or of pain extending from the upper arm to the back, are occasionally present. It is diagnostic of these attacks that they are instantly arrested when the individual ceases writing; and that the hand is capable of every other combination of movements and exertions.—*The Nervous Diseases of Man*, vol. i. p. 320. The disease is chiefly confined to middle age, and scarcely ever occurs in women; and there can be no doubt that an occupation entailing much writing predisposes to it, the quality of the paper or of the pen having nothing to do with it. The treatment hitherto pursued, both local and general, has, according to Romberg, been 'invariably ineffectual.' This is, however, too strong a term, since he mentions a case in which Stromeyer applied the principle of division of the muscles to the cure of writers' cramp, and in one case a brilliant result justified the antispasmodic reputation of tenotomy; the patient being perfectly able to write as early as the fourteenth day after the subcutaneous division of the tendon of the long flexor of the thumb.' The same operation was, however, several times performed by Dieffenbach without success. In some cases judicious treatment, combined with entire cessation of writing for a considerable time, have led to satisfactory results. Galvanism, and the use of strychnia, iron, or conium, have also proved useful.

WRITING is the art of fixing thoughts in a palpable and lasting shape, so as to make them known to others. There are two principles employed in this process, either separately or jointly—viz., Ideographism and Phonetism. An ideograph is either a picture of the object the idea of which is to be conveyed, or at a later stage, some symbol which stands, by common consent, for the object, in which case it is called Symbolism. Phonetism, on the other hand, is either Syllabism—i. e., a combination of consonants and vowels which form a word, or component parts of it—or Alphabetism, a system that further breaks up the syllables into their single component parts of vowels and consonants. All systems of writing seem to have originated in ideographism, and to have gradually arrived at phonetism. The pictorial mode of ideography gradually led, as indicated, to the symbolical mode. The former, also called kyriological (Gr. *kyrios*, principal, proper, the opposite of metaphorical or symbolical) writing, contents itself with representing only bodily things, either by fully or partly depicting them, or by merely indicating them by some special characteristic. The latter—the symbolical mode—represents abstract things in accordance with their similarity to corporeal subjects, as in the hieroglyphs of later Egyptian times.

Examples of the real delineations of the subjects, or parts of them, which have been replaced by conventional signs, we find at an early period in Egypt, as well as with the Aztecs, with the

primitive Assyrians, in ancient China, and in Guiana. Phonetism here no longer aims at a delineation of subjects or symbols, but of the sounds by which these objects are conveyed to the mind. The first step in phonetic writing is, as we said, the syllabic, which by degrees becomes alphabetical. Difficult though it be in many instances to fix accurately the original ideographic meaning of many of the letters now in use, there is yet absolutely no doubt as to their having once been mere pictures of certain things to which a meaning was attached, the sound of which was in some shape connected with the present value of the letter. Our knowledge of Phœnician, whence our alphabet is directly derived, and of its cognate dialects, enables us, in many instances, to trace them back to their primitive source. Thus, our *A* was originally depicted as the head of an *ox*, a likeness to which may still be traced in its Phœnician form, and its name (Aleph = ox) has still survived in Hebrew and Greek (Aleph or Alpha). This process of the gradual change of a picture into a character is most clearly traceable in the various stages of Egyptian hieroglyphics, which, when written more cursively, assumed such different shapes (in hieratic and demotic respectively), that often there remains scarcely a likeness between different forms of the same characters. Among the ideographic methods, there are some, however, which scarcely seem to deserve the name of writing, in the ordinary sense. Such are the Peruvian quippos, or knots, which, by changes in color, size, arrangement, and the rest, indicate a certain special sequence of ideas; further, the 'khemns' or sticks, which, before the introduction of their present alphabet, the Tartars used to circulate among their tribes, to indicate the number of men and horses to be used for some special expedition. Similar to the Peruvian quippos, was (according to the celebrated Chinese work, *I-king*) also the primitive Chinese mode of writing; while the Scandinavian and Germanic runes rather remind of the Tartar staves. Of a more advanced stage appears the Mexican Pichne-writing, a system by which single syllables or words were expressed by phonograms. The Chinese system appears to combine both the ideographic and phonetic characters; but there is scarcely a doubt that even the phonetic signs are derived from ideographic ones. The step to the alphabetic system, however, was never taken by the Chinese.

When and how our present alphabet was invented, has been matter of speculation from the earliest times. The myths of antiquity ascribed it to Thoth (q. v.) or to Kadmus, which only denotes their belief in its being brought from the East (Kedem), or being perhaps primeval. The Talmud ascribes it to a special revelation. It has been a question whether there were several original alphabetical systems, or whether one is to be assumed as having given rise to the various modes of writing now in use. Thus, three principal sources—Semitic, Chinese, Indian—are given by Klaproth. It is, however, now agreed on all hands that it is the Phœnician character, as we now know it, to which we directly owe our own. See PHŒNICIA. From it many streams have flowed out. The principal of these appear to have been—First, the Semitic, in which the values of the letters have remained almost identical with those of the original Phœnician, with exception, perhaps, of a few sounds added to them in Persian, for the purpose of expressing certain Indo-Germanic sounds not existing in Phœnician. This class has further been subdivided into Hebræo-Samaritan and Aramaic, the latter embracing the square or modern Hebrew, which is closely allied to the Palmyrene, the Estranghelo or Syriac, the Sabian, the Arabic in its different forms, the Mongol, the Pehlvi, Armenian, &c. The second or central division embraces the writing of Greece, Asia Minor, and Italy, from the Æolo-Doric, Etruscan, Umbrian, Oscan, and other but little known kinds, to the late Pompeian Graffiti. A further group would include the 'Indo-Homerite' characters, and seems to have originated in Central Arabia, whence it appears to have spread to Africa and India, where the Magadhi—the oldest variation the Phœnician assumed here—gave rise to the five families of Devanaghari, Pali, Dravidian, Oceanian, and Tibetan.

Yet, when we speak of the Phœnician as being the mother of all our known alphabets, we must not be understood finally to ascribe to the Phœnicians the original invention of it in the first instance. We shall only indicate here that the theory to that effect, held by Gesenius and others, will probably, sooner or later, have to give way to the more recent results of De Rongé's investigations, who, with great show of probability, believes it to have been borrowed, or rather adapted from certain archaic hieroglyphics of Egypt. It would appear as if at some very archaic period the Phœnicians had borrowed the hieratic signs then in use; as, indeed, the *Prisse Papyrus*, the oldest in existence, exhibits striking similarities with the Phœnician characters. Instead, however, of simultaneously taking the Egyptian names for these characters, they invented new ones according to their own fancy, and to the supposed similarity of the characters to some particular thing.

The Egyptian origin of the Phœnician character, if confirmed by further researches, would be a striking instance of the correctness of the tradition to that effect, which Tacitus has preserved (*Annal.* xi. 14).

We have in the course of this work treated at full length several points of this subject. See HIEROGLYPHICS, CUNEIFORM, ALPHABET, &c. We may therefore, for a fuller elucidation of the details, refer to those articles. We shall only add in this place that the manner of writing is very different with many nations. The Mexican picture-writing begins at the bottom; the Chinese and Japanese, as well as the Mongols, write in columns beginning from the top, and going from right to left. The Egyptian hieroglyphics have no fixed direction; but the hieratic and demotic, though the single letters are formed from right to left, always run from left to right; as is also the case in Ethiopic, Cuneiform, and Indo-Germanic languages generally. The Semitic languages have retained the Phœnician mode of writing from right to left—all but the numerals—a mode still retained in archaic Hellenic and Etruscan. By degrees, however, the writer, not wishing to return to the beginning of the line, and continuing right underneath the last word penned, a double mode was introduced called the boustrophedon—as the ox ploughs. Finally, this too was abandoned, and the direction from left to right was followed. About the many various styles of modification our characters have undergone in the course of time, the punctuation of the words, and the rest, we refer to ALPHABET. The materials and the instruments (see PAPYRUS, PEN, &c.) differed much at various times. Consult Steinthal, *Die Entwickelung der Schrift* (1852); Wuttke, *Geschichte der Schrift* (1872).

WRO'NGDOER, in English law, as well as popular parlance, is he who commits some wrong for which an action may be brought to recover damages.

WROXETER. See URICONIUM.

WRY'NECK (*Yunx*), a genus of birds of the Woodpecker family (*Picidæ*), having a short, straight, conical beak; a long extensile tongue, with a horny point; wings of moderate size; a rather short and rounded tail; the feet with two toes in front, and two



Wryneck (*Yunx torquilla*).

behind. One species, the COMMON W. (*Y. torquilla*), is a summer visitant of Britain, and the north of Europe. From its appearing at the same time with the cuckoo, it has acquired the name of *Cuckoo's Mate*. It is common in the south of England, but very rare in the northern parts of Britain. It is about seven inches long, of a rusty ash color, irregularly spotted with brown and black. It feeds on caterpillars and insects, and is often seen on the ground near ant-hills, feeding on the ants and their 'eggs.' The construction of its tongue resembles that of woodpeckers, and enables it to seize its insect prey with wonderful celerity; the tongue is darted out, and retracted, so that the eye can scarcely follow it; the two posterior branches of the bones of the tongue being much elongated, and muscles for its extension attached to them. There is also a long gland on each side of the lower jaw, which secretes a glutinous mucus, so that insects adhere to the horny tip of the tongue. The W. generally makes almost no nest, but deposits its eggs on fragments of decayed wood in the hole of a tree. The young birds are easily tamed, and are great favorites with boys. In France, it is common for boys to tie a string to one of the legs of the bird, and to allow it to climb trees in search of insects. It climbs readily on their clothes. The name W. is derived from the habit which the bird has of writhing its head and neck quickly in various directions, with an undulating snake-like motion, which it does particularly if found in its hole in a tree, making at the same time a hissing noise, so as to alarm the intruder; but on his drawing back, it suddenly darts out and escapes.

WUDWA'N, a town of India, in the peninsula of Kattywar, province of Guzerat, 105 miles west-by-north from Baroda. It is situated on a small river, which falls into the great salt marsh, the Runn of Cutch. Pop. 32,220. The surrounding district is in

a high state of cultivation, and is celebrated for the excellence of the cotton which it produces.

WULSTAN, or WULFSTAN, and sometimes WOLSTAN, a name of interest in connection with Anglo-Saxon history and literature. There are three individuals of the name especially noticeable.—1. A monk of Winchester in the 9th c., author of a poem, in Latin hexameters, on the Miracles of St. Swithin, which is reputed the best Latin poem of that age produced in England. —2. An Archbishop of York, in 1003, author of two pastoral letters and several sermons in Anglo-Saxon, the most remarkable of which is printed in Hickes's *Thesaurus*, vol. iii.—3. The well-known Bishop of Worcester, and a saint of the English calendar. He was born at Icentum, in Warwickshire, about 1007, and educated at Evesham and Peterborough. He became a priest, afterwards a monk and prior of the monastery of Worcester, and ultimately, in 1062, bishop of that see. He lived through the troubles of the Norman Conquest, and enjoyed the favor not only of the Conqueror, but of William Rufus, and died in 1095, at the age of 87. He is by some reputed the author of the portion of Anglo-Saxon Chronicle which extends from 1034 to the death of the Conqueror.

WU'PPERTHAL, a celebrated valley of Rhenish Prussia (q. v.), derives its name from the river Wupper, or Wipper, a small affluent of the Rhine, which rises between the towns of Wipperfürth and Hückeswagen, 26 miles north-east of Cologne. Its course is first north, then north-west, past Barmen (q. v.) and Elberfeld (q. v.)—the chief town on its banks—then south-west to its junction with the Rhine between Wiesdorf and Rheindorf, 7 miles below Cologne, after a course of 50 miles. The waters of the Wupper are very abundant, and for the length of its course it supplies motive-power to an extraordinary number (about 400) of mills, of various kinds. It is navigable for small craft below Solingen (q. v.). The Valley of the Wupper is the most actively industrious and most densely peopled in all Germany. Coal is found in abundance.

WU'RNO, a town of the Hánsa States, Central Africa, 18 miles north-east of Sókoto, on the Sókoto, a tributary of the Niger. It is extremely filthy—the small ravine which intersects the town forming a most disgusting spectacle. Barth expresses his astonishment at the quantity of cotton brought into the market, which showed what the fine vales in the vicinity are capable of producing. The pop. is stated at from 12,000 to 13,000.

WÜ'RTEMBERG, THE KINGDOM OF, lies in 8° 15'—10° 30' E. long., and 47° 35'—49° 35' N. lat., is bounded on the W., S.-W., and N.-W. by the Grand Duchy of Baden; E., S.-E., and N.-E. by Bavaria; and S., for a few leagues, by the Lake of Constance and Vorarlberg. Hohenzollern makes a deep indentation into the land from the south, and the entire boundary is very irregular. Detached pieces of territory belonging to W. also lie in the adjacent countries. Its greatest length, from the village of Simmringen in the north, to the Lake of Constance in the south, is 139 miles; and greatest breadth, from the Katzenkopf, in the Black Forest, eastward to the castle of Duttenstein in Nercstein, 105 miles. The following table gives the area and the population according to the census in 1875:

Circles.	Area in Square Miles.	Population (1875).
Neckar	1280	587,834
Black Forest	1835	454,937
Jagst	1975	390,703
Danube	2410	448,031
Total	7500	1,881,505

At the census of 1880, the population was 1,971,118. W. is fourth in population of the states of the empire, after Saxony, and before Baden; but is third in point of size, having a greater area than Saxony.

The capital of W. is Stuttgart (q. v.). Ulm has above 30,000 inhabitants; and Esslingen and Heilbronn have each about 20,000; but Stuttgart has no rival as to pop. or importance.

Physical Aspect.—The surface of W. is composed of terraces of hill and dale, the lowest point being 420 feet above the sea. In the Black Forest Circle the mountains attain the highest elevation, the Hornisgrinde rising above 3700 feet. One point of the Swabian Alps is nearly 3000 feet high. The valleys and plains average 500 feet above the sea. Rich pastures, cultivated fields, orchards, gardens, hills covered with vines, and mountains with forests, give the most diversified scenery. In the south-east are extensive peat-lands.

Rivers, Lakes, &c.—The most important rivers are: the Neckar (q. v.), with its affluents; the Danube, which receives the Iller; and the Tauber, a tributary of the Maine. The Neckar and its streams drain 4200 sq. m.; the Danube, 2037; the rivers which fall into the Lake of Constance, 714; the Tauber, 315; and other water-courses, 168 sq. miles. The only lake in the interior is the Federsee, near Buchau in the Danube Circle. There is much traffic both by steam and sailing ships on the Neckar, and from Friedrichshaven, on the Lake of Constance.

Railways have been constructed to the extent of 780 English miles, from Bruchsal to Ulm, Ulm to Friedrichshaven, Bietigheim to Hall, Cannstatt to the Bavarian lines, and from Plochingen by Tübingen and Rottweil into Baden and on to Schaffhausen. There were, in 1879, 511 post-offices, which forwarded 20,000,000 letters, about 4,000,000 post-cards, and above 22,000,000 newspapers. The postal income in 1880 was 4,946,070 marks, the expenditure about 600,000 marks less. Of telegraphs, there are 1500 miles in operation.

Geology, Mineralogy, &c.—The prevailing rocks are granite, gneiss, limestone, and various sandstones. Tourmaline, cobalt, bismuth, silver, malachite, chalcedony, gypsum, copper, rock-crystal, and iron occur. A great variety of fossils have been found. The peat-lands are extensive, and yield annually 450,000 florins. Fire-clay of excellent quality, earths for dyeing, and native sulphate of lime, are worked. Building materials, from the granite of the Black Forest to the tufa of the Alb Valley, abound. Clay-band ironstone, yielding from 30 to 36 per cent. of iron, is worked in eleven different districts, and salt in five. The annual value of mineral products is about £200,000. In 1874, 10,816 tons of iron were produced, valued at £86,113. There are many springs of mineral water, those of Cannstatt and Stuttgart being much frequented.

The climate is mild and healthy, but in the highlands the winters are long and cold. When west winds prevail, the cold of winter and summer heat are less than in some countries in the same latitude. The greatest quantity of rain falls in summer. Of the total area about 25 per cent. is occupied by plains or level ground, 46 per cent. is hilly, and 29 per cent. mountain land. The soil is for the most part very fertile and well tilled. The vineyards are chiefly in the Neckar Circle and that of the Jagst. The forests, grain, and pasture lands are nearly equally distributed throughout all the circles. Wheat, oats, barley, rye, potatoes, beans, maize, turnips, mangold-wurzel, lucerne, &c., are the principal agricultural products. There are extensive orchards in all parts of the land. Cherries, damsons, walnuts, peaches, apricots, and the more common fruits, are largely grown. Timber is largely grown and exported, especially from the Black Forest regions. Large and small cattle are plentifully reared. Large cattle, which in W. are generally fed in the stall, constitute the principal export of W. to Switzerland and neighboring lands. Forestry and the various branches of agricultural science are diligently promoted by numerous technical institutes.

Manufactures, Industries, &c.—The manufactures are chiefly linen, woollen, cotton, and silk fabrics. Wool and cotton spinning, bleaching, dyeing, printing, iorn-founding, making machinery, cutlery, gold and silver articles, glass, porcelain, earthenware, tile, cabinet-work, sawing wood, carriage building, grinding corn, book-printing, and the cognate trades are principal industries. There are many oil-mills, beer-breweries, and brandy distilleries. Water is to a large extent the motive-power employed in the manufactories and mills. In W., more than 215,500 000 bottles of beer, or 125 for each person, are consumed yearly, besides wine, brandy, and liqueurs. The total value of land, houses, railways, movables, &c., is reckoned at 2710 million florins, and the income of the people at 276,000,000—140,000,000 being from land produce, 131,000,000 from the industries, and 5,000,000 from interest on foreign funds. The exports are chiefly grain, cattle, wood, salt, oil, leather, woollen, cotton, and linen goods, beer, &c.

Religion, Language, Education, &c.—The population of Old Würtemberg is almost entirely Lutheran. The numbers of each denomination in 1871 will be seen in the subjoined table:

Circles.	Evangelical Lutherans.	Roman Catholics.	Other Christians.	Jews.
The Neckar	497,826	44,389	2,280	4,227
" Black Forest	329,960	116,121	746	1,328
" Jagst	264,479	115,752	459	4,624
" Danube	156,595	277,280	372	2,666
Total	1,248,860	553,542	3,857	12,245

Of 7,897,713 marks set apart in the budget of the year 1877–78 for 'Church and School,' a great part was expended on the support of the various religious bodies.

Several dialects of German are spoken, of which the Swabian and Franconian are the most general. W. has been the native country of many distinguished men, of whom a few may be mentioned. In poetry: Schiller, Uhland, Wieland, Kerner; in theology and philosophy: Brentz, Œcolampadius, Bengel, Schelling, Hegel, Baur, Strauss, &c.; in science and art: Kepler, Stiefel, Tobias Mayer, the botanists Joseph and Karl Friedrich Gärtner

the chemist Schönbein, the painters Eberhard Wächter, Hetch, and the famed sculptor Dannecker.

Every child between 7 and 14 years must attend school. In a district having 30 or more families, is a public school, and a teacher for every 90 children. There are four Protestant theological seminaries, with a course of four years; gymnasia, grammar, trades, and high schools in all the principal towns. The university at Tübingen has 80 ordinary and extraordinary professors and tutors. The number of students varies from 700 to 950, of whom 200 to 300 are foreigners. At Hohenheim is an agricultural and botanical institution, in which farming, management of forests, and gardening are scientifically taught. Stuttgart has a polytechnic school, which is one of the best institutions of the kind in Germany. There is not in W. a person above ten years of age who cannot both read and write.

Revenue, Expenditure, &c.—In 1877–78, the revenue was 48,338,788 marks (£2,416,940), balancing the expenditure. The interest of the national debt was 17,482,596 marks. Of the income, 21,285,293 marks came from public property (including a revenue of 13,012,900 marks from the railways), and 22,613,266 marks from direct and other taxes. In the budget for 1880–81, the revenue was 49,958,400 marks, which did not cover the expenditure. The troops of W. form the 13th corps d'armée of the German empire.

Government, &c.—The crown is hereditary in the male line, and failing that, in the female. Freedom of the press and religion are enjoyed. The privy-council consists of a president, the six ministers of state, and members named by the king. The legislative body is composed of two chambers—the first being formed of princes of the royal family, nobles, and members appointed by the king, the last named not exceeding a third part of the whole; the second chamber is composed of 13 representatives of the knighthood, 6 Protestant general superintendents, the bishop and two others of the Catholic clergy, the chancellor of the university, 7 representatives from the cities Stuttgart, Tübingen, Ludwigsburg, Ellwangen, Ulm, Heilbronn, and Reutlingen, with a representative from each of the 64 bailiwicks. Members of the second chamber are not eligible as such before reaching their 30th year. The king has the power of prorogning or dissolving the chambers; but in the latter case, a new election must take place within six months. As a member of the re-constituted German empire (1871), W. has 4 votes in the Federal Council, and 17 representatives in the Diet of the empire.

History.—The earliest inhabitants of W. were probably Celts; but when the Romans came first to know the country, it was held by the Snevi, who were succeeded by the Alemanni and the Franks. In 1090, Conrad, Count of Würtemberg, possessed a castle near Cannstatt, and limited territories, which were largely added to by Ulric I. from 1246 to 1265. Other extensions were gained by Eberhard I. between 1279—1325; by Ulric II., who, though a man of peace, added Tübingen; Eberhard II., who secured Teck, Gutenberg, Kirchheim, Herrenberg, and other places. By the marriage of Eberhard IV. with the Countess of Montbéliard, that county became connected with Würtemberg. At his death, the possessions were divided between his two sons, each of whom enlarged his portion; and a few years after their death, Eberhard V. secured a reunion, and the land advanced rapidly in power and importance. In 1495, the Emperor Maximilian raised Eberhard to the rank of Duke, with the title of Eberhard I. In 1519, Duke Ulrich having offended the Swabian League by some arbitrary acts of oppression exercised upon the imperial free city of Reutlingen, he was forcibly ejected from W., and did not reconquer his estates till 1534. While Eberhard III. was Duke (1628—1674), W. suffered much in consequence of the Thirty Years' War. Ludwig Eugene (1793—1795) having taken part in the war against the French Republic, a French army attacked and compelled him to resign Montbéliard, and pay 8,000,000 francs.

With Duke Frederick II., who succeeded his father in 1797, the most important period in the history of W. begins. In 1800, compelled by the French to flee from his dukedom, he got back, by the Peace of Lunéville, all his territories except Montbéliard, and instead, had others granted, with the rank of Elector. Having aided Napoleon in the war against Austria, at the Peace of Presburg (26th December 1805), W. was further enlarged, and made a kingdom. After the battle of Leipzig, Frederick abandoned the cause of Napoleon, and concluded a treaty with Austria, in which his lands were guaranteed. His reign was arbitrary; and internal troubles were thickening around him, when he died (30th October 1816), and was succeeded by his son, William I., who was born at Lubin, in Silesia, 27th September 1781. He was cordially welcomed to the throne, and the expectations of his subjects were realized.

His first acts were to reduce the expenditure, and introduce other reforms, prominent among which was the liberal constitution of 1819. In 1848—1850, a strong agitation was kept up with the view of obtaining some permanent modifications in this constitution, but without success. For nearly 50 years, he reigned over a people steadily increasing in prosperity, and died 25th June 1864, at Rosenstein Castle. His son, Charles Frederick Alexander, now Charles I., born March 6, 1823, succeeded him. See GERMANY.

WÜ'RZBURG, a former sovereign bishopric or ecclesiastical principality of the German Empire, was founded in 741 (according to other accounts, 742 or 746), and received endowments from the Frankish kings, which were afterwards increased by the German emperors. The first bishop was Burkhardt, who was consecrated by Boniface. The patron saint was Kilian (q. v.), who is said to have preached the gospel here as early as 688. By good management and economy, the bishops were able to acquire numerous possessions of the neighboring Frankish proprietors; and out of these was gradually formed the extensive sovereign bishopric of W., ruled over by the prince-bishop as Duke of Franconia. The ducal title and authority were first conceded about 1120. In spiritual matters, the bishops were under the Archbishop of Mainz. The area of the bishopric was as much as 1827 sq. m., with a pop. of 250,000 and a yearly revenue of 500,000 guldens. At the Peace of Lunéville (1801), the bishopric of W., like the other spiritual principalities of Germany, was secularized; and in 1803, the greater part of it was conferred on the Elector of Bavaria as a secular principality. The last prince-bishop received a pension, and died at Bamberg in 1808. At the Peace of Presburg (1805), Bavaria gave up W. to the Grand Duke Ferdinand of Tuscany, and the principality was raised to the dignity of an electorate. In 1806, the Elector Ferdinand joined the Confederation of the Rhine, and from that time took the title of Grand Duke of Würzburg. By a decree of the Vienna Congress, the grand duke received his hereditary state of Tuscany, and W. reverted to Bavaria. At present, the greater part of the bishopric belongs to the circle of Lower Franconia.

WÜRZBURG, capital of the former principality of Würzburg, now of the Bavarian circle of Lower Franconia, is situated in a beautiful valley on both sides of the Maine, over which there is a stone bridge 600 feet long, of eight arches. The number of inhabitants amounts to (1880) 51,014, of whom 6200 are Protestants. Among the public buildings, the most distinguished are the Episcopal Palace or Residence, rebuilt in 1720—1744, one of the most magnificent royal residences in the world; and the spacious and excellently fitted-up Julius Hospital, established in 1576. Of the numerous churches, the most worthy of notice are the richly-decorated cathedral, which was rebuilt in the 11th and following centuries; the Marien-kapelle, one of the most beautiful monuments of old German art, with 14 statues of the 15th c. by Tilmann Riemenschneider; and the Neumünster Church, containing the bones of St. Kilian. The streets adjoining the Palace Square are wide and straight, but most of the others are narrow and crooked. In front of the Julius Hospital there is a bronze statue of the founder, Bishop Julius, by Wiedemann, founded in bronze by Miller; a monument of Walther von der Vogelweide (q. v.) stands in a niche outside the Neumünster Kirche.

The university of W. was founded in 1582 by Bishop Julius, who also founded the hospital above mentioned. The endowments for both institutions were taken from the possessions of the convents that were destroyed during the Peasant War (q. v.). In order to promote the study of medicine, the hospital was put in connection with the university, the professors of medicine being made physicians and surgeons to the hospital; this connection has all along kept the medical faculty in high reputation, and promoted the prosperity of the university as a whole. The present medical staff includes several names of European reputation, among others, Kölliker (q. v.). All the professors of the theological faculty are thoroughgoing Infallibilists. There is also a faculty of political economy. In the summer session 1878, there were 941 matriculated students. The library contains above 100,000 vols. In the Musical Institute, any one can receive instruction gratis in singing or in playing on any instrument; and twice a week there are great musical pieces performed.

In W., besides the university, there is a gymnasium, a Latin school, a district agricultural and trade school, a seminary for Catholic priests, and a seminary for training teachers, an orthopedic institution, a veterinary school, a school for midwifery, a swimming school, a society for the improvement of the arts and manufactures, and a female society for the encouragement of skill in arts and handicrafts among women. Besides the Julius Hospital, there are asylums for the deaf and dumb and for the blind, and other charitable institutions. The manufactures are woollen stuffs and cloth, mirror-glass, leather, tobacco, railway carriages, and sparkling wines. The fortress of Marienberg, built on the site where Drusus founded a castle, is situated on a hill 400 feet high, on the left bank of the Maine, outside the town. The campaign of the Prussian army of the Maine ended with an action fought before W., 27th July 1866. The fortifications have been demolished. The industry of W. has greatly prospered during the last ten years.

WÜ'RZEN, a small walled town of Saxony, 15½ miles east of Leipzig, picturesquely situated and surrounded by romantic valleys, on the Mulde, here crossed by two bridges. Pop. (1880) 9719, employed in brewing, bleaching, weaving, and hosiery-work. It is a station on the Leipzig and Dresden Railway.

WYANDO'TS, a tribe of North American Indians, of the Iroquois family, the Hurons of the French writers, who called themselves Wendats or Yendats, first known at Montreal, where, in the middle of the 17th c., they became Roman Catholics under the instructions of the French missionaries. Having, as allies of other tribes, become involved in a war with the Iroquois, they were nearly exterminated, and the remnant emigrated to the country around Lake Superior; then gathered at Mackinaw, 1670, under the care of Father Marquette, thence came to Detroit, where they furnished 400 warriors to the English in 1812. In 1829, they were settled, to the number of 600, on the head-waters of the Sandusky River in Ohio; and in 1832, by a treaty with the United States government, removed to Kansas, where the few remaining have acquired the rights of citizenship, each having of their divided lands a farm of 40 acres.

WYATT, Richard John, an English sculptor of great eminence, was born in Oxford Street, London, on the 3d of May 1795. He belonged to a collateral branch of the family which made the name of Wyatt famous during two centuries in connection with architecture and sculpture, sharing their descent from a stock of yeomen long settled at Weeford in Staffordshire. Having the bias of his family towards art, he became an articled pupil of Charles Rossi, R.A., sculptor, and afterwards a student of the Royal Academy, whose medal was twice awarded to him during his pupilage. He afterwards passed some time in Paris, studying under Bosio; and from Paris, in 1821, he went to Rome, and entered the studio of Canova, where he had Gibson for a fellow-pupil. The remainder of his life was spent in Rome, in complete devotion to the prosecution of his art; and he died at Rome on the 29th of May 1850. His youth had shown great promise, in the estimation of painters like Lawrence and sculptors like Canova; and the works which he produced in rapid succession, early placed him in the front rank of English sculptors. Several of his works were shown at the Great Exhibition of 1851, and the medal for sculpture was awarded to him, though he had died in the previous year. Living only for his art, he labored at it incessantly—often, it is said, from dawn till after midnight; and the number of his works is very great. Elegance and refinement, singularly combined with animation and finish of workmanship, are his characteristic merits, but his works also disclose a lively and graceful invention. His favorite subjects were classical and poetical. His most admired productions are in England, and casts from several of them are to be seen at the Crystal Palace. He was not admitted to the honors of the Academy, a by-law of that institution confining its membership to artists resident in England.

WYATT, Sir Thomas, was born in 1503, at Allington Castle in Kent. His father, Sir Henry Wyatt, of a family originally of Yorkshire, stood high in favor with Henry VII.; and not less so with Henry VIII., who succeeded him. In 1515, the young W. was entered at St. John's College, Cambridge, where in due time he took his degrees of Bachelor and Master of Arts. Whilst still very young, he was married to Elizabeth Brook, daughter of Lord Cobham. Through his father's influence, a career at court was open to him. In this sphere he was thoroughly well qualified to succeed; he was one of the most accomplished men of his day; of a noble presence and fine manners, and withal dexterous and subtle in the management of affairs, though of unimpeached honor and integrity. In 1536, he received at the hands of the king the honor of knighthood; and the next year he was made high sheriff of Kent. Though necessarily involved in much perilous court intrigue, he continued—though once or twice in some hazard of losing it—to retain the favor of the king, and was frequently employed by him in positions of trust and importance. His chief service was rendered, as English ambassador at the court of Charles V., in which capacity he acquitted himself with much diplomatic tact and skill. In 1542, in token of the king's appreciation of his services, he received a grant of lands, at Lambeth; and the year after, he was named high steward of the king's manor at Maidstone. He had now very much withdrawn himself from public life, and lived for the most part retired at Allington. On the 11th of October 1542, he died at Sherborne, of a fever contracted, it is said, on an overhasty journey caused by a sudden summons to attend the king.

Among the other accomplishments of W. was that of verse, which he seems to have begun to cultivate early, and continued through life to practise. During his life, he had acquired considerable reputation as a poet; and in 1557, his poems, along with those of the celebrated Surrey, were published in London. As marking a stage in the progress of our early literature, they hold a permanent place. His love poetry is somewat overrun with conceits derived from the study of Italian models; but some of the shorter pieces are models of grace and elegance. His satires also possess very considerable merit. More lately, in 1815, an edition of his works, in two volumes, was published in London.

WYATT, Sir Thomas, surnamed 'the Younger,' to distinguish him from the preceding, of whom he was the only son, was born about 1520. After a wild and riotous youth, he raised a body of men at his own expense, and did good service at the siege of Landrecies (1544), displaying considerable military talent; and continued in honorable service on the continent till 1550. In 1554, when the Spanish match was in agitation, W. joined the insurrection, and led the Kentish men to Southwark, after gaining considerable successes over the royalists; but failing to capture Ludgate, he became separated from the main body of his followers, and was taken prisoner, and soon after executed, 11th April 1554.

WYATT, Sir Mathew Digby, an eminent English architect and writer on art, was born in 1820 at Rowde, near Devizes, Wilts. After his apprenticeship and studying for some time at the Royal Academy, he, in 1844, went to the continent and made a diligent study of the architecture of Italy, France, and Germany. He returned to England in 1846, and in 1848 published *Geometrical Mosaics of the Middle Ages*. He not only studied decorative art in his own profession, but also in its various applications. In 1849 he made a report to the Society of Arts on the Paris Exposition of Industry; and soon after, as secretary to the Royal Commissioners, took an important part in the arrangements of the 1851 Exhibition. He took a similar interest in the Sydenham Crystal Palace. In 1856 he was appointed architect to the East India Company, for whom he designed several important public works—bridges, barracks, and hospitals. In 1865 he was made honorary member of several foreign academies, and in 1866 received the royal gold medal of the Royal Institute of British Architects. He was knighted in 1869, and in the same year was chosen Slade Professor of Fine Arts at Cambridge. His chief art publications are *Metal Work and its Artistic Design*, 1852; *Industrial Arts of the Nineteenh Century*, 1853; *Art Treasures of the United Kingdom*, 1857; *Fine Art*, 1870; *Architect's Handbook in Spain*, 1872. He died in May 1877.

WYCHERLEY, William, a comic dramatist of the period of the Restoration, was born at Clive, near Shrewsbury, in 1640. His father, a cavalier squire of £600 a year, sent his son to France at the age of 15; and during his residence on the banks of the Charente, the youth was a favorite at the court of the governor of Angolême, whose accomplished wife, the Madame Rambouillet of Voiture, converted him to the creed of the Church of Rome. On his return to England in 1660, W. studied a short time at Oxford, where he was reconciled to the Anglican Church, and he was entered of the Middle Temple. His first comedy, *Love in a Wood*, was acted with great applause, and published in 1672, and it was followed by three other successful comedies, *The Gentleman Dancing-master*, 1673; *The Country Wife*, 1675; and *The Plain Dealer* (his best work) 1677. About 1680, the dramatist was married to a young and rich widow, the Countess of Drogheda, whom he had met at Tunbridge. The lady was distractedly jealous of him, kept him from frequenting the court, which lost him the favor of the king, and watched him closely wherever he went. She did not live long, and she left him the whole of her fortune; but his succession to the estate was disputed, and an expensive lawsuit ensued, the costs of which, added to personal debts, fairly broke down the unlucky dramatist. He was committed to the Fleet, and suffered to languish there neglected for seven years. He was partly relieved by the bounty of James II.—probably because he returned to the communion of the Church of Rome—and he succeeded to the patrimonial estate in Shropshire by the death of his father. This did not, however, much relieve him, as the estate was heavily mortgaged, and strictly entailed. He was on bad terms with the heir-at-law, his nephew; and on purpose to injure this relative, W., at the age of 75, married a young girl, on whom he settled a jointure; and eleven days after this transaction—the last and perhaps the most scandalous act of his life, as Macaulay describes it—the old dramatist died. His death took place in December 1715, and he was interred in St. Paul's Church, Covent Garden. Besides his comedies, W. published a volume of wretched *Miscellany Poems*, 1704; and another volume, partly consisting of 'moral reflections,' was published after his death. The comedies of W., on which his fame rests, reflect the literary taste, the manners and vices of the times in which he lived. They are, in truth, grossly immoral and profligate. They have, however, some literary excellence. The language is clear and forcible, the dialogues often witty and lively, some of the characters vigorously drawn, and the observations and maxims scattered throughout the different scenes are shrewd and sensible, and expressed in a terse sententious style. W. was the founder of that school of artificial comedy which Congreve, Farquhar, and Sheridan carried to its highest perfection, imparting to it an airy grace and brilliancy far above the reach of its first master.

WY'COMBE, CHIPPING or HIGH, a municipal and parliamentary borough in Bucks, surrounded by beech-clad hills, 28 miles west-north-west of London, on the Wye, a small affluent of the Thames. The church of All Saints is a large and handsome building, erected in 1273; it is in the Norman and early English style of architecture, and consists of a body and two aisles, and, with the chancel, is 180 feet long. The tower is 96 feet high, and was built in 1522. There are corn and paper mills on the Wye; beech-wood chairs are made here, and lace-making is carried on. At two miles' distance is the village of West Wycombe. Since 1867, the borough returns one member to parliament. It is connected with the Great Western Railway. Pop. (1871) of municipal borough, 4811; (1881) 10,618; of parl. b., (1871) 10,492; (1881) 13,154.

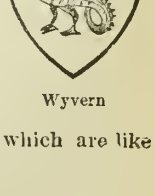
WYE, a river of England, of great picturesque beauty and considerable importance, an affluent of the Severn, has its origin in two copious springs which issue from the south-east side of Plinlimmon, not two miles from the head-water of the Severn (q. v.). It flows in a south-east direction through Montgomeryshire and Radnorshire, forming the south-west and south boundary of the latter, east-south-east to the middle of Herefordshire, and then south, dividing in its lower course the county of Monmouth from that of Gloucester, and entering the estuary of the Severn below Chepstow. Length of course 130 miles, for 70 miles of which to Hereford it is navigable for barges, though large vessels cannot ascend above Chepstow Bridge. At Chepstow (q. v.), the tide rises higher than at almost any other place in Great Britain. The chief affluents of the W. are the Lug and Ithon on the left, and the Monnow, the Caerwen, and Irfron on the right. The part of the river which separates Monmouth from Gloucester is that chiefly visited for its singular beauty.

WYKEHAM, WILLIAM DE, was born at Wickham, in Hampshire, in 1324. He was educated at Winchester. On October 8, 1366, by the king's recommendation, he was elected Bishop of Winchester. He was consecrated October 10 of the year following. Meanwhile, he had been appointed Lord High Chancellor of England; in which office he was confirmed September 17, 1367. He resigned on March 14, 1371, on a petition being presented to the king against the government remaining too long in the hands of men connected with the church. He now devoted himself to various objects of lasting usefulness. His preparatory college or school at Winchester was opened for teaching in 1373; but the building of the college was not begun till 1387. It was finished in 1393. In the college which he instituted at Oxford, teaching had also begun in 1373; but the building of 'St. Mary's College of Winchester in Oxford' was not begun till 1380; it was finished in 1393. He began the rebuilding of Winchester Cathedral in 1395, and just lived to see it finished. Meanwhile, he had become the object of resentment to the Duke of Lancaster and party, at whose instance he was indicted for pecuniary defalcation, and other crimes alleged to have been committed by him as Keeper of the Privy Seal and Lord Chancellor. He was heard in 1376 before a commission of peers, bishops, and privy councilors, declared guilty, and a severe sentence was passed upon him. It was, however, ultimately commuted into a fine, which was remitted on the accession of Richard II. in 1377. He was one of the council of 14 appointed to the king in 1386, and in May 1389 he was again made Lord Chancellor. He continued in office till September 27, 1391, when he resigned; and from this date he appears to have taken little active part in public affairs. He was present in the parliament held on September 30, 1399, when Richard II. was deposed. He was also present in the first parliament of Henry IV. He died at South Waltham, September 27, 1404.—See *Life* by Dr. (afterwards Bishop) Lowth (Lond. 1754). W. of Wykeham was one of the most munificent benefactors of the English Church; but he was not a fanatic. He loved learning, order, civilization, and purity of manners; and as Bishop of Winchester, signalized himself by his rigorous reformation of ecclesiastical abuses; but he had not the slightest tendency towards *Protestantism*, affording, in this respect, a most striking contrast to his great contemporary Wicliffe (q. v.). W. of Wykeham may be taken as the type of a class of English Churchmen both before and after the Reformation—men who are destitute of zeal on questions of doctrine, but zealous for the dignity, culture, and practical efficiency of the church.

WYNTOUN, ANDREW, an old rhyming Scottish chronicler, lived in the beginning of the 15th century. Except that he was prior of the monastery of St. Serf on Loch Leven, and wrote *The Orygynale Cronykil of Scotland*, well known and valued by students of that kind of curious literature, almost no information regarding him has been preserved. Though with the usual proportion of extravagant fable, his work is not without considerable historical importance; while philologically it has very distinct value, as a specimen of the old Scotch, then as nearly as might be identical with the contemporary dialect of England. The *Orygynale Cronykil* consists of nine books or cantos, of which only the last four are devoted to Scottish history; the first five giving a fragmentary outline of the history and geography of the ancient world. From his quotations, W. seems to have been a well-read scholar for his time. His style is not essentially different from Barbour's, and his versification is the same—the pleasant octosyllabic. In 1795, a splendid edition of this work was published by Mr. D. Macpherson; and this edition has been revised and enlarged by D. Laing, LL.D. (vols. 1 and 2, 1872; vol. 3, 1879).

WYO'MING, a territory of the United States, formed in 1868, with an area of 97,883 square miles, lies between 41° and 45° N. lat., and 104° and 110° W. long. Its boundaries are—N., Montana; E., Dakota and Nebraska; S., Colorado; S.-W., Utah; W., Idaho. It is a very mountainous region, elevated from 2500 to 3000 feet above the sea-level. The chief ranges are the Wind River range of the Rocky Mountains, in the W.; the Big Horn Mountains, near the center; and the Black Mountains, in the N.-E. The Missouri, Columbia, and Colorado have their sources within this territory; and other important rivers are the Green River in the south-west, a fork of the Platte in the south-east, and in the north-west the Yellowstone (q. v.). The Laramie Plains in the S. form a tableland of 7000 square miles in extent. The soil of the valleys is moderately fertile, and there is good pasturage. W. is rich in minerals, which embrace iron, copper, lead, coal, silver, and gold. The Union Pacific Railway traverses the S. of W., passing Cheyenne, the chief city. Pop. (1871) 9118, besides 1800 tribal Indians; (1880) 20,788.

WYO'MING VALLEY, a beautiful, fertile valley on the Susquehanna River, in Pennsylvania, U. S., 21 miles long by 3 wide, surrounded by mountains 1000 feet high, its name supposed to be a corruption of the Indian *Maughwauwame*—large plains. It was purchased about 1765 by a Connecticut company from the Delaware Indians; but the settlers were soon dispersed by hostile savages. In 1769, 40 families came from Connecticut, but found a party of Pennsylvanians in possession, and for several years there were continual contests of the settlers with the Indians, and with each other. The Connecticut colony finally succeeded, and their town of Westmoreland had 2000 inhabitants. In 1776 they armed for their own defence against the English and their Indian allies; but in 1778, most of their troops were called to join the army under Washington. June 30, a force of 400 British provincials, or 'Tories,' and 700 Seneca Indians, led by Colonel John Butler, entered the valley, and were opposed by 300 men, under Colonel Zebulon Butler. On July 3, the settlers were driven to the shelter of Fort Forty, with the loss of two-thirds of their number, many soldiers and inhabitants being murdered; a half-breed Indian woman, called Queen Esther, having, in revenge for her son's death, tomahawked fourteen with her own hand. On the 5th, the remnant of the troops surrendered, and they and the inhabitants were either massacred or driven from the valley, which was left a smoking solitude. Campbell's *Gertrude of Wyoming*, founded upon the stories of this disaster, contains exaggerations and misstatements, notably that of attributing the leadership to Brandt, who was not in the expedition. The disputes between the Connecticut and Pennsylvanian settlers were not finally settled till the commencement of this century. The valley is now one of the most flourishing districts in the state.



Wyvern

WY'VERN, a fictitious monster of the middle ages, frequently occurring in heraldry. It resembles a dragon, but has only two legs and feet, which are like those of the eagle.

X.

THE last letter of the proper Latin alphabet, and the last but two of the English. It is in reality a superfluous character, being equivalent in English, as it was in Latin, to *ks* or *gs*. In form it corresponds to the Greek χ, but in power to Greek ζ. It was a later addition to the Latin alphabet, having been introduced, according to Corssen, between the time of the Decemvirate and the fall of Veii. Some Roman scholars did not acknowledge the character, but wrote *cs*, *gs* instead; and this substitution frequently occurs in inscriptions (e. g. *ucsori*, for *uxori*). At one period of Roman literature, *xs* was often written for *x;* e. g., *saxsum*, *lexs*. In the popular pronunciation, the guttural element of the character gradually disappeared, until, in the later period of the Empire, *x* was undistinguishable from *ss* or *s;* thus, inscriptions show *visit* for *vixit*, *milex* for *miles*. This change survives in modern Italian, which substitutes *ss* or *s* for the Latin *x*, as *sasso* = *saxum; straneo* = *extraneum;* and uses *x* only in foreign words. In Spanish, in the beginning of words, *x* has a guttural sound, something between *ch* and *y*. In German, the use of *x* is mostly confined to foreign words; in native words the sound is usually represented by *chs*, as *wachsen*, to wax or grow, though some write, e. g., *axe* for *achse*.—In Algebra, *x* is the usual symbol for the unknown quantity which is to be determined.

XA'NTHEINE AND XANTHINE OF FLOWERS. The coloring matters of various flowers have been carefully examined by Fremy and Cloez, who believe that the various tints may be referred to three distinct substances, of which one is of a blue or rose color, while the other two are yellow. These pigments have received the names of *Cyanine*, *Xanthine*, and *Xantheine;* the first being derived from the Greek *kyanos*, sky-blue; and the last two from *xanthos*, yellow. None of these substances, have, however, been extracted, in a pure condition, and hence nothing definite can be stated regarding their composition or properties.

XA'NTHINE, or XANTHIC OXIDE ($C_{10}H_4N_4O_4$), was first described by Dr. Marcet, who regarded it as a very rare constituent of urinary calculi, and from its composition he gave it the name of *uric oxide*. During the last ten years, it has been proved to be a normal ingredient (although to a very small amount) of human urine, and has been found in the brain, the spleen, the pancreas, and the liver of the ox; in the thymus gland of the calf; and in the muscular tissue of the horse, the ox, and of fishes; as well as in the liver of various animals. Calculi composed of this substance are extremely rare, the total known number obtained from the human subject being less than half a dozen. They are of a light-brown cinnamon color, assume a waxy appearance when rubbed, and consist of concentric layers easily separable from one another. *Xanthine* occurs in such very minute quantities in the various tissues, and is so rare an ingredient of calculi, that it is unnecessary for us to enter into any description of its properties, further than to state that, when dried, it exists as a yellowish white powder, which assumes a glistening appearance when rubbed, and exhibits no signs of crystallization under the microscope; moreover, the chemical difficulties of detecting traces of this substance are so great, that we shall not attempt to describe its tests. It seems to be intermediate to uric acid and hypoxanthine, both in a chemical and a physiological point of view. The composition of uric acid is represented by the formula $C_{10}H_4N_4O_6$, that of xanthine by $C_{10}H_4N_4O_4$, and that of hypoxanthine by $C_{10}H_4N_4O_2$. The former two occur simultaneously, not only in the urine, but in the spleen, the liver, and the brain; while xanthine is not only invariably accompanied by larger or smaller quantities of hypoxanthine, but the latter can be made by the oxidizing action of nitric acid to yield a product from which xanthine (in place of hypoxanthine) may be obtained by a process of reduction. Xanthine must be regarded as a higher stage of oxidation of hypoxanthine, and a product of the regressive metamorphosis of the tissues, which, in the ordinary condition of the system, is excreted in a more highly oxidized form of urea, uric acid, &c.

This substance is stated to have been found by Göbel in some oriental bezoars, extracted from the intestines of certain ruminating animals. It is most probable that the supposed bezoars were in reality urinary calculi.

XANTHI'PPÉ, the wife of Socrates, has acquired the reputation of having been an archtermagant, doubtless not without some foundation. It ought, however, to be remembered that her naturally infirm temper must have been not a little tried by the small concern manifested by Socrates in the regulation of his domestic affairs, which appears occasionally to have made it difficult for X. to 'make both ends meet.' Socrates himself, it is known, had completely mastered his naturally strong appetites and passions and had acquired a temper of perfect serenity. It is quite natural then, that contrast-lovers and story-mongers should, as a foil match so great a practical philosopher with a woman of such an ungovernable temper as X. is said to have been. She herself, if we can trust Plato, appears to have really loved her husband, and he at his death committed her tenderly to the care of his friends. Many stories are told of her, as of every other notable character in history, to illustrate her peculiar tendency, but it is difficult to say how much credit ought to be given them.

XANTHORRHÆ'A. See GRASS TREE.

XANTHO'XYLUM, a genus of trees and shrubs, the type of the natural order *Xanthoxylaceæ*, an order closely allied to *Rutaceæ*, and chiefly distinguished from it by unisexual flowers, including more than 100 known species of trees and shrubs, having opposite simple or pinnate leaves with pellucid dots, and no stipules, chiefly natives of warm climates, and more particularly of the warm parts of America. The order is generally characterized by pungent and aromatic qualities, which are strongly developed



Xanthoxylum fraxineum.

in the genus X. itself. *X. fraxineum*, a North American species a very low, deciduous tree, with leaves somewhat like those of the ash, common from Canada to Virginia, is called TOOTHACHE TREE, from the use made of the hot acrid bark and capsules for the relief of toothache. It is also in high repute in the United States as a remedy for chronic rheumatism, for which it is administered in the form of a powder, in doses of from ten grains to half a drachm three times a day. Some of the species are popularly called PEPPERS in their native countries, as in India and Japan, where they are used as a substitute for pepper. The bark of *X. fraxineum* is a powerful sudorific and diuretic, and other species possess similar qualities; some are febrifugal, and the seeds and unripe capsules of some are gratefully aromatic.—To the order *Xanthoxylaceæ* belong the AILANTO (q. v.) and the WHITE IRON-WOOD (*Vepris undulata*) of the Cape of Good Hope, the wood of which is very hard and tough, and is much used for agricultural implements.

XA'NTHUS, the name of the capital of the ancient Lycia, anciently called Arina, a city of the Tramilæ, or Solymi, the primitive inhabitants. It lies at the south-west corner of Asia Minor and near the village of Kounik. From the earliest historic times to that of Crœsus, the Lycians appear to have been independent under native rulers; but after the fall of Sardis and the capture of Crœsus, the Persian conqueror Cyrus sent an army for the conquest of Lycia, led by Harpagus, in 546 B. C. The mos

desperate resistance was made by the Lycians, and the people of X. burned themselves in their citadel, rather than surrender to the conqueror, only 80 families surviving the catastrophe. Reduced to a Persian satrapy, they sent 50 ships to the expedition of Xerxes against Greece, and contributed to the revenues of Persia. Little is known of the history of this town till the days of Alexander the Great. Alexander took X., which is said to have made as determined a resistance as it did on the former occasion. In the war which ensued amongst the successors of Alexander, Ptolemy took X. from the garrison of Antigonus; and the city subsequently passed into the possession of the Ptolmies and Seleucids. After the defeat of Antiochus, it was ceded by the Romans to Rhodes, but subsequently had its liberties restored. In the civil war between Brutus and the Triumvirs (43 B.C.), X. was taken by Brutus. The inhabitants a third time destroyed themselves and their families, and few survived the capture. From that time, X. belonged to the Roman Empire, and suffered in the earthquake in the reign of Tiberias; but Lycia did not lose all its freedom till the time of Claudius, who reduced it to a province. X. was situated 70 stadia, or 9 miles, from the sea, on the left bank of the Sibres or Sibrus, the Greek Xanthus, or Yellow River, on a plateau of elevated ground, of nearly rectangular shape, the elevated parts close to the river rising 200 feet. The most remarkable edifices in the city and its vicinity, according to ancient authors, were the Sarpedoniom, or Temple of Sarpedon; that of the Lycian Apollo; and Letôon or Temple of Leto. On the elevated ground, or Acropolis, stood the so-called Harpy Tomb, and an ancient theater of Greek workmanship; while in the other part of the city which lay to the east was a mixture of Greek and Roman buildings. The whole city and its environs contained numerous temples and tombs.

The discoveries of Sir C. Fellows in 1838 revealed the city of X., its temples and its monuments, and they appear to fall into the following classes: 1. The sepulchres of the early inhabitants, placed inside the wall in shape of square columns, with step-shaped bases, and sepulchral chamber on the summit. The most remarkable of these is the Harpy Tomb, so called from the subject of the bas-reliefs being the Harpies bearing off the daughters of Pandarus, king of Lycia—executed in a style resembling the earliest efforts of oriental Greek art. Another, with a frieze of lions and hunters in Persian style, and the inscribed obelisk, with long Lycian inscription and some Greek verses, apparently of the time of Artaxerxes Longimanus, and made about 466 B.C. 2. The tombs of the age of the Persian subjection, with roof-shaped tops and ridges, and imitation of woodwork, the sepulchral chamber for the principal dead being at the summit, the others in the middle and base, the sides ornamented with reliefs of a later style of art. Of a later style, but of more beautiful art, was the Ionic peristyle temple or monument of 14 columns, with a solid cella, placed on a base or pedestal, both temple and base ornamented with friezes, supposed to represent the conquest of Lycia by Harpagus, and with figures between the columns. The friezes represent hunts and feasts, the combats of Lycians and Persians, and taking of the city of X. by the latter—the whole treated in a style not unlike the school of Phidias and his successors. These sculptures have been supposed to represent the exploits of Harpagnas, or the suppression of the revolt of the Cilicians by a Lycian satrap, and to have been made between 450 and 387 B.C. This temple was discovered by Sir C. Fellows in 1840—1844.

The language found on the monuments of Lycia, written in an alphabet of 25 letters, is an Aryan dialect, distinguished by a prevalence of vowels. The letters, with two exceptions, are archaic Greek, and borrowed from by no means the oldest form of that language. The syntax and inflections are Aryan or Indo-European, but many of the roots are different from the languages of that family, although certain words may be referred to well-known equivalents—as *goda*, 'lord,' to the Persian; *tedeeme*, 'son,' to the Slavonic; and *ladé*, 'wife,' to the Anglo-Saxon. Some words, too, resemble the Zend. The presence of many Greek words barbarously transcribed can also be well recognized in the different inscriptions, and some few derived from their Persian conquerors—as *gsatrape*, or 'satrap.' The inscriptions are generally short and sepulchral, and follow the well-known formula commonly used under the Roman Empire, and are sometimes accompanied by Greek versions or translations, helping to explain the Lycian. One inscription alone, recording the exploits of one of the family of the Harpagi after the battle of Eurymedon (466 B.C.), on the so-called obelisk of X., is of any length. The language seems to have lasted from about the 5th c. B.C. to the 1st c. A.D.—Rawlinson, *Herodotus*, vol. i. pp. 311, 673; *Synopsis of the Contents of the British Museum*. 1855, p. 105; Fellows, *Asia Minor* (Lond. 1839); *Discoveries in Lycia* (1841); Birch in the *Archæologia*, vol. xxx. pp. 176—204.

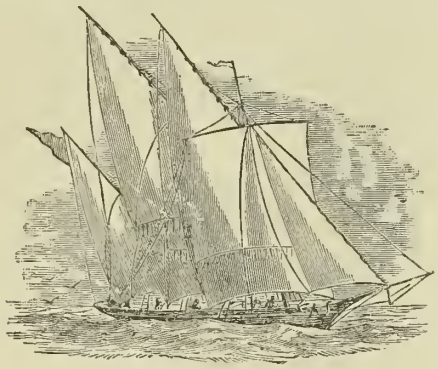
XAVIER, St. Francis, a celebrated missionary of the Roman Catholic Church, was born of a noble family at Xavier, in Navarre, April 7, 1506. Having received his early education at home, he was sent, when in his 18th year, to the college of Sainte Barbe, at Paris, where he formed the acquaintance of Ignatius de Loyola (q. v.), with whom he ultimately became associated in the foundation of the Jesuit Society. Under that head will be found detailed so much of his history as regards the first establishment of the order, and the early labors of its founders in Rome. It was while he was engaged in these early labors of the society in Rome, that X. attracted the notice of the representative of John III. of Portugal at Rome, Govea, who suggested to the king the idea of sending out members of the new order as missionaries to the Portuguese colonies in the East. X. was chosen for this purpose in the place of Bobadilla, who had been originally appointed, but was prevented by sickness from going on the expedition.

Having sailed from Lisbon, April 7, 1541, and wintered at Mozambique, he arrived at Goa, May 6, 1542, and presented to the bishop his letters of authorization from the Pope Paul III. X.'s first proceeding, on finding the excessively depraved condition of the European Christians settled in India, was to endeavor, by stirring up among them a spirit of penance and religious fervor, to remove the great obstacle to the efficacy of his preaching to the native population, which was presented by the evil example of the professing Christians of the colony. His efforts in this preliminary reformation were eminently successful, and he was equally blessed in his labors among the pearl-fishing population of the coast, from Cape Comorin to the island of Manaar. After a stay of more than a year in this region, he returned to Goa, and with a fresh staff of assistants, visited the kingdom of Travancore, where, in the space of a single month, he baptized 10,000 natives. Passing thence to Malacca, where he was reinforced by three other Jesuit missionaries, sent by Ignatius de Loyola in compliance with X.'s earnest solicitations, and having achieved great success among the residents of the coast, he proceeded, in 1546, to the Banda Islands, to Amboyna, and the Molluccas. In all these places his success was extraordinary. Having thus effected a first establishment of the Gospel in many places, he resolved to retrace his steps, and revisit the several scenes of his preaching. He arrived at Malacca in 1547, and thence by Manassar, near Cape Comorin, where he stayed for some time, he passed to the island of Ceylon, where he converted the king of Kandy, with many of his people. In May 1548, he returned a second time to Goa. His great object now was to carry out a project for the conversion of the Japanese Empire, which had been suggested to him by a Japanese of high rank, whom he had attached to himself at Malacca, and who accompanied him to Goa. This Japanese, whom, with two of his domestics, he converted and baptized, became a most valuable auxiliary. Through his aid, X. was enabled during the voyage to acquire so much of the Japanese language as enabled him to translate into Japanese and explain the Apostles' Creed; and although his success in the first island which he visited was very insignificant, yet at Firando, and afterwards at Miako, his preaching was attended with extraordinary fruits.

At the latter place he had failed signally upon his first visit, which was made in a very poor and humble guise; but having returned with a more imposing train, and under circumstances of greater outward distinction, he obtained a ready and favorable hearing, and made so lasting an impression that the mission which he founded continued to flourish for above 100 years, until the final expulsion of Christianity from the Japanese Empire. His mission to Japan occupied about two and a half years; and in November 1551, he sailed from Amanguchi for the purpose of returning to Goa to organize a mission to China. Touching at Malacca, upon his voyage, he endeavored to concert with the governor an embassy in the name of the king of Portugal, to China, under cover of which he hoped to effect an entrance for his missionary enterprise, but on his return from Goa to Malacca, he found a new governor, who was opposed to any such attempt; and he was obliged to adopt the expedient of sailing in a merchant-ship to the island of Sancian, near Macao, which was at that time the trading dépôt of the Chinese with the merchants of Portugal. From Sancian, X., having procured a Chinese interpreter, hoped to induce one of the native merchants to land him secretly on the coast; but in this hope also he was baffled by the fears of the Portuguese, who dreaded for themselves the vengeance of the Chinese authorities upon this infraction of the law. This disappointment, coupled with the privations and labors to which he had been exposed, brought on a violent fever, and under the combined weight of mental depression and physical sickness, this Christian hero sunk upon the very threshold of what he had looked to as the great enterprise of his life, in the island of Sancian on the 22d December 1552. His remains were conveyed to Malacca, and thence with great solemnity to Goa, March 15, 1554. Many miracles, attested by numerous witnesses, were reported of X. in almost all the stages of his career. Among these, there have been some who reckoned the miraculous gift of tongues. The evidence of these miracles was submitted to the usual process of inquiry at Rome, and many miracles having been established by the ordinary canonical process,

X. was 'beatified' by Paul V. in 1619, and 'canonized' by Gregory XV. in 1622, his festival being fixed upon the 3d December. His only literary remains are, a collection of Letters, in 5 books, 8vo (Paris, 1631), and a Catechism, with some short ascetic treatises. His Life, by Père Bouhours, was translated by James (brother of John) Dryden. There is also a Latin Life by Tursellino (Rome, 1594); in Italian by Bartoli and Maffei; in German by De Vos (1877); and in English by Venn (1862) and Coleridge (1873).

XEBEC, an armed vessel of great speed, formerly used by the Algerine corsairs. It carried three masts, on which square or lateen sails could be set. The bow and stern were remarkable for the small angle they made with the water. The sides were low, and the upper deck of great convexity, that the water might readily flow off through the scuppers. As this rendered them inconvenient for walking on, gratings were laid at the sides of the deck, to avoid the convexity. The crew walked dry on these gratings, while the water flowed out underneath. Xebecs carried from 16 to 24 guns. A few of these vessels—unarmed—still sail the Mediterranean as carriers of perishable goods.



Xebec.

XE'NIA, a handsome and flourishing town in Ohio, U. S., and important railway junction, on the little Miami River, 65 miles north-east of Cincinnati, the center of a rich and populous agricultural district; it has a large court-house, jail, 3 newspapers, a college, and a theological seminary. Pop. (1870) 6337; (1880) 7026.

XENO'CRATES, an ancient philosopher, was born at Chalcedon 396 B.C., and died 314. At an early age, he attached himself to Plato, and in course of time, was so much esteemed for his proficiency in philosophy and high moral character, that he was thought worthy of succeeding Speusippus, Plato's successor, in the presidency of the Academy. This post he filled most creditably for 25 years. He wrote numerous treatises upon dialectics, physics, and ethics, and drew with unusual precision the boundaries between these three departments of philosophy. Of these works, merely the titles have been preserved; and what is known of his doctrines is gathered only from notices of them contained in various authors. He introduced into the Academy, to a greater degree than before, the mystic Pythagorean doctrine of numbers, in connection with the *ideas* of Plato. Zeus, the father, ruling in heaven, he called Unity, as being uneven number and spirit; the World-soul, which operates through all things liable to motion and change, he styled Duality.

This divine world-soul dwells in the heavenly bodies, the Olympic gods, the elements of nature, and also in terrestrial demons, whom he regarded as intermediate between gods and men. In his ethical teaching, he aimed at making the Platonic doctrines more directly applicable to ordinary life in individual cases, and pitched his standard of excellence very high. He held that virtue is in itself valuable, while other things are only so conditionally, and that it extended to thoughts as well as actions. He was himself of irreproachable character, of a well-balanced mind, and temperate in his habits without cynicism. His conversion of the youthful debauchee Polemo into an earnest, virtuous man, and his disregard for wealth, as shown by his refusal of the offers of Philip and Alexander, are the best known incidents in his long, useful, and virtuous career.

XENO'PHANES, founder of the Eleatic School of Philosophy, was born at Colophon, in Asia Minor, about 580 B.C., or, according to others, about 40 years earlier. He spent the greater part of a life which was prolonged beyond his 90th year, in banishment. He passed many years in Sicily, and resided for some time at Elea (whence adj. *Eleatic*), in Lucania. He composed many poems, historical, didactic, and elegiac, which have all perished, except a few fragments. He employed his poetry as the instrument for disseminating his philosophical tenets. He was the first to maintain the Eleatic doctrine of the oneness of the universe; and recognizing clearly the unity and perfection of the deity, he attacked the prevalent mythology and the practice of attributing to the godhead a human form and human weaknesses. He was thoroughly in earnest, but his logic was confused and contradictory. While he held the existent to be identical with the deity, and regarded it as the basis of phenomena, he also maintained that the divine essence was neither finite, nor infinite, neither moved nor unmoved: not finite, for then it must be limited by another, whereas God is one; nor, on the other hand, infinite, for only non-being is infinite, as having neither beginning, middle, nor end. The distinguishing tenet of X. is his Monotheism; and as a philosophical rhapsodist, he sought to inculcate it, though he failed to express it in a clear and systematic manner. His speculations are sceptical in their tendency, and appear to have had great influence upon succeeding philosophers. His explanations of physical phenomena were crude; but one is recorded in which he has anticipated modern geology.

From the shells and marine petrifactions found on mountains and in quarries, he inferred that the surface of the earth had risen gradually out of the sea. In the 18th c., Voltaire could give no better explanation of the fact of sea-shells being found on the mountains of Spain, than the supposition that they were the scallop-shells dropped by pilgrims journeying to and from the shrine of St. James.

XE'NOPHON, celebrated as a general, historian, and philosopher, was born at Athens 445 B.C. At an early age he became a pupil of Socrates, and is said to have been saved from death by that philosopher at the battle of Delium. At the age of 40 or thereabouts, he joined the expedition of the younger Cyrus against his elder brother, Artaxerxes Mnemon, king of Persia. After the battle of Cunaxa, and the treacherous massacre of the Greek generals, X. played an important part in the adventurous retreat known in history as the Retreat of the Ten Thousand; and it was his courage and conduct that contributed mainly to its success. After having returned to Asia Minor, X. led a portion of his forces upon a pillaging expedition, and amassed wealth enough to enable him to live the life of a country gentleman. Before retiring, he served under Agesilaus, the Spartan general, against the Persians; and at Coronea fought against his own countrymen. Sentence of banishment had been previously passed upon him at Athens, probably for his share in the Cyrean expedition. His sympathies were entirely Spartan. He soon afterwards settled at Scillus, a small town near Olympia, in Elis, under Spartan protection, where he lived upwards of 20 years, occupying himself with hunting, agriculture, and writing. He is not mentioned as having ever returned to Athens, though his sentence of banishment was repealed, and his two sons were in the Athenian division which aided the Spartans at Mantinea. At last X. was driven from his retreat at Scillus by the Eleans, and took refuge in Corinth, where he probably died, 359 B.C. His works are numerous, and to judge by their titles and number, all extant. His style is simple, elegant, but rather monotonous and deficient in vigor. As a philosopher, he holds no very high rank.

He possessed excellent practical talents, was a humane, sensible, religious man, but seems to have had neither genius nor taste for speculative philosophy. His principal works are the *Anabasis*, or narrative of Cyrus's expedition, and the Retreat of the Ten Thousand; a History of Greece in continuation of Thucydides; the *Cyropædia*, or education of Cyrus the Elder—a sort of political romance, in which Cyrus is drawn as the model of a wise and good ruler. In the latter work, X. clearly shows his preference of a well-regulated monarchy to the democracy of his native country. He wrote besides, the Reminiscences (*Memorabilia*) of Socrates, a series of dialogues intended to refute the charges upon which that philosopher was executed; also treatises on Hunting, on the Horse, the Revenues of Athens, and Domestic Economy.

XE'RES-DE-LA-FRONTER'A, or JEREZ-DE-LA-FRONTERA, an important town of Spain, in the province of Cadiz, and 14 miles directly north-east-by-north from Cadiz, near the right bank of the Guadalete, and on the railway between Cadiz and Seville. The houses are generally well built, and the streets and squares clean, spacious, well paved, and well lighted. The wealthy wine-merchants mostly reside in the suburbs. X. is an ancient town supposed by many to be the *Asta Regia Cæsariana* of the Romans. X. has manufactures of woollen cloth and leather, and a considerable trade in corn; but all these are of little consequence in comparison with its wine-trade. *Sherry* derives its name from Xeres-de-la-Frontera. Some of its *bodegas*, or wine stores, are of vast dimensions. They are not wine-vaults, but stores erected above ground. The greater part of the wine of X. is exported to England; and some of the principal wine-merchants are of French and Scottish extraction. Pop. (1877) 64,533.

XERES-DE-LOS-CABALLE'ROS, or JEREZ-DE-LOS-CABALLEROS (anc. *Esuris*), a town of Spain, in the province of Badajoz, and 40 miles south from Badajoz. X. is a picturesque old town, partly surrounded by a Moorish wall. The ecclesias

tical edifices are remarkably numerous. There are manufactures of woollen and linen cloth. Amongst the chief articles of trade, besides the produce of the manufactures, are pigs and fruit. Pop. (1877) 8463.

XE'ROTINE SICCATIVE is a compound of boiled linseed oil and certain metallic oxides or salts, and like similar compounds bearing the common name of 'driers,' is largely used for mixing with oil colors, that they may readily dry. Salts forming very unstable compounds when mixed with oil, have come into use, and constitute highly explosive substances. The destruction of H.M.S. *Doterel*, in 1881, was apparently caused by X. S.

XERXES I., king of Persia, was the eldest son of Darius and his second wife Atossa, and was appointed successor by his father, in preference to Artabazanes, his eldest son by his first wife. Darius died in 485 B.C., in the midst of his preparations for a third expedition against Greece. X., after having subdued the rebellious Egyptians, gave his whole attention to the preparations begun by his father, which occupied nearly four years. Immense hordes of men were gathered together from all parts of the vast Persian Empire, and an enormous fleet was furnished by the Phœnicians to Persia. A bridge of boats, an English mile in length, under the superintendence of Egyptians and Phœnicians, was built across the Hellespont. The bridge, however, was destroyed by a storm, on which X. is said to have beheaded the engineers, and to have ordered 300 lashes to be administered to the rebellious sea, and a set of fetters to be cast into it. Another bridge, consisting of a double line of boats, was built; and a canal was cut through Mount Athos, at the point of the peninsula of Acte in Macedonia, on which the fleet of Mardonius had been wrecked in 492 B.C. The preparations were completed in 481 B.C., and in the autumn of that year, X. arrived at Sardis, where he wintered.

In the spring of the following year, the vast assemblage began to march towards the Hellespont; and, according to Herodotus, it took seven days and nights to march across the bridge. After crossing the Hellespont, the march was continued along the Thracian coast towards Doriscus on the Hebrus, where a halt was made on a large plain, and the army numbered. The fleet drew up near to Doriscus. According to Herodotus, the whole number of fighting-men, military and naval, amounted to nearly 2,500,000, and the fleet consisted of 1207 ships of war, besides 3000 smaller vessels. These numbers were considerably increased during the march between Doriscus and Thermopylæ by the Thracians, Macedonians, Magnesians, and other nations through whose territories X. passed on his way to Greece. Herodotus supposes that the number of camp-followers, exclusive of eunuchs and women, would amount to more than that of the fighting-men; so that, according to him, the whole number of people assembled on this occasion would be considerably over 6,000,000, a number greater than the entire population of Ireland. This number is doubtless greatly exaggerated; still, it cannot be doubted that this was one of the greatest multitudes ever brought together for any purpose under the sun. Grote, who discredits the immense numbers given by Herodotus, nevertheless says: 'We may well believe that the numbers of Xerxes were greater than were ever assembled in ancient times, or perhaps at any known epoch of history.' This immense force moved on without resistance through submissive nations till it reached Thermopylæ (q. v.), where it was brought to a stand by the army of Leonidas (q. v.). Although the Greeks were entirely defeated and slain, it was not without heavy loss to the Persians. On the same day, and on the third day after, the Persian fleet, which had previously suffered severely from a storm, was defeated with heavy loss by the Greeks off Cape Artemisium in Eubœa. X. continued his march on to Athens through Phocis, which he laid waste, and Bœotia, whose inhabitants joined him, with the exception of those of Platæa and Thespia, which cities he burned. A detachment which he sent to attack Delphi met with a signal defeat.

When X. arrived at Athens (in the summer of 480, three months after crossing the Hellespont), he found the city deserted, the Athenians having sent their families to Trœzen, Ægina, and Salamis. Athens was destroyed. Meantime the two fleets had sailed round from Eubœa and taken up their positions in the narrow strait between Salamis and the Attic coast, where the famous naval battle of Salamis took place (September 480 B.C.). See SALAMIS. X. witnessed the fight from a lofty throne which he had caused to be erected on one of the slopes of Mount Ægaleus,

> 'The rocky brow
> Which looks o'er sea-born Salamis.'

X. was apparently confounded at the unexpected and inglorious result of all his mighty preparations for the overwhelming of Greece, and becoming alarmed for his personal safety, fled, under an escort of 60,000 men, with all haste towards the Hellespont, which he reached in 45 days. The bridge of boats having been again destroyed by a storm, he crossed over to the Asiatic coast in a vessel. Mardonius was left with 300,000 men to carry on operations in Greece. In 479 B.C., the Greeks defeated Mardonius in the famous battle of Platæa (q. v.), and on the same day gained another victory over the Persians at Mycale in Ionia. Next year (478 B.C.), the Persians lost their last possession in Europe by the capture of Sestos on the Hellespont. The war was continued for a few years longer, though the struggle was now virtually at an end. Little more is known of the personal history of X., except that, in 465 B.C., he was murdered by Artabanus, who aspired to the throne, and was succeeded by his son Artaxerxes. From all that is known of X., he appears to have been utterly ignoble in character, vain-glorious, licentious, cruel, cowardly—the very *beau-idéal*, in short, of the worst kind of eastern potentate. His history would be scarcely worth recording were it not for his connection with Greek history. His famous invasion was undertaken apparently for no other purpose that to gratify a weak-minded vanity, which was delighted with the idea of being able to assemble at one time 'ships by thousands' and 'men in nations,' who were at the mercy of his unprincipled caprice.

XIMENES, FRANCIS DE CISNEROS, by which latter name he is commonly called in Spain, the well-known statesman, archbishop, and cardinal, was born of a humble family at Torrelaguna, in Castile, in 1437. He was educated at Alcalá de Henares, Salamanca, and finally Rome, where he obtained from the pope a provisional or prospective nomination to a prebend in the cathedral of Toledo. The archbishop, resisting the papal claim of 'provisor,' refused to admit X.; and on his persisting in his claim, put him in prison, where he was detained for a long period. On his release, he was named Vicar-general of Cardinal Mendoza at Siguença; but he gave up this preferment, and entered the Franciscan order in 1482. His reputation for piety and learning, led the queen, Isabella, to choose him, in 1492, for her confessor; and three years afterwards, to name him Archbishop of Toledo—a dignity which he refused to accept until he received an express command from the pope. Having yielded in the end, he continued as archbishop the life of mortification and austerity which he had practised in his monastery; and he applied to purposes of religion, charity, and public utility the whole of the princely revenues of his see. As confessor and confidential adviser of the queen, X., during the lifetime of Isabella, was the guiding spirit of Spanish affairs; and on her death in 1504, he held the balance between the parties of Ferdinand and Philip of Burgundy, husband of Joanna, the heiress of the crown. On the death of Philip in 1506, X. was appointed Regent, in consequence of the incapacity of Joanna and the absence of Ferdinand, and conducted the affairs of the kingdom through a most critical time with consummate skill and success. In 1507, he was created cardinal; and in the following year, he organized, at his own expense, and himself accompanied as commander, the celebrated expedition, consisting of 10,000 foot and 4000 horse, for the conquest of Oran, on the African coast. Ferdinand died in January 1516, and on his deathbed named X. Regent of Spain till the arrival of his grandson Charles; and although the grandees had organized an opposition as well to himself as to the royal authority, X., by his prompt and able dispositions, overawed them into submission; and subsequently, by the same exercise of vigor and determination, quelled the incipient revolt of Navarre.

In order to the better consolidation of the royal authority in Spain, X. urged very strongly the speedy visit of Charles, who still lingered in his Flemish principality; but it was not till after the lapse of a year and a half, that the king decided on his journey; and meanwhile, the enemies of X. had so worked upon his jealousy and pride, that he took the ungracious and ungrateful course of dismissing his faithful, but, as he feared, too powerful servant. X. had set out to meet the king, and although laboring under great infirmities, continued to prosecute his journey, when he was seized with a mortal illness at Branguillas, near Aranda de Duero, where he died, November 6, 1517.

As a statesman and administrator, the reputation of Cardinal X. is deservedly of the very highest. The social and political revolution which he effected in breaking down the feudal power of the nobles, has often been compared with the analogous change wrought in France by Richelieu. But the revolution of X. was, at least in its results, rather in the interest of the people than, like that of Cardinal Richelieu, of the crown; and while it freed the sovereign from the unworthy position of dependence on the nobility, it established the municipalities and the communal representatives in the enjoyment of certain well-defined and undoubtedly substantial privileges and immunities. His munificence as a patron of religion, of letters, and of art, has been the theme of praise in every history of his time. The university of Alcalá de Henares, which he planned, organized, erected, and endowed, was a marvel of enlightened munificence in such an age, and may compare advantageously with even the most princely foundations of the most enlightened times. His Complutensian Polyglot (q. v.), besides being the first of its class, was, considering the resources of the period, perhaps the grandest in conception among

the projects of its own order; and the perseverance with which, during the long period of fifteen years devoted to its preparation, he watched and directed its progress, is an evidence that it originated from a genuine love of sacred learning, rather than a passing impulse of literary enthusiasm. The cost of this gigantic undertaking amounted, on the whole, to 80,000 ducats. His expenditure on churches, hospitals, schools, convents, and other works of religion and benevolence, was on a scale of corresponding munificence. He maintained thirty poor persons daily at his own cost, and he regularly set apart one half of his income to the uses of charity.—See Hefele's *Der Cardinal Ximenes und die kirchlichen Zustände Spaniens* (Tübingen, 1851); Prescott's *Ferdinand and Isabella*.

XYLOÏ'DIN is a substance which is precipitated in the form of a white powder, insoluble in water, alcohol, and ether, when water is freely added to a solution of starch in cold nitric acid. Its composition is not determined with positive certainty, but it is probably starch, $C_{12}H_{10}O_{10}$, in which either one or two atoms of hydrogen are replaced by a corresponding number of atoms of peroxide of nitrogen, NO_4. According to Professor Miller, there is a substitution of two atoms, so that the formula representing xyloidin is $C_{12}H_8(NO_4)_2O_{10}$. It explodes when sharply struck, and burns with violence at 356°. By the action of reducing agents, it is again converted into starch.

XY'LOL (Gr. *xylon*, wood) is an oily aromatic fluid with a strong refractive power, and boiling at about 263°. Its composition is represented by the formula $C_{16}H_{10}$, and it is regarded as the hydride of a non-isolated radical, $C_{16}H_9$, to which the name *Xylyl* is given. Xylol, mixed with toluol, cumol, and cymol, is found amongst the oils which are separated from crude wood-spirit by the addition of water.

XYLO'PHAGA (Gr. wood-eaters), a family of *Coleoptera*, of the section *Tetramera*, nearly resembling weevils, but differing from them in the want of a beak. They have short antennæ, thickened towards the tips, and sometimes leafy from the base. The species are numerous, and are arranged in many genera. They mostly live in wood, on which they feed, both in their perfect and larval states. Some of them are very destructive to trees and timber. See BARK BEETLE and SCOLYTUS. Some of the X. live in fungi, and feed on them.

Y.

THE last letter but one of the English alphabet, is derived from the Greek Υ (*υ*). It had no place in the earlier Latin alphabet, and only came into use by Roman writers in the time of Cicero in spelling words borrowed from the Greek. In the Greek of the classical age, *υ* (Υ) no longer retained its pristine power (Ital. *u* or Eng. *oo*), but had degenerated into a sound like the French *u*, or even nearer to *i* (*ee*); it could not therefore be represented by the Roman *u* or *v*, which had remained (and remains yet in modern Italian) undegenerated, and thus was appended to the Roman alphabet as a new character. Its use in native Latin words, as *sylva* for *silva*, *satyra* for *satira*, is an error of modern editors. Italian has no *y*, but uses *i* instead, as *sinfonia*, symphony. The other modern languages of Europe have not only retained it in spelling words of Greek origin, but some of them substitute it for *i* in native words, generally in a very capricious manner. German orthography has recently been purged of this abuse; and in Dutch, where it had always the sound of English *i* (*ai*), the double character *ij* is now written. In English, it is used to represent the semi-consonantal power of *i* or *j* (see I and J) in the beginning of a word and before another vowel, as *yoke* = Lat. *iugum* or *jugum* = Ang.-Sax. *iuc; young* = Ang.-Sax. *iong* = Ger. *jung*. It has been suggested that the practice of writing *y* at the end of a word instead of *i*, while we replace it by *i* on adding a syllable (e. g., *lovely*, *lovelier*), may have arisen like the habit of giving a tail to the last unit of the Roman numerals (e. g., ij, iij, iiij, in the wish to give a kind of finish to the word and please the eye. The would-be antique spelling *yᵉ*, *yᵗ*, for *the*, *that*, is a blunder, arising from mistaking the Ang.-Sax. *þ* (= *th*) for a *y*.

YABLONOI' MOUNTAINS, a range in the north-east of Asia, dividing the basin of the Amur from that of the Lena. Some peaks are between 7000 and 8000 feet high, but parts of the ridge are but a kind of plateau. The Stanovoi Mountains (q. v.), are a continuation of the Yablonoi Mountains.

YACHT is a small vessel constructed so as best to insure strength, elegance, and speed, and exclusively employed for pleasure-sailing. Vessels of this sort were first constructed in this country in 1604, at which date a yacht was built by the king's master-shipwright for Henry, eldest son of James I. of England; the idea of such a vessel being taken from the Dutch, among whom they had been employed for some time previous. From this time, yachting, steadily patronized by royalty, became a favorite pastime of the nobility and gentry, and there are now about 50 yacht clubs in the United Kingdom, possessing, according to the *Yacht List* of 1880, about 3700 yachts. This amusement is encouraged by government, mainly because it supplies an excellent training for seamen, who in time of war become available for the royal navy, while in time of peace they are no burden on the national treasury; and accordingly, yachts are allowed to bear the ensign of the royal navy, supplemented by the special flag granted by the Admiralty to each club, and to refit and revictual in the royal dockyards. The oldest yacht club in the United Kingdom is the *Royal Cork*, which under the title of the 'Water Club of Cork,' is known to have existed as early as 1720; and the next in order of seniority is the *Royal Yacht Squadron*, founded in June 1815, and having its headquarters at Cowes, Isle of Wight. The club which stands first as to the number of its members and yachts is the *Royal Thames Yacht Club*, which was founded in 1823, and has its head-quarters in London. Of the other clubs, 6 are Scotch (4 on the Clyde and 2 on the Forth), 8 Irish (2 at Queenstown, 2 at Kingstown, 1 at Dublin, 1 at Belfast, 1 at Carlingford Loch, and 1 at Loch Erne), and the rest English, being mostly located on the Thames, the channels between Southampton and the Isle of Wight, or the N. coast of Wales, from Liverpool to Holyhead. More than half of these clubs have been founded since 1840. Yachting is gaining ground in foreign countries and in the British possessions, the United States ranking next to Great Britain and Ireland in the number and importance of her yacht clubs (the chief of which is the New York Yacht Club); and Holland, Belgium, France, Australia, Bermuda, Canada, and Russia have similar associations.

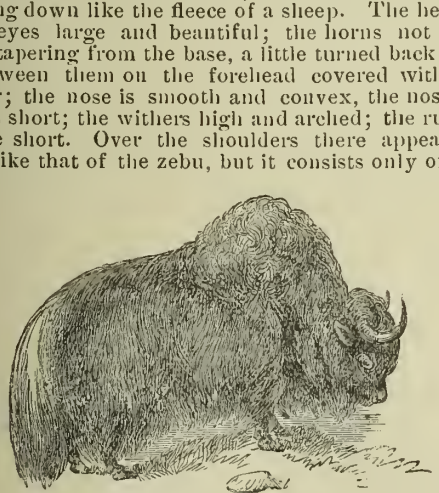
The principles adopted in the construction of yachts have fluctuated greatly, from the simple unpretending rig, small tonnage, and clumsy build of the early yachts of the Royal Cork Club, to the immense canvas area, larger size, and long narrow build of the yacht of the present time. The yacht of the early part of the century was built with a fine run aft, and a bluff bow; but about 20 years ago, this style was supplanted by increased sharpness of bows and stern, a raking (slanting upwards and backwards) stern-post, more depth, the draft aft double of that forward, great fineness of the water-lines, narrow beam, and immense sails. The effect of these changes was a great increase of speed, attended, however, with certain defects: one of which was that the diminished breadth of beam injuriously affected buoyancy, and the yachts consequently were more liable to be wetted in a heavy sea. In 1851, the hollow manner in which the crack yachts of the principal clubs in England were beaten by the yacht *America* of the New York Yachting Club, showed their owners and builders that they had still much to learn in the way of improvement; and with few exceptions, they wisely took the lesson. The *America* had great breadth of beam, comparatively little depth inside, an upright stern-post, extremely sharp entrance, and fine water-lines, and (the most remarkable feature) her maximum breadth considerably abaft the center. With the exception of the great breadth of beam, and little depth inside, all the other characteristic points of the American yacht were adopted by the builders of yachts in this country; the difference between the draught aft and forward was diminished; and the result of these changes has shown that they were great improvements.

The materials used in the building of yachts are wood, iron, and steel; wood alone, wood and iron together, iron alone, and steel alone, being the various ways in which the materials are

employed. Yachts built of wood, or of wood and iron, are generally coppered, to protect the planking, and secure the smoothness of surface essential to speed. The considerations which determine the relative length, breadth, depth, &c., are treated of under SHIP-BUILDING. Considerable stimulus is given to improvements in construction by the numerous prizes which are offered for competition by the various yacht clubs, and which amounted in 1875 to £14,000, besides cups. These small, but powerfully built and thoroughly sea-worthy vessels have traversed every sea on the globe; some make trips to Nova Zembla, Norway, and the Arctic Ocean; a few visit America and the Indian and Southern Oceans; and one or two have circumnavigated the globe. Some of the most remarkable performances of yachts are the voyage from New York to Liverpool of the *Charter Oak*, 23 tons, in 36 days; that of the *Sylvie*, 205 tons, from Halifax to Havre, in 16½ days; those of the *Inca*, *Katinka*, and *Vivid*, 25 tons each, from England to Australia; and the great Atlantic yacht-race from New York to Cowes, in December 1866, which was won by the *Henrietta*, 205 tons, after a voyage of 14 days. Yachts may be divided, according to the style of their rig, into Cutters (q. v.), fore-and-aft and square topsail Schooners (q. v.), and Yawls (q. v.). The tonnage of these vessels is very variable, ranging from 3 to 420 tons in Britain, the average tonnage being 30—50 tons. Steam-yachts (screws) are now exceedingly common, their independence of wind making them very popular. The *Victoria and Albert* and the *Osborne*, both belonging to Her Majesty, are specimens of this class.

YAJNAVALKYA is the reputed author of the S'atapatha-Brâhman'a (see *Yajurveda*, under VEDA), and of a Dharmas'-âstra, or law-book (see SANSCRIT LITERATURE, sec. *Law*). His name points to his being a descendant of Yajnavalka; and, according to tradition, he was also a descendant of *Vis'wâmitra* (q. v.), and belonged to a branch of the *Kus'ikas*. He seems to have occupied an influential position at the court of King Janaka of Videha. Nothing certain, however, is as yet known regarding the age at which he lived.

YAK (*Bos grunniens*), a species of ox found in Tibet, and domesticated there. It is ranked by Colonel Hamilton Smith in the genus *Bison*, along with the Bison, Gaur, and Gayal, and by Mr. Gray in the new genus *Poëphagus*. The wild yak of Central Asia is the largest native animal of Tibet, and is found only near the limits of perpetual snow, descending into the higher wooded valleys in winter, and ascending in summer to the pastures of short grass and *carices*, some of which are at an elevation of 17,000 feet above the sea. It is hunted by large dogs, and is very fierce, falling upon an adversary not only with its horns but with its chest, and crushing him by its weight. It is generally black. The yak has been domesticated from time immemorial, and forms great part of the wealth of the inhabitants of the highest and coldest regions of Central Asia. The domesticated yak is about the height of an English ox, which it much resembles also in figure of body, head, and legs. It is covered all over, however, with a thick coat of long silky hair, hanging down like the fleece of a sheep. The head is rather short; the eyes large and beautiful; the horns not very large, spreading, tapering from the base, a little turned back at the tips, a space between them on the forehead covered with a mass of curling hair; the nose is smooth and convex, the nostrils small. The neck is short; the withers high and arched; the rump is low; the legs are short. Over the shoulders there appears a bunch somewhat like that of the zebu, but it consists only of long hair.



Yak (*Bos grunniens*).

The hair of the whole ridge of the back is long and erect, but not harsh. The tail is covered with a prodigious quantity of long flowing hair, descending to the hock, and has much the appearance of a large bunch of hair artificially attached. Not a joint of it is visible. From the chest, between the fore-legs, issues a large pointed tuft of long hair. The hair of the shoulders, rump, and upper parts of the body is comparatively thick and short; but that of the lower parts is long and straight, hanging below the knee, and sometimes even to the ground. Yaks exhibit great variety of colors; but black and white are the most prevalent. It is not uncommon to see the long hair on the ridge of the back, the tail, the tuft on the chest, and the legs below the knee white, whilst all the rest is jet black. The great quantity of hair, evidently a protection against the cold of the climate for which it is destined, gives the yak an apparent size far beyond the reality.

The yak does not low like an ox, but utters a short grunting sound like a pig, as the expression either of uneasiness or of satisfaction.

It delights in steep and rocky places. Hooker, in his *Himalayan Journal*, describes the calves as 'the drollest of animals, like ass-colts in their antics, kicking up their short hind-legs, whisking their bushy tails in the air, rushing up and down the grassy slopes, and climbing like cats to the top of the rocks.' The yak is capable of becoming very tame. The Tibetan girls call the yak cows by a peculiar cry to be milked.

The milk of the yak is very rich, and the curd made of it is much used by the Tibetans, both fresh and dried, often powdered into a kind of meal. The butter made from yak-milk is excellent, and is preserved for a long time in the dry and cold climate of Tibet in bladders. It is an important article of Tibetan commerce. The flesh of the yak is of the finest quality; that of the calves is much superior to ordinary veal. Yak flesh is often dried in the sun by the Tibetans, and eaten raw. The yak is never used for tillage or draught, but is very much employed as a beast of burden, and travels at a slow pace twenty miles a day, where no other beast of burden could well be employed. The lazy and luxurious lamas of Tibet often ride upon it, an attendant leading the animal. The hair is spun into ropes, and made into coverings for tents. The soft fur on the hump and shoulders is made into a fine and strong cloth. Caps, jackets, cloaks, and blankets are made of the skin, with the hair on. The tails are the *chowries*, or fly-flappers, used in all parts of India, and which are to be seen particularly on all occasions of state and parade, and sometimes in the hands of the meanest of grooms, sometimes of the highest officers of state.

There is much reason to think that the yak deserves a degree of attention which it has not yet received. It is still confined to its native region, whereas it is probably adapted to increase the productiveness and wealth of many parts of the world. It seems extremely suitable to Norway, Iceland, and other northern countries, and perhaps might be advantageously introduced into the Highlands of Scotland. Its hair is probably fit for other textile purposes than those to which it has been applied by the rude Tibetans.

YAKSHA is, in later Hindu Mythology, the name of a kind of demigods, who especially attend on Kuvera, the god of riches, and are employed in the care of his garden and treasures. According to the Vishn'u-Purân'a, they were produced by the god Brahman, as beings emaciate with hunger, of hideous aspect, and with long beards; but Brahmanic poetry generally represents them as inoffensive, and in the Meghadûta of Kâlidâsa (q. v.), it is a Yaksha banished from his wife who utters the most poetical thoughts, and is capable of the tenderest feelings. The Buddhists, on the contrary, describe them in some of their legends as cruel demons, who feast on serpents and human corpses, and when filled with the flesh they have devoured, indulge in fierce combats; but in others again, as beings who also delight in dances, songs, and amusements, and sometimes even enter the paths that lead to *nirvân'a*. In Buddhist legends, they also possess the power of raising storms, and altogether occupy a far more prominent position than is allowed them in the Brahmanic pantheon. The Yakshas of the Brahmanic mythology have wives, Yakshis, who sometimes appear in the train of Umâ (q. v.).

YAKUTSK. See JAKUTSK.

YALE COLLEGE, an institution of learning in New Haven, Connecticut, U.S., founded in 1700 as the collegiate school of the colony of Connecticut, under the trusteeship of the ten principal ministers of the colony, who each contributed a gift of books. It was first established at Saybrook, and in 1716 removed to New Haven. Among its early patrons were Governor Yale, whose name it bears, and Bishop Berkeley. Of its four faculties, the medical was organized in 1812, the theological in 1822, the legal in 1824, and the philosophical in 1847. Its government consists of the governor, and lieutenant-governor of the state, six fellows, its president, and ten ministers. The library has about 100,000 vols. There is a geological and mineralogical cabinet of 30,000 specimens, and the college has the historical pictures and portraits of Trumbull. A natural history museum has been added from funds given in 1866 by the late George Peabody. It has over 100 instructors and more than 1000 students, and has had about 10,000 graduates. See *The Yale Book*, 2 vols. (New York, 1878).

YAM (*Dioscorea*), a genus of plants of the natural order *Dioscoreaceæ*, distinguished by an inferior ovary and membranous winged fruit. The species are mostly tropical, natives of the

East and West Indies, &c. They have tuberous roots and herbaceous twining stems. The great fleshy roots of some of them are very much used as an article of food, in the same way that potatoes are in more temperate climates. They contain much starch, and generally become somewhat mealy and pleasant to the taste when boiled. This, however, is not the case with all: the roots of *D. triphylla*, *D. dæmonum*, *D. virosa*, and several other species with ternate leaves are very nauseous even when boiled, and are poisonous. The tubers of all the yams contain an acrid substance, which, however, is dissipated by boiling, except in the species with compound leaves. The WINGED YAM (*D. alata*) is an article of food in daily use in the South Sea Islands. The roots are 1½—3 feet long, and often 30 lbs. in weight, with a brownish



Common Yam (*Dioscorea sativa*).

or black skin, juicy and reddish within. They vary exceedingly in form. The stem, which is winged, twines up tall poles which are provided for it by the cultivator; the leaves are between heart-shaped and arrow-shaped. Two or three small tubers are generally found in the axils of the leaves. It is supposed that this species may be the original of most, or perhaps all, of the yams cultivated in the tropical parts of Asia, Africa, and America—as the Common Yam of the West Indies (*D. sativa*), which has a round stem and heart-shaped leaves; *D. bulbifera*, in which the tubers in the axils of the leaves attain the size of apples; the Prickly Yam (*D. aculeata*), which has a prickly stem, and a fasciculated, tuberous root; *D. globosa*, the most esteemed yam of India, which has very fragrant flowers, and roots white internally; *D. rubella*, another Indian kind, with tubers sometimes 3 feet long, tinged with red below the skin; &c. The species are not well ascertained.

Yams are propagated by means of their tubers; the small axillary tubers, or the small tubers produced at the base of the stem around the neck of the large tuber, being used for this purpose.—A species of yam (*D. Batatas*) has recently been brought from the temperate parts of China, where it appears to have been long in cultivation, and is found to succeed well in France. It is hardy enough to endure the climate even of Scotland without injury; but the heat of the summer is not sufficiently great and long-continued for its profitable growth, so that, in general, the plant merely lives, without producing a large tuber. The root is of very fine quality, and attains a very considerable size. The stem requires the support of a pole, round which it twines; the leaves are more elongated and acuminated than those of the West Indian yams; the root strikes perpendicularly down into the ground, and forms its tuber often at a very considerable depth, which is sometimes inconvenient to the cultivator; but this is prevented by putting a slate under it.

YAMA, the Hindu god, who, at the epic and Purân'ic period of Hinduism (see INDIA, sec. *Religion*), is the sovereign of the Manes, and the judge of the dead, is, in the hymns of the R'igveda, a son of *Vivas'wat* and *Saran'yû*, and a twin-brother of *Yamî*, whose desire to become his wife he resists. His father is sometimes also called the *Gandharva;* and he is further represented there as possessing two four-eyed dogs, which guard the road to his abode (see J. Muir, 'Yama and the Doctrine of a Future Life, according to the R'ig-, Yajur-, and Atharva-vedas,' in the *Journal of the Royal Asiatic Society*, New Series, 1865, vol. i. p. 287, ff.). The idea represented by these mysterious deities has been differently understood. Professor Roth takes Vivas'wat for the light of heaven, Saran'yû for the dark storming cloud, and Y. and Yamî as representing the first human pair—the originators of the race, or the Vedic Adam and Eve produced by the union of the damp vapor of the cloud and the heavenly light.

The Vedic hymns, however, do not afford the slightest ground for such a fantastical interpretation of these names; and as regards that of Y. and Yamî, they discountenance it even distinctly by describing Y. as resisting the sexual alliance with his sister. Professor Max Müller understands *Vivas'wat*, to represent the sky; *Saran'yû*, the dawn; *Y.*, the day; and *Yamî*, the night (*Lectures on the Science of Language*, 2d Series, Lond. 1864, p. 509, ff.). But this interpretation, too, is open to the strongest doubts, inas-



Yama.

much as there is no valid ground for identifying the luminous deity Vivas'wat with the sky, or *Saran'yû* (from *saran'a*, going, moving) with the dawn. It seems more probable that the phenomena symbolized by this myth are not of a luminous, but of an aërial character; the kindred myth of a luminous character being that of the *As'wins*, who are likewise the twin progeny of Vivas'wat and Saran'yû, or rather of Vivas'wat and 'a form similar to that of Saran'yû,' and who represent the transition from darkness to light, and the inseparable duality produced by the intermingling of both (see J. Muir, 'Contributions to a Knowledge of the Vedic Theogony and Mythology, No. 2,' in the *Journal of the Royal Asiatic Society*, vol. ii. 1866). For as *Vivas'wat*, 'the expanding,' probably implies the firmament 'expanding' to the sight through the approaching light, *Gandharva*, as usual, the solar fire, and *Saran'yû*, the dark and cool 'air' (the moving element), Y. and *Yamî* seem to represent the current of air produced by the effect of the solar heat emanating from the firmament on the cool air of the night, when the antagonism between the warm and cold air of which this current consists would be Y. repelling the union with his sister Yamî, though, at the same time, they are 'husband and wife while yet in the womb' (of the night-air). And since this phenomenon extends over the whole atmosphere, the two four-eyed watch-dogs of Y. are probably the eight or twice-four regions of the compass, either each couple of them taken together with their intermediate regions—whence both dogs are called spotted—or the four regions and the intermediate four taken separately—whence one dog is also called *dark*, and the other *spotted*.

Y. being produced by the solar heat, it becomes then intelligible why it is said of Agni, the (solar) fire, that he is born as Y., and Y. being a phenomenon of the air, why he is also identified with Vâyu, the wind, and why the intermediate space between heaven and earth is assigned to him as his domicile. It is probably a later conception of the Vedic period which describes this abode as having been made for him by the spirits or *Manes*, and Y. as having been the first who found his way to it; and a still later one, which represents him as the first of *mortals* who went to that world, for in passages where these ideas are expressed, there is an association between the moving air and departed life which is foreign to the oldest notions of the Vedas. It led to the position which subsequently Y. assumed as a luminous king who dwells together with the Manes, and as the lord of Death—death then becoming his messenger. Yet in the R'igveda, he has not yet the office of judge of the dead which is assigned to him in the later mythology of the epic poems and Purân'as, and probably already in some of the Upanishads. At the epic and Purân'ic period, Y. entirely loses his cosmical character, though he is still called the son of Vivas'wat. He then marries 13 daughters of the patriarch Daksha, is installed as the king of the Manes, becomes the regent of the South, and resides in Yamapura, a town of the infernal regions, where he sits in judgment over the souls of the departed which are brought before him. They are generally fetched by his messengers, who draw them with nooses out of the bodies which they animated; but in the case of very pious persons, he assumes himself the function of separating the soul from the body. After the soul has been brought before him, he orders his recorder, *Chitragupta* or *Chandragupta*, to read to him an account of all the good and bad actions it had done during its life, and which are kept registered in a book called *Agrasandhânî;* and

according to their merit or demerit, it is sent to heaven or the infernal regions. The precise knowledge which the Purân'as pretend to possess of all these proceedings, also extends to the description they give of this recorder, and to their enumeration of the assessors who co-operate with Y. at his court.—Y.'s sister is *Yamunâ* (q. v.). Amongst his other names, *Dharma* ('justice'), *Dharmarâja* ('king of justice'). *Antaka* ('the ender'), *Kâla* ('time'), and *S'râddhadeva* ('the god of the S'râddha,' q. v.), are of usual occurrence.—When represented, he is of grim aspect; his color is green, his garments red, and he rides on a buffalo with a crown on his head, in one hand holding a club, and in another the noose.

YA'MBU, or YEMBO (*Iambia* of Ptolemy), a maritime town of Arabia, on the coast of the Red Sea, about 130 miles south-west of Medina, stands on the edge of a barren plain that extends between the mountains and the sea, fronting the northern extremity of a narrow winding creek. It shares with other places the title of 'Gate of the Holy City,' and is the third quarter of the caravan road from Cairo to Mecca, and is thus a place of considerable importance. Y. being the port of Medina, is supported by a considerable transport-trade and extensive imports from the western coasts of the Red Sea. The harbor is good and well sheltered. It is surrounded by walls with turrets, outside of which are a few domes and tombs. The streets are wide, the houses stand at a considerable distance from each other, are built of limestone and coralline, and have huge hanging windows. There is a large market-place, a custom-house, some white-washed mosques of a very simple form, and a few caravanserais. According to Burton, 'there is an independent bearing about the people, strange in the East; they are proud without insolence, and look manly without blustering. Moreover, the population has a healthy appearance.' Pop. between 6000 and 7000. See Burton's *Pilgrimage to El-Medinah and Meccah* (1855).

YAMUNA, the modern Jumna, is one of the sacred rivers of the Hindus, mentioned as such as early as in the hymns of the *R'igveda*. Bathing in it, especially where it falls into the Ganges, at Allahabad, was at a later period, and is now, supposed to have the efficacy of removing sin, because at Allahabad the god Brahman is said to have performed a great horse-sacrifice—whence this place is termed *Prayâga*, literally, 'sacrifice,' or *Bhat't'a-prayâga*, literally, 'the best sacrifice.' (Though Allahabad, which is a celebrated place of pilgrimage, is *the* Prayâga, this term is also applied to other places where two sacred rivers meet, four of which, situated at the confluence of the Ganges with the Alakanandâ, Pindar, Mandâkinî, and Bhâgîrathî, are, besides Allahabad, held in especial sanctity, and severally called *Nanda-*, *Karn'a-*, *Rudra-*, and *Deva-Prayâga*.)

In the Purân'ic mythology, the Y.—in Sanscrit, a word in the feminine gender—is called a sister of the god *Yama* (q. v.); and a legend is also told in regard to her, according to which Balarâma, the brother of Kr'ishn'a (see VISHN'U, the 8th Avatâra), once ordered the river to come to him, and as she disobeyed his bidding, plunged his ploughshare into her banks, and dragged her to him. Y., the legend continues, was thus compelled to quit her ordinary course, and to follow Balarâma whithersoever he went. At last, however, appeased by her entreaties, he let her go, after she had watered all the country. Professor Wilson appends to this legend, where occurring in his translation of the *Vishn'u-Purân'a*, the following remark: 'The legend probably alludes to the construction of canals from the Jumna, for the purposes of irrigation; and the works of the Mohammedans in this way, which are well known, were no doubt preceded by similar canals dug by order of Hindu princes.'—*Vishn'u-Purân'a* (Lond. 1840, p. 572).

YANG-TZE-KIA'NG, 'son of the great river' or 'sea,' the principal river of Asia, the 'girdle of China,' connecting together all the central provinces of that empire situated between Tibet and Kokonor on the west and the Pacific Ocean on the east. Its entire length through all its numerous windings, under its various names, can hardly be less, but rather more than 3000 miles. If regard be had to its tributaries and to the cities to which its waters give access, to the richness of the soil, and the variety of the products along its banks, and above all to the vast population scattered far and wide over the valleys, and plains, and hill-sides drained by it and its confluents, the Y. has no equal on the globe. It takes its rise in the same elevated regions of Central Asia which give birth to the Brahmaputra, Makiang or Mekong, Salween, and Hwang-ho or Yellow River. Its course at first is southward, winding its way through an apparently level country, and bearing the name *Mura Ussu*, or Tortuous Waters. The magnitude of the stream must be considerable even in these upper regions, for it was here, beyond the Bayen Khara Mountains, that the missionary traveler, M. Huc, in the winter of 1845, saw a herd of wild oxen that had perished, having got frozen up in the ice while attempting to cross the river. Leaving these upper regions, after traversing the wide territory of Kokonor, the Tortuous Waters run southward, and enter the province of Yun-nan at about 28° N. lat. The river then flows in a south-east direction through this province, and at about 26° N. lat. and 103° E. long., it turns north, forming part of the boundary between the provinces of Yun-nan and Sze-chuen. After entering the latter province, it flows in a north-east direction under the name of *Kin-sha-kiang* (River of Golden Sands), receiving at this part of its course many tributaries.

On the south, the tributaries of the provinces of Yun-nan and Kwei-chow are numerous, but not large; the principal one, the Oo or Woo, flows through the latter. On the north, the tributaries are numerous and large, the principal being the Ya-loong, the Min or Wen, and the Kia-ling, which force their way through narrow passes, rolling over lofty precipices, and carrying with them large masses of ice. Two of these rivers are each more than 1000 miles in length. It enters the province of Hu-pe at about 110° E. long., shortly before which it receives the name of *Ta-kiang* (Great River). The Great River next runs east-by-north through the entire length of the province of Hu-pe, receiving in its progress the waters of many lakes and rivers, the principal being the *Han-kiang*, from which the most illustrious dynasty takes its name, which in turn gave to Chinamen the name of which they are most proud—Sons of Han. The two provinces Hu-pe and Hu-nan—i. e., 'North of the Lakes' and 'South of the Lakes'—contribute, by natural or artificial channels, to augment the main stream. One of these lakes, the Tung-ting-hu, is the largest in China, having an area of 300 sq. miles. After receiving the waters of these lakes, the river proceeds in a north-eastern course through the province of Ngan-hwui, in which part are situated the cities forming the great mart Han-kow. Skirting the north of the province of Keang-se, it receives the waters of the Po-yang Lake, which receives nearly the whole of the waters of the province of Keang-se, and, like the Tung-ting-hu, pours all its contents into the Great River. Thence moving in a north-east direction, it becomes broader and deeper as it traverses the province of Ngan-hwui, receiving tributaries from both banks. Entering Keang-su, and passing Nankin, it travels southwards, intersecting the 'Transport River,' or Yun-ho—i. e., the Grand Canal. Through the whole of this province it receives tributaries, helping to swell the flood of waters, till in one broad expanse, several miles in extent from north to south, they disembogue into the Yellow Sea. To name the cities on the banks and tributaries of this rival of the Mississippi, would be to enumerate a large portion of the cities of the empire. It is navigable by ships of the largest class to 900 miles from its mouth, and for smaller vessels to upwards of 1500 miles. There is a large steam traffic on it up to Han-kow, nearly 700 miles from its mouth. By the treaty of Tien-tsin, the Y. was opened to foreign commerce as far as Han-kow; and in 1877, Ichang, 360 miles farther up the river than Han-kow, became an open treaty port, and the seat of a British consul.

YANINA. See JANINA.

YA'NKEE. YANKEE DOODLE. Yankee, the popular name for a New Englander in America, and in Great Britain often applied indiscriminately to the whole population of the United States, was in its origin a corruption of the word English as pronounced by the Indians (Yenghies, Yanghies, Yankees). It seems to have been first applied about 1775 by the British soldiers as a term of reproach to the New Englanders, who themselves afterwards adopted it.—Since the War of Secession, the Southern population apply it to the Northern people generally.

The air known as *Yankee Doodle* was originally *Nankee Doodle*, and is as old as the time of Cromwell. It was known in New England before the revolution; it is said to have been played by the English troops in derisive allusion to the then popular nickname of the New Englanders; and afterwards the New Englanders, saying that the British troops had been made to dance to *Yankee Doodle*, adopted the air. The citizens of the United States do not now recognize *Yankee Doodle*, but *Hail, Columbia*, as their national air.

YANKTON, capital of the U. S. territory of Dakota, stands on the north bank of the Missouri, 980 miles above its junction with the Mississippi. It has grown very rapidly, and is becoming an important trade center. Pop. (1870) 2097; (1880) 8390.

YA'POCK (*Cheironectes palmatus*), a marsupial quadruped of the Opossum family, *Didelphidæ*, the only known species of its genus. It differs from the opossums in having only five molars on each side of each jaw, in its aquatic habits, and its incapacity for climbing trees. The muzzle is rather sharp; the ears naked and rounded; the tail long, scaly, and prehensile; the feet webbed; the hind-feet with an opposable thumb. The Y. inhabits Brazil and Guiana. It is rather larger than a rat. It is of a brown color, with three transverse gray bands, white on the under parts. It feeds on crustaceans, fishes, &c. It has cheek-pouches, in which it stows away its food.

YAR, or YARE, a river of the county of Norfolk, rises about the middle of the county, flows east past Norwich, and, receiving

the Waveney, widens into the estuary of Breydon Warter, is joined by the river Bure at Great Yarmouth, 2½ miles below which it enters the North Sea, after the course of about 30 miles.

YARD (A.-S. *geard*, *gyrd*, Ger. *gerte*, a rod or wand), the British standard measure of linear dimension (see WEIGHTS AND MEASURES), is subdivided into feet and inches. The yard contains 3 feet, and each foot 12 inches. The terms 'yard' and 'ell' (the ell being, however, equivalent to 1¼ yards) are frequently (*commonly*, according to Recorde) used synonymously by old authors.

YARD, in the rigging of a ship, is a timber which, when in its normal position, is borne horizontally at right angles to the ship's length at one of several heights on a mast, for the purpose of sustaining and spreading a square sail. It is upheld by the 'lifts,' and trimmed out of its right angle to suit the wind by the 'braces.' The lower sails or courses are upheld by the main, fore, or mizzen yards. Above these are the topsail-yards, the topgallant-sail-yards, and the royal-yards.

YARKA'ND, the commercial capital of Eastern Turkestan (pop. not less than 155,000), is situated in 38° 24′ N. lat., and 77° 14′ E. long., near a river of the same name. Until Y. was visited by Mr. Shaw, in 1868, we had little reliable information concerning it. He found it to contain long streets, covered in against the rays of the sun, with rows of fine shops, in which goods of every sort, and from every country, were exhibited. He found the bread excellent; the supply of vegetables varied and abundant; the butchers' shops well provided with horse-flesh, camel beef, and mutton. The population seemed industrious, orderly, and well skilled in many of the arts of civilized life. In 1877, Eastern Turkestan (q. v.) was retaken by the Chinese, and Chinese rule was re-established at Y.—See Shaw's *High Tartary, Yarkand, and Cashgar* (1871); Boulger's *Life of Yakoob Beg* (1878).

YA'RMOUTH, GREAT, a municipal and, until 1867 when it was disfranchised for corruption, a parliamentary borough returning two members to parliament, an important seaport, and fishing and sea-bathing town, on the east coast of Norfolk, 19 miles directly east of Norwich, and 20¼ by railway. It stands about 2½ miles above the mouth of the river Yare, on a slip of land about a mile and a half broad, washed on the west by the Yare, and on the east by the North Sea. Between the town and the suburb of Southtown, or Little Yarmouth, on the right bank of the Yare, in Suffolk, communication is established by means of a bridge. Connected with Southtown is the village of Gorleston, near the mouth of the river. The principal streets of Y. run parallel to the river, and are intersected by about 150 cross lanes or 'rows,' which, as a rule, are so narrow as to be impassable for ordinary wheel-carriages, being generally not more than from 5 to 8 feet wide. The vehicles by means of which traffic is carried on in the rows, are called 'Yarmouth carts.' They are low, narrow, and well suited for conveying heavy goods. A quay of nearly two miles runs along the river, and here are the town-hall, the council-chamber, and several other handsome buildings—the finest houses, however, being those built along the esplanade on the beach. There are many churches, schools, and other public buildings, including a sailor's home, fisherman's hospital, and military asylum, the principal church being that of St. Nicholas, founded in the 12th c., a handsome cruciform building with a tower and spire 168 feet high. The town also contains a monumental column 144 feet high, to the memory of Nelson. On the coast are several batteries, three piers, besides two at the harbor mouth, several public gardens, and a marine drive and promenade 2 miles long. Vessels of over 200 tons can enter the harbor, which is formed by the Yare. Y. is the principal seat of the English herring-fishery, which employs above 1000 boats, and nearly 5000 hands; deep-sea fishing, the produce of which is forwarded daily to London, is also carried on, and employs many hands. The curing of fish, especially of herrings, is important, there being consumed for this purpose about 10,000 tons of salt annually; and the 'Yarmouth bloater' is highly esteemed in London and throughout the country. In 1878, 1455 vessels, of 181,760 tons, entered the port, and 1499, of 186,478 tons, cleared. An extensive export trade in agricultural produce, herrings, and malt is maintained. Ship-building is carried on, and the manufacture of ropes, sails, nuts, and silk goods; there are also foundries, tan-works, and flour-mills. The coast is dangerous, but in Yarmouth Roads, inside a line of sand-banks, there is safe anchorage. A new town-hall has been erected at a cost of £50,000. Pop. (1871) 41,819; (1881) 46,211.

YARN. The name applied to the thread spun for the purpose of weaving cloths of various kinds. It varies not only in the materials of which it is made, but also in the fineness to which it is spun. This latter quality is of great importance, as upon it depends entirely the evenness and quality of the manufacture. In order that uniformity may be insured, a pound of the material is taken as the standard, and this is divided into *hanks* or *cuts*. Thus, with linen yarn, a hank or cut consists of 300 yards; and if it takes 25 of these hanks to make a pound, the yarn is called 25s; and if 40, 40s; and so on. A hank of wool or cotton consists of 840 yards. No material admits of such fine spinning as cotton. Messrs. Thomas Houldsworth & Co. of Manchester have probably produced the finest—that is the thinnest—cotton yarn ever seen; they have produced 700s, of which muslin has been made, and this is the finest ever woven; but to test the wonderful perfection of their machinery, they have produced yarn of No. 2150—much finer than that of the famous Dacca muslin. A pound of the finest Sea Island cotton spun of this fineness, would be 1000 miles in length.

YAROSLAV. See JAROSLAV.

YARROW. See ACHILLÆA.

YA'RROW, a Scottish stream, rendered famous by song and ballad, rises a little over a mile east of Loch Skene, at the place where the counties of Dumfries, Peebles, and Selkirk meet. It flows in a general north-east direction through Selkirkshire, and joins the Ettrick about two miles above the town of Selkirk, after a course of 25 miles. About 3½ miles from its source, it expands into the Loch of the Lowes, which is a mile long, and a quarter of a mile broad. Leaving the Loch of the Lowes, the small stream enters St. Mary's Loch, separated by a narrow neck of land, on which stands St. Mary's Cottage ('Tibby Shiels'), from the other and smaller lake. St. Mary's Loch is 3½ miles long, and nowhere broader than 7 furlongs. The peaceful grassy hills which surround the loch slope downwards to the water's brink, uninterrupted by trees, and compose a scene of great quietude, over which broods the spirit of 'pastoral melancholy.' The prevailing calmness of the waters is pictured by Wordsworth in the lines:

> 'Let . . . .
> The swan on still St. Mary's Lake
> Float double, swan and shadow.'

YASKA. See NIRUKTA.

YAW, in the motion of a ship or boat, is the term for describing an irregular deviation in the course steered. A very chopping wind or sea *may* produce this effect, but the helmsman would usually have the credit of bad steering.

YAWL, a decked boat having two masts, on the first of which is a lugsail and topsail; and on the aftermost, which rises almost from the sternmost, a driver or fore-and-aft sail. It is a very easily managed rig.

YAWNING may be either the simple result of deficient aëration, or may be brought on by the mere sight of the act in another person, and is a modification of the ordinary movements of respiration, in which the inspiration is deeper than usual, and is accompanied by a kind of spasmodic contraction of the muscles which depress the lower jaw, and by a great elevation of the ribs and to some degree of the shoulder-blades. 'The purely involuntary character of the movement,' says Dr. Carpenter, 'is sometimes seen in a remarkable manner in cases of palsy, in which the patient cannot raise his shoulder by an effort of the will, but does so in the act of yawning. Nevertheless, this act may be performed by the will, though not completely; and it is one that is particularly excited by an involuntary tendency to imitation, as every one must have experienced who has ever been in company with a set of yawners.'—*Principles of Human Physiology*, 8th ed., p. 280.

YAWS, known scientifically as *Frambœsia*, is a cutaneous eruption of a very peculiar nature, which commonly attacks negroes, but has been noticed in Europeans. The disease is preceded by languor and pain in the limbs, and shivering, succeeded by heat and restlessness, and is more severe in children than in adults. After a few weeks, the pure glossy-black color of the skin gives place to a dirty dull tint; and the patients often not only loath food, but take to eating coals, chalk, earth, &c. The skin is then covered for a few days with a white mealy scurf, as if it had been dusted with flour, after which pimples like pin-heads appear on the forehead, face, neck, groins, &c., which increase for a week or more, growing into crusted pustules, which enlarge until the base attains the size of a sixpence, or even a shilling. If the crust is removed, a foul sloughing sore is exposed. The pustules may, however, burst spontaneously, and discharge a thick viscid matter, which hardens to a scab on the surface. In the larger pustules, this surface at length becomes elevated into a red granulated excrescence, not unlike a wild raspberry (*Frambœsia*), which is the true and characteristic yaw. In size, it may vary from that of a pea to that of a mulberry, and in color it varies with the general health of the patient from a red to a pale white tint. It has very slight sensibility, and never properly suppurates, but discharges a glutinous fluid, which communicates the disease by inoculation. When the yaw has remained for some time, it diminishes in size, and as the pustule heals, is finally covered with skin, leaving little or no mark. When the disease seems to have reached its height, one pustule becomes much larger than any of the others, and instead of being elevated is depressed. This is termed the master or mother yaw, and requires much care. When

the mulberry-like excrescences appear on the soles of the feet, the resistance of the thick epidermis excites great pain. They are then termed by the negroes *Tubbæ*, or crab yaws. This disease is endemic among certain tribes of native Africans, and is common among the negroes of the West Indies and of North and South America. It is contagious, and cannot be communicated except by the actual contact of yaw-matter to the abraded skin, or by inoculation, which is sometimes effected by means of a large fly called the yaw-fly. The interval between the reception of the poison and the formation of the eruption varies from seven to ten weeks. The disease scarcely ever attacks the same individual more than once.

'Yaws,' says Dr. Craigie, in his learned work on *The Practice of Physic*, 'are liable to be confounded with the secondary [tertiary ?] or cutaneous symptoms of syphilis, with sivvens,* with the Arabian leprosy, with radesyge, pellagra, and the red leprosy of Cayenne.' Several writers of eminence regard yaws as the same with the disease described in Leviticus, chap. xiii., as the Jewish leprosy, but the description of the symptoms there given is not sufficiently precise to furnish sufficient evidence regarding their identity. With regard to treatment, mercury does more harm than good, and all that can be done with advantage is to render the progress of the morbid processes as little painful as possible. The most important remedial agent is the warm bath; and blood-purifying drinks, such as decoction of sarsaparilla, &c., may be prescribed. The Africans have their own native remedies in the bark of trees called *Yuffo* and *Bullanta*, taken in infusion or decoction; and to destroy the mother yaw, they adopt the following barbarous process: Iron is boiled in lime-juice with a quantity of the common black ants and of Malaguetta pepper, and the liquid thus prepared is applied hot to the yaw.

YAZOO', a river of Mississippi, U. S., formed by the union of the Tallahatchie and Yallobusha, runs south and south-by-west in a very serpentine course, in a deep, narrow, sluggish channel, between fertile cotton plantations, and empties into the Mississippi River, 12 miles above Vicksburg; it is 290 miles long, and navigable at all seasons.

YEA'DON, a town of the West Riding of Yorkshire, England, six miles north-north-east from Bradford. It stands on a hill, on the left side of the valley of the Aire. It has considerable woollen manufactures. Pop. (1881) 6533.

YEAR, a division of time containing a complete course of the seasons, and depending upon the revolution of the Earth (q. v.) round the sun. Its duration was variously determined by the nations of antiquity, the earliest method being the conventional one of making it include a certain number of lunar months; the lunar month being, after the day, the first period of time which was fixed. Twelve lunar months, giving a year of 354 days, were first taken as a near approach to a course of the seasons. This, though a pretty close approximation to the true value of a year, was yet so incorrect (being defective by more than 11 days) that it was soon found to be necessary to intercalate these 11 days, in order to preserve the year in a constant relative position to the seasons. The intercalation was variously effected: thus, the Egyptians, who knew the year of 365 days previous to 1500 B.C., divided it into three seasons ('Winter,' 'Summer,' and 'the Nile,' i. e., *the inundation of the Nile*) of four months each, made each month contain 30 days, and introduced five intercalary days at the end of the 12th month; the Greeks, who generally retained the lunar year of 354 days, added 3 months in the course of every eight years, giving an additional month to the third, fifth, and eighth year of each cycle; the Romans also added additional days, but their system of intercalation was continually changed, not always for the better, till Julius Cæsar caused the adoption of the solar year. The Romans likewise abolished, in Asia, Egypt, and all the other countries under their sway, the old method of reckoning by lunar years, and compelled the adoption of the Julian calendar, according to which the year was assumed to contain 365 days 6 hours. The substitution of the Gregorian Calendar in the 16th c. introduced for the average length of the solar year, 365 days 5 hours 49 minutes, which differs only by a few seconds from its true value; and this small annual error, as well as the excess of the true year over the year of 365 days, is compensated for by means of a succession of *Leap-years* (q. v.).

The time at which the year began varied much among different nations. The Carthaginians, Egyptians, Persians, Syrians, and other eastern peoples commenced their year at the autumnal equinox, at which time the civil year of the Jews also began, though their sacred year was reckoned from the vernal equinox. The commencement of the Greek year was at the winter solstice before Meton's time, and was then changed to the summer solstice. The Romans were the first to adopt the first day of January as the first of the year, but their example was not followed by subsequent European nations for some time. In France, the commencement was 1st March under the Merovingians, 25th March under the Carlovingians, Easter under the Capetians, and 1st January from 1564. The ecclesiastical year in Europe generally commenced on 25th March (see DATE). The ancient northern nations reckoned their year from the winter solstice; the Russians, till Peter the Great's time, from 1st September, and the same reckoning, known as the Byzantine era, was in use in the Eastern empire. Of necessity, the commencement of the year among Mohammedan nations has no fixed position in relation to the sun's course or the seasons, it being invariably a lunar year. In Astronomy, there are several kinds of years depending upon the various configurations of the earth in its orbit, and consequently varying in length. First, there is the *tropical*, or (as it is sometimes incorrectly called) *solar* year, which, from its being recognized in legislation and history, and commonly applied in the measure of time, has also received the name of *civil* year. This year is defined as the time which elapses from the sun's appearance on one of the tropics to its return to the same, and has a mean length of 365·2422414 mean solar days, or 365 days 5 hours 48 minutes 49·7 seconds (see PRECESSION). Next is the *sidereal* year, which is the period required by the sun to move from a given star to the same star again, and this year, affected as it is by Nutation (q. v.) only, is one of the most invariable quantities which nature presents us with, and has a mean value of 365·2563612 mean solar days, or 365 days 6 hours 9 minutes 9·6 seconds. The time which elapses between the earth's arrival at its Perihelion (q. v.) and its return to the same position, is known as the *anomalistic* year, and is equivalent to 365·2595981 mean solar days, or 365 days 6 hours 13 minutes 49·3 seconds. The sidereal and anomalistic years have a merely astronomical importance.

YEAST. In the process of fermentation of saccharine fluids, containing albuminous matter, as in brewing or wine-making, the originally clear fluid becomes turbid, carbonic acid is evolved, and the substance causing the turbidity gradually separates in a graying foaming mass of a bitter taste and an acid reaction. This is yeast; and on examining it under the microscope, it is found essentially to consist of aggregations of small oval cells of a vegetable nature, known as the yeast-cells, yeast-plant, or *Torula cerevisiæ* (q. v.). Yeast, as is well known, has the property of setting up fermentation in saccharine solutions; and beer-yeast, the kind with which we are specially acquainted, possesses, according to Professor Miller, this power in the highest degree, as may be shown by dissolving 4 parts of pure cane-sugar in 20 parts of water, and adding 1 part of fresh yeast: if this mixture be exposed to a temperature of about 80°, in less than an hour, fermentation will have commenced. The investigations of Mitscherlich have led chemists to distinguish two varieties of yeast—viz., the *Ober-hefe*, or surface-yeast, and the *Unter-hefe*, or sediment-yeast, the former collecting on the surface of the fermenting fluid, and the latter forming a sediment. Surface-yeast is propagated by buds (see TORULA CEREVISIÆ) and sediment yeast by spores; and each variety produces specific results upon the fermenting fluid. The fermentation induced by the surface-yeast is rapid and irregular; while that produced by the sediment-yeast is slow and quiet. The surface-yeast is formed when the saccharine fluid ferments at a temperature of from 65° to 77°; while the sediment-yeast is chiefly produced when fermentation takes place at the lower temperature of from 32° to 45°. In their chemical relations, the two varieties present no apparent difference. On treating yeast with a solution of potash, a cellulose-like substance remains, while an albuminate is dissolved. The action of yeast is destroyed by exposing it to a temperature of 212°, by alcohol, by the strong mineral acids, chlorine, iodine, and bromine, oxide of manganese, creasote, &c.; on the other hand, it may be dried at a low temperature, or by pressure, and may be preserved in this state without losing its activity. The part which the globules of yeast play in exciting the conversion of sugar into alcohol and carbonic acid, is very obscure; but an experiment of Mitscherlich seems to show that the sugar ferments only in those points which are in actual contact with the globules. Pasteur's experiments render it probable that the process of fermentation is connected with the assimilation of the sugar by the yeast-plant during the development of the yeast-globules, or, in other words, that 'the essential condition of fermentation is the conversion of albuminoid matter into organized globules.'

According to Mitscherlich's analysis, the cells of ordinary washed yeast in a condition to excite fermentation contain (the ashes being deducted): carbon, 47·0; hydrogen, 6·6; nitrogen, 10·0; sulphur, 0·6; oxygen, 35·8; while spent yeast (after fermentation had ceased) contained only 5 of nitrogen. The inorganic

* As Sivvens or Sibbens, and Radesyge, are diseases not much known to the general public, and not noticed in this work, we may mention that sibbens is a tubercular affection of the skin, often extending to the deeper tissues, very infectious, and said to be endemic in Dumfriesshire, Ayrshire, and Galloway, first described about a century ago by Dr. Ebenezer Gilchrist; while the Radesyge, Spedalskhed, Spedalska, Liktraa, Northern Leprosy, or Marsh Sickness, is endemic in various parts of Scandinavia, consisting in its fully developed form of 'an eruption of pimples, scales, patches, and tubercular pustules on the skin, terminating in pusiform discharge, with or without ulceration.'—Craigie, *op. cit.*, vol. i. p. 690.

matter amounted to 7·3 per cent. of the dried yeast, and consisted entirely of phosphates.

The economic uses of yeast in bread-making, brewing, &c. are noticed in other articles. Beer-yeast (*Cerevisiæ fermentum*) is an article of the British Pharmacopœia. It is employed as a stimulant in the advanced stages of low-fevers, and is especially serviceable in cases where, in consequence of inflammatory symptoms, wine is inadmissible. Neligan has found it of great service in intense tympanitis following parturition. The dose is two table-spoonfuls every three hours, and it may be given in camphor mixture or peppermint water. Yeast-poultice forms an excellent stimulating application to foul and irritable sores. It is composed as follows: Take of yeast, six fluid ounces; flour, fourteen ounces; water heated to 100°, six fluid ounces. Mix the yeast with the water, and stir in the flour. Place the mass near the fire till it rises. This poultice should be renewed every six or eight hours. Its special efficacy depends upon the carbonic acid gas which it evolves.

If surface-yeast or under-yeast be collected and placed on a cloth to drain, and then pressed until nearly dry, it can be kept with care for several months, and in that state is what is called GERMAN YEAST, for which a large trade has sprung up within the last few years; the imports to Britain from the continent having amounted, in the year ending 31st December 1880, to 208,123 cwts., of the value of £544,783. It is chiefly imported from Holland and Hamburg, and is obtained mostly from the great continental distilleries. Nearly the whole of this large quantity is consumed by the bakers. PATENT YEAST is exactly similar, but is raised from a wort made purposely from malt and hops. ARTIFICIAL YEAST is a dough of wheat or other flour, mixed with a small quantity of common yeast, and made into small cakes, which are dried. If kept free from damp, it long retains its fermentive power.

YEDO (pronounced Edo, 'River-door'), since 1868 called TOKIO ('Eastern capital'), the chief city of Japan, is situated in the east of the mainland, at the head of the bay of the same name, in lat. 35° 26′ 30″ N., and long. 139° 39′ 24″ E. The river O-gawa, or Great River, divides it into an eastern and a western portion, the latter being by far the larger and more important. For postal and general municipal purposes Y. has of late years been divided into six great sections, each of which is subdivided into from eleven to fifteen districts. Five of these sections lie to the west of the river O-gawa; the sixth, lying to the east, forms the most densely populated part of an extensive suburb, which is for the most part farm-land, but also contains a great number of large timber-yards, brick-kilns, &c., and is ramified by a vast network of canals. These canals also serve to join O-gawa with Naka-gawa, which latter river bounds the above-mentioned suburb to the east, and by which a great deal of produce is brought to the capital from the interior. The O-gawa is a large and rapid river, and is spanned by six wide bridges, whose lengths range from 250 to 350 yards. In 1878, however, a return was made to the old district names, two of which, Honjo and Fuku-gawa, lie between O-gawa and Naka-gawa. Under the Shogun (mistakenly called Tycoon, see JAPAN), Y. proper was divided into O-shiro, or the citadel; Soto-shiro, outside the citadal; and Michi or streets. In O-shiro was the palace of the Shoguns, which, repeatedly burned and rebuilt, was again destroyed by fire in 1872. But the beautiful large parks surrounding it are maintained in good order, and here it has been proposed to build a new palace for the Mikado or emperor.

Soto-shiro, which engirdles O-shiro, is partly occupied with palaces and temples; and the more eastern part of it is intersected by the Tokaido, the most important high-road through Japan. It also contains Dai-gaku, the modern imperial university, where native youths get a liberal education and college training for the professions of law, medicine, engineering, and industrial chemistry; as also Kobu-dai-gakko, which is a special school for engineers. One of its numberless bridges is called Nihon-bashi ('bridge of Japan'), and is considered the center of the empire, all geographical distances being reckoned from it.

The third of the old divisions of the city forms the exterior part of the city, and contains amongst others the temple of K'wanon, the most venerated and frequented in all Japan; that of Confucius, which under the Shoguns was the national university for the study of Chinese literature, and is now converted into a public library of native, Chinese, and European books; and that of Kanda-Niyojin, the tutelary deity of the city. In this division also is Yoshiwara, the most popular of the five districts of Y., set apart for prostitutes.

The population of Y. was formerly much greater than it is now because of the Shogun compelling every daimio, or clan-prince, to live in Y. for a great portion of the year with a large body of retainers. This custom being, of course, extinct since the revolution of 1868, the population had sunk in 1881 to 957,121 inhabitants. The area covered by the capital, however, is about 28 sq. m.; and therefore Y., in point of extent, is, after London, the largest city in the world. It is situated in a great plain, which extends north and south about 100 miles, and from the coast to the mountains from 20 to 60 miles. This plain is one of the most fertile in Japan, and is tilled with great skill and laborious care, irrigation and manuring being adopted to the fullest possible extent. It is traversed by many large rivers, from one of which an abundant water supply is brought to Y., a distance of 40 miles. Smaller streams intersect the plain in every direction, and form rich and lovely valleys, the ridges between which rise at very few places to more than 200 feet above sea-level. Y. is connected with Yokohama by railway, and a large extent of telegraphic line now keeps it in close communication with the south, north, and west of the empire. In recent years a very eager desire for the acquirement of European knowledge of science, industry, and political and social philosophy has been manifested by the people. The classes of the recently established colleges of the capital are crowded with enthusiastic and industrious students. Immense improvement has been made both in the lower and the higher education of the people. In 1873 there were only 12,597 elementary schools, with 1,326,190 pupils. In 1875 the number of schools had increased to 24,225, and the pupils to 1,925,206.

Of the 34 millions of Japanese subjects, 15·2 per cent. are reckoned as of school-age—namely, from 6 to 14 inclusive, and 35·4 per cent. of this elementary-school population were in the schools in 1875. Although external evidences of superstition abound in Japan, nothing illustrates the small practical influence superstition has upon the daily actions and thoughts of the Japanese people more forcibly than the marvelously rapid progress that rational European *medical* science has made in Japan, not merely in the education of a large body of intelligent and well-qualified physicians and surgeons, but still more remarkably in the confidence and faith in the doctors of the new school displayed by the people at large.

The main body of the new imperial army is located and drilled in the capital. Its creation after the great revolution of 1868 was superintended by French officers. There is a large arsenal, well stocked with excellent modern machinery, in Y.; and also a naval college, where cadets for the marine service receive a good scientific education and practical training.

Much of the former glory of old Y. has vanished, many stately palaces and rich temples having been burned to the ground, or allowed to fall into decay. But the chief natural beauties of the city remain—the thirty miles of tortuous moats, with their summer blaze of lotus-flowers, and the exquisitely beautiful parks and gardens with their luxuriant flowers and rich wooding.

During the winter there are almost nightly fires in Yedo. In 1858 a single fire destroyed fully one-quarter of the whole city; and in one night in 1876, 8000 houses were burned. The whole business part of the city is studded with clay fire-proof storehouses, into which all the chief valuables are hurriedly thrust immediately upon the breaking out of a fire in the neighborhood. The massive iron doors and shutters of these fire-proof 'dova' are, as soon as the interior is filled, cemented air-tight. Lighted candles having been placed inside before the closing of the last door in order to exhaust the inflammable oxygen of the enclosed air, the building may be left to be raged round by the flames of a dozen burning houses crowded about it, and may even be raised to a red-heat without there being any danger of combustion taking place inside. The houses burned down, being of a light wooden construction, are rebuilt with what appears to a stranger incredible rapidity.

In Y., as in other important towns of Japan, the use of gas for street and shop lighting is gradually extending. There are numerous papers (including a dozen dailies) and periodicals published in Y.; but although many of them are cleverly edited, the press suffers severely from government censorship. A considerable export trade in silk, silk-worms' eggs, copper, lacquer-work, mats, timber, &c., passes through Y., the goods being shipped at Yokohama. The Bay of Y. is shallow, permitting only small craft to approach the city at high tide.

H.B.M.'s Consular Reports for 1870—1879; Adam's *History of Japan;* Griffis' *Mikado's Empire;* Aimé Humbert's *Japon Illustré;* Maurice Dubard's *Japon Pittoresque;* Sir Rutherford Alcock's *Capital of the Tycoon;* Oliphant's *Narrative of Lord Elgin's Mission; The Treaty Ports of China and Japan;* Mossman's *New Japan.*

YEDO, BAY OF, an inlet of the North Pacific, on the south-east coast of the island of Nipon, Japan, lying between 35° and 35° 40′ N. lat., and intersected by the 140th meridian of E. long. The city of Yedo is situated at its north-western extremity. The depth of water, nowhere great, decreases all along the banks, towards the town, which, at low water, cannot be approached within a mile even by a boat. Solid batteries of granite, well kept, and in general aspect not unlike those of Cronstadt, have been erected midway between the anchorage and the shore.

YEKATERINBURG. See EKATERINBURG.

YELATOM See JELATOM.

YELL, one of the Shetland Islands (q. v.), and, after Unst, the farthest north of that group, is separated from Mainland by Yell Sound, and from Unst by Blue Mull Sound. It is 17 miles in length, 5½ miles in average breadth. Area, 94 sq. m.; pop. (1881) 2529. The west coast is rocky and precipitous, but on the whole the surface is tame, and consists largely of moorlands—the greatest elevations being no more than 400 feet above sea-level. Agriculture is in an unusually backward state, and, though the surrounding seas are generally stormy, fishing is the chief employment.

YELLOW BERRIES. See FRENCH BERRIES.

YELLOW-BIRD (*Chrysomitris tristis*), a bird of the Finch family (*Fringillidæ*), a native of North America, where it is very widely distributed. It is rather more than five inches in entire length; the male in summer plumage of a bright yellow color, with black crown, wings, and tail, the upper and under tail-coverts white. The female is yellowish brown above, and ashy brown below, and the male assumes a very similar plumage in winter. Yellow-birds are often seen in large numbers, feeding on seeds of thistles and other plants, and seldom alighting on the ground. The nest is made of lichens fastened together with saliva, and lined with soft substances. The song of the Yellow-bird is very pleasing; and it is a sprightly and attractive cage-bird, easily tamed, and capable of being taught tricks. Several allied species are found in the western parts of America.

YELLOW COLORS. The yellow pigments employed by painters are: 1. The varieties of chrome prepared from chromate of lead. See CHROMIUM. 2. Several colors technically called *pinks*—as *Brown Pink*, prepared as a lake from a decoction of French berries and fustic; and *English Pink* and *Dutch Pink*, both lakes, prepared by different processes from French or yellow berries and tumeric. 3. *Naples Yellow*, a mixture of metallic antimony, red-lead, and oxide of zinc calcined, added to a small quantity of lime, then fused, and afterwards ground to powder. 4. *King's Yellow* is a tersulphuret of arsenic. 5. *Patent Yellow* consists of 28 parts of chloride of lead and 27 parts of carbonate of lead well mixed in powder, and then fused together. 6. *Weld Yellow* is prepared from a decoction of Weld (*Reseda luteola*), or dyer's weed, with alum, and is, in fact, another yellow lake. It is much used in paper-staining. 7. *Gamboge*, which constitutes the chief yellow color used in water-color painting.

YELLOW FEVER is a disease endemic in low districts near the sea, but under certain circumstances sporadic in other places, never appearing beyond 48° of north latitude, nor without a temperature of at least 72° F., nor above the elevation of 2500 feet above the level of the sea, depending in part on causes not yet known, but in circumstances favorable to its production, capable of being propagated by contagion. It usually commences suddenly (generally in the night or early morning) with a sense of coldness, a rigor, or actual shivering, followed by vascular reaction, as shown by the heat and dryness of the skin, headache, especially over the eyes, and pain of the eyeballs, which are suffused, and have a strange drunk-like aspect. The limbs and loins are painful; the tongue is loaded, and its edges are red. There is a peculiar and characteristic flush or suffusion of the face, occupying a zone of about an inch above and below the eyes. Nausea, gastric uneasiness, and a tendency to vomit soon supervene. These symptoms may gradually lessen, and the patient will then regain his ordinary health in 24 or 36 hours; but if the symptoms persist, they soon become more aggravated, and the stomach ejects at first a clear fluid, which soon becomes of a dirty brown tint, and is finally succeeded by the true *black vomit*. A yellow tint on the conjunctiva is observed, which extends to the skin of the face; and as the disease advances, the whole body becomes of a yellow color, varying in intensity from a pale lemon to a deep orange tint. The anxious countenance indicates the distress of the patient, who appears to be agitated by fearful apprehensions or incipient delirium. The skin feels constricted, and is of a pungent heat. The bowels are constipated, and the red, clean, and tremulous state of the tongue indicates the presence of intestinal irritation, and consequently the increase of danger. The urine and other excretions are more or less suppressed. Eructations, hiccoughing, and vomiting increase the distress and weakness. The disease in fatal cases usually terminates on the second or third day. The above train of symptoms is by no means constant. Sometimes, when everything seems favorable, black vomit suddenly appears, and the patient immediately succumbs. In other cases, patients experience no symptoms except severe pains in the legs and suppression of urine, and die without taking to their beds. In all cases terminating fatally, albumen appears in the urine on the second or third day.

In females, the catamenial discharge is sure to appear, whether due or not. The discharges from the bowels, towards the close of the disease, may be black or dark green, and these dark evacuations are succeeded by what is termed the 'caddy-stool,' resembling dark sandy mud. As yellow fever is not a disease of this country, we shall not enter more fully into its symptoms. According to Dr. Jackson, who has written an excellent treatise on this disease, the usual course of yellow fever in its most concentrated form consists of 12 hours of forming period, 36 or 48 of formed or proper fever, and 24 or 36 of declining or concluding period. When the symptoms are less intense, the patient may survive to the 14th day. In the milder modifications of this disease, the morbid symptoms are prolonged to a considerable extent. Death may occur at any period of the disease, and the mode in which it occurs is by syncope (fainting), uræmia (or poisoning of the blood by the accumulation of urea), apoplexy, or asphyxia or suffocation. When the black vomit is plentiful, and the urine free, the intelligence remains unaffected, but the skin becomes cold and damp, the pulse small, and finally imperceptible at the wrist, and death ensues from gradual exhaustion and syncope. When the black vomit is scanty, and the urine is suppressed, the poisoned blood acts upon the brain, and the patient exhibits wild delirium, followed by coma, convulsions, and death. The ratio of deaths to cases in the disease is always very high. From Tulloch's statistical Reports on the Diseases of Soldiers, it appears that in the Windward and Leeward command, the ratio was 1 to 2⅔ (or 3 in every 7 cases died), in the Jamaica command it was 1 to 1⅓ (or 3 in every 4 cases died), while in Gibraltar it was 1 to 1⅔ (or 3 in every 5 cases died).

There are great differences of opinion as to the proper treatment of this disease. Dr. Blair, one of the highest authorities on yellow fever, holds that the disease may be cut short, or aborted by prescribing '20 grains of calomel added to 24 grains of quinine, afterwards followed by two drachms of carbonate of magnesia, and two ounces of sulphate of magnesia in eight ounces of peppermint water.' These aborting doses were repeated at intervals of four or six hours, one dose being generally efficient, but four have been given before the quinine induced its special symptoms of cinchonism. Many physicians who have had much experience of this disease, have no belief in the abortive treatment; and some treat their cases with antiphlogistic or lowering remedies, and others with stimulants. It is probable that there is no one mode of treatment suitable for all cases, and that each should be treated according to its special symptoms. The extreme heat of the surface (a temperature of 107° has been observed in the arm-pit) may be relieved by the frequent application of the wet sheet; cupping or leeches often relieve the head-symptoms; and a blister to the gastric region may relieve the irritation of the stomach. If there is no suppression of urine, and if that fluid is free from albumen, morphia is of great service, but it must be given with great caution. The food should be of the mildest form, such as chicken-tea, arrowroot, sago, and barley-water, and these should be taken frequently in very small doses, in consequence of the state of the stomach. Similarly, with regard to all drinks, which are most likely to be retained if sucked through a tube or given by teaspoonfuls. Tea usually disagrees, but cold infusion of oatmeal, and very dilute brandy and water, are usually relished. Our highest authority on Tropical Diseases, Sir J. Ranald Martin, states that, whenever the disease breaks out, 'the most speedy means of prevention [of its spreading] in respect to towns and garrisons, will always be found in the removal of both the sick and the healthy to a locality where the temperature is sufficiently low, such as a neighboring range, or dry ventilated ground.'

In all ships on service on the west coast of Africa and other unhealthy stations, the following rules (which we borrow from Dr. Aitken's *Handbook of the Science and Practice of Medicine*) should be strictly attended to. A prophylactic dose of quinine (five grains) should be administered to the men daily (a precaution that should be taken in all malarious regions, independently of yellow fever). Whenever the fever appears on board, the ship should at once put out to sea, and should proceed to the coolest atmosphere within reach. The most immediate measures of prevention should be, to obviate direct solar exposure, to prevent fatigue, and to check any excesses in the use of spirits. Seamen should be kept as remote from unhealthy coasts as is consistent with duty, anchoring every evening a few miles from the shore, if possible. Duties in boats should as much as possible be conducted during the mornings and evenings, the noon-day heats and the deadly nocturnal emanations being to be equally avoided. When men are landed, they should be encamped on high and dry ground. Meals should be regularly served and carefully cooked, and coffee should be given early in the morning, and after unusual fatigue or exposure, and no work should be commenced till the coffee has been taken. Holds of ships should not be cleansed on the spots where the fever has originated, or during its prevalence, but the process should be deferred till the vessel is in a colder latitude. Lastly, green wood should not be placed on board ship in hot climates, but the wood should be barked and partly charred.

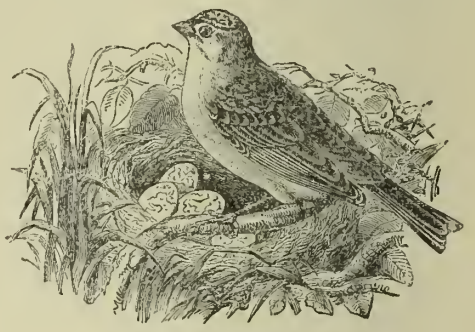
Dr. Craigie, in his learned *Practice of Physic*, gives the following extensive list of synonyms of Yellow Fever: '*Febris flama, Typhus ecterodes*, Sauvages and Cullen; *La Maladie de Siam, La Fièvre Matelotte, Vomito Prieto, Chapetonada, Fiebre Amarilla Hispanorum et Hispano-Americanorum;* New Distemper of 1691; Kendal's Fever, Pestilential Fever, Bilious Fever of Gamble; Endemial Causus or Burning Fever of Moseley; Malignant Pestilential Fever of Chisholm; Remittent and Bilious Remittent of Hunter; Concentrated Endemic Fever of Jackson; Tropical Continued Fever of Lempriere.' We shall conclude with a short notice of the history of this disorder. Long before the arrival of Cortes in Mexico, an extremely fatal epidemic disease used to prevail amongst the native Mexicans. Epidemics of special severity occurred in 1545, 1576, 1736—1737, and 1761—1762.

Although Humboldt thinks that the elevation of the table-land of Mexico (7200 to 7800 feet above the level of the sea) is sufficient to exclude any idea of the identity of this disease, known as *Matlazahuatl*, with yellow fever, there can be little doubt, from the similarity of the symptoms, that the two diseases are really the same. The Europeans visiting the shores of America soon became painfully familiar with the disease; and it is almost certain that 'the plague' which so often destroyed the English and Spanish troops at the end of the 15th and the beginning of the 16th centuries was in reality yellow fever. A disease bearing the character of yellow fever appeared in 1618 among the Indians in certain parts of Massachusetts, and prevailed with much severity till 1622, and committed great havoc among the emigrants to Virginia. When the expedition against Hispaniola in 1655, under Venables, returned to Jamaica, they met there 'an enemy (the plague) more severe than the Spaniards, which in a little time reduced the army, originally 7000, to fewer than 2000 men.' There can be little doubt that this plague was yellow fever. In 1691, it was very fatal in Barbadoes, where it was known as the *New Distemper*. From about this date, yellow fever has been endemic in the West Indies. It was unknown at Carthagena and along the coast till 1729, when it committed dreadful havoc; the Spanish galleons never remaining any time without interring one-half, or at least one-third of their men. In 1740, it first appeared at Guayaquil, since which time it has often occurred; and in all the towns on the coast of the American continent and islands between 45° N. lat. and 10° S. lat. it appeared in proportion as Europeans began to visit them. 'In this manner,' says Dr. Craigie, 'Vera Cruz, Cumanà, Havana, Acapulco, and La Guayra have successively become its endemial abodes; and its appearance in these towns is as uniform and certain as the arrival of the sun at the tropic of Cancer. Of these places, Vera Cruz and Havana may be regarded as the nursery of yellow fever; and from the month of March to that of September or October, the disease rages like a pestilence among the recently arrived Europeans, and those natives who descend from the elevated table-lands of the interior.

Until the year 1793, the disease was regarded as having a spontaneous origin, and being due to tropical peculiarities operating on European and unseasoned constitutions; but that year the doctrine of infection suddenly started. In that year the disease appeared with great virulence in the island of Granada, and rapidly spread over the Antilles to Philadelphia, and many parts of the state of Pennsylvania, to Massachusetts, New York, Caroline county Maryland, Alexandria in Virginia, several counties in North Carolina, and Caraccas in Venezuela. This outbreak was preceded by a few days by the arrival of a vessel from Bulam, on the West African coast, at a harbor in St. Granada, in which vessel, when stationed off Bulam, fever had prevailed about five months before to a great and fatal extent. This disease was at the time termed the Bulam Fever, but soon turned out to be ordinary yellow fever. Since 1763, yellow fever has very often appeared as an epidemic in the West India Islands and various parts of the American states, and has even been endemic in various parts of the south of Europe, especially Gibraltar and Malaga. From the testimony of many medical writers, it is certain that a disease essentially identical with yellow fever prevails endemically along the west coast of Africa, at Senegal, Sierra Leone, Cape Coast Castle, and the island of Fernando Po. Fortunately for this country, this fell disease, which has repeatedly been brought to our shores (Swansea, Southampton, &c.), is at once nipped out by our climatic conditions. When, in 1866, it was imported into Swansea, Dr. Buchanan, who was at once sent down by the government to watch the disease, and take the necessary measures to prevent it from spreading, recorded 12 instances in which, with filth, bad ventilation, and every other condition favoring the fever, it failed in every case to spread beyond the original victim. Altogether there were 20 cases, of which 15 were fatal.

The most terrible recent visitation of yellow fever scourged portions of the lower Mississippi valley in the autumn of 1878. In New Orleans and Memphis alone, the deaths exceeded 5000.

YE'LLOW-HAMMER, or YELLOW-BUNTING (*Emberiza citrinella*), a species of Bunting (q. v.), which is one of the most common of small birds in Britain, distributed over all parts of the country, and is common also in most parts of the continent of Europe, from Norway and Sweden to the Mediterranean. It is about seven inches in entire length, and the male is a bird of brilliant plumage, although there is something in the short thick form of the bird, and in the tints and distribution of its plumage, which prevents it from being greatly admired for beauty. It is, perhaps, also the less regarded because it is so common; and in many parts of Britain there is a prejudice against it, so that boys who would think it wrong to rob any other bird's nest, esteem it a kind of duty to rob that of the yellow-hammer. In the summer plumage of the male, the head, cheeks, ear-coverts, and nape of the neck are bright lemon yellow, with a few dusky black patches; the upper part of the back and wings are reddish brown, tinged with yellow; the wing-primaries are dusky black, with narrow external edges of bright yellow; the secondaries, tertials, and wing-coverts dusky black, broadly margined with rich chestnut brown; the upper tail-coverts reddish chestnut, edged with yellow; the tail-feathers dusky black, the central pair edged with chestnut, and tinged with yellow; the chin, throat, and whole under surface, bright lemon yellow, clouded on the breast and flanks with reddish brown. The tail is slightly forked, and is shorter than that of the Common Bunting. The knob in the palate is also less conspicuous. The female has much less yellow about the head than the male, and her plumage is altogether much less vivid. The Y. frequents hedges and low trees, and is often to be seen, especially in winter, in the vicinity of houses, in flocks, with sparrows, chaffinches, &c. It generally makes its nest on



Yellow-hammer (*Emberiza citrinella*), with Nest and Eggs.

the ground, under shelter of a bush or a tuft of grass, forming it of moss, roots, and hair. The song of the male is very sweet, and consists of few notes, which have been jocularly set to music with the words. '*A little bit of bread, but no-o cheese.*' He is remarkably attentive to his mate, and takes his turn in incubation. In Italy, great numbers of yellow-hammers are caught, and fattened like ortolans for the table. It is a curious and noteworthy circumstance, that this bird is rare in insular situations; in the islands of the Mediterranean, as well as the Orkneys. The name Yellow-hammer is a corruption of Yellow-ammer; *Ammer*, in German, signifying Bunting. In Scotland the Y. is known as the Yoldrin or Yite.

YELLOW RIVER. See HWANG-HO.

YELLOW SEA. See WHANG-HAI.

YE'LLOWSTONE, a river of the U. S., rises in a beautiful lake of the same name high up in the Rocky Mountains, and receiving numerous branches from the south, flows north-easterly through the territory of Montana, and empties into the Missouri River, in the north-west part of Dakota Territory, lat. 48° 5′ N., long. 104° W. It is 800 yards wide at its mouth, 1000 miles long, and navigable 700 or 800 miles.

The region of the Y. and its source was for the first time explored by parties from the United States in 1870 and 1871, and seems to be one of the most wonderful spots in the earth. Making their way up the river through the grand scenery of the Rocky Mountains, the explorers came to a district of a square mile in area, filled with hot springs in active operation, which cover the hillsides with snowy white deposit like a frozen cascade. Three or four miles around were occupied by springs which have ceased to flow. They are about 6000 feet above the sea, and are already resorted to by invalids. This was but the beginning of the wonders. Next they came to a terrific rift, 2000 feet in depth, with a river rolling in its deeps, 'a grand, gloomy, terrible place.' At the head of this cañon are the Tower Falls, with a sheer descent of 400 feet. The Grand Cañon, however, throws this into the shade. This fearful abyss is 3000 feet in perpendicular height, and to one looking up from the bottom, stars are visible in broad daylight. The ravine is full of hot springs of sulphur, sulphate of copper, alum, steam jets in endless variety, some of most peculiar form. The grandeur of the cañon is at once heightened and di-

versified by the Upper and Lower Falls; the latter one unbroken symmetrical expanse, 350 feet in height. Between this fall and the lake lies a region full of boiling springs and craters, with two hills 300 feet high, formed wholly of the sinter thrown from the springs. Further on is a valley containing about 1500 geysers, some throwing up immense columns of water to the height of more than 200 feet. The beautiful lake from which the river issues is about 300 square miles in area, and is situated 7427 feet above the level of the sea. In 1872, the region at the source of the Yellowstone, 65 miles long by 55 miles broad, including the Grand Cañon and the lake, was reserved by Congress from occupancy, and set apart as a 'public park or pleasuring-ground for the benefit and enjoyment of the people.'

YE'MEN, in a wide sense, includes the whole south and south-west of Arabia; but, more strictly, is the name of only the south-western corner of the peninsula, bounded on the N. by Hedjaz and Nedjed; and on the E., by Hadramaut and the Desert. It was known to the ancients as *Arabia Felix* (*Felix* being a mis-translation on the part of Ptolemy of *Yemen*, which does not mean 'happy,' but the land to the 'right' of Mecca), and they obtained from it much frankincense, myrrh, and other costly balsamic substances, in which it abounds more than any other part of the world; they obtained also from its ports the products of India, and other eastern regions, with which its inhabitants maintained a constant trade. The history of Y. reaches back to the highest antiquity. The Joktanides, descendants of Joktan or Kahtan, are its first possessors of whom we have any record; and from them it seems to have passed, about 2400 B.C., into the hands of the Himyarites, or Homerites. The Himyarite states and cities of Saba, Thaphar, and Athana or Aden, attained at an early period a high degree of prosperity, carrying on a great commerce both by sea and land, and they extended their dominion over a large part of Asia and the north-west of Africa. See SABÆANS and ADEN. The persecution of the Christians by the last Himyarite princes led to the overthrow of the Himyarite power by the Abyssinians, 529 A.D. From this date till 601, Y. was ruled by Abyssinian governors; then for a short time by the Persians, under Khosru (*Chosroes*) II. The followers of Mohammed did not succeed in subduing Y. till they had for a considerable time been masters of the rest of Arabia. Under all the califs, and even under Saladin, Himyarite princes retained a partial independence, which they reacquired when the Turks, who conquered the country in the 16th c., were expelled in the century following. For more than two centuries afterwards, the country remained under the dominion of a number of Himyarite princes or sheiks, the most powerful of them being for a time the Imám of Sanáa (q. v.). In 1871—1873 it was reconquered by Turkey.

The people of Y. differ considerably in physical characteristics, dress, and manners from the inhabitants of the other parts of Arabia, and their language gives evidence of a different origin. See SABÆANS.

Our geographical knowledge of Y. has been much increased by recent explorations, and charts of its coasts have been laid down by officers in the service of the East India Company. Throughout the whole length of the country, at a distance of from 10 to 30 miles from the coast, a chain of mountains extends, between which and the sea is a tract of low ground, the *Tehama*, generally sandy and desolate, but in some places very fertile, and clothed with tropical vegetation. Inland from the mountain-chain is a fertile table-land, at a general elevation of about 4000 feet, yielding the productions of warm temperate rather than of tropical regions. Some of the mountains rise to a height of about 8000 feet. The slopes even of the more lofty mountains are covered with luxuriant forests, and the mountain valleys are of unsurpassed fertility. The principal exports are coffee, dates, senna, gums and gum-resins, wax, ivory, and goat-skin morocco. Some grain is also exported. There are no rivers; but good harbors are formed in some places by natural openings in the coral reefs which line the coast. The principal ports are Mocha (q. v.), famous for the coffee which it exports; Aboo Arish, or Gasim; Hodeida; Shehr; and Aden (q. v.), which is now in the hands of the British. Sanaa, the capital, or nominal capital, is situated on the table-land. Damar, Taas, Loheia, Beit-el-Fakih, and Zebeed are among the other principal towns.

YENIKA'LÉ STRAIT, sometimes also called STRAIT OF KERTCH, connects the Sea of Azov with the Black Sea, forming a sea-passage between the Crimea on the west and the Caucasus on the east. It is over 20 miles in length, and at its narrowest is less than two miles, and so shallow and interrupted by shoals, that cautious sailing and steering are necessary even for small steamers.

YENISEI', one of the largest rivers of Siberia, formed by the junction of the Oulou-Keme and the Bey-Keme, which rise in the mountains on the southern border of Siberia. It flows north through the center of Siberia into the Arctic Ocean, forming at its month a long estuary. In the earlier part of its course, it is interrupted by falls and rapids; but afterwards flows through a great plain or steppe, receiving many tributaries, of which the principal are the Upper Tunguska or Angara, from Lake Baikal; the Middle and the Lower Tunguska. The Y. is 3400 miles long, and is traversed by steamers. Repeated voyages since 1875 have proved that it is possible during part of the summer for vessels from Europe to sail direct to the mouth of the Y., and to carry back the varied produce of the immense basin drained by it.

YENISEI'SK, a town in the government of the same name in Siberia, on the Yenisei. Pop. (1880) 7185. Y. is an important trading center, and has a great annual fair, the chief articles of trade being grain, fish, salt, spirits, and furs. It is three miles in circumference, and has a custom-house and arsenal.

YEO'MAN (Ang.-Sax. *gemen*, common), a term which seems, in early English history, to have been applied to a common menial servant, but after the 15th c. came to denote a class of small freeholders, forming the next grade below gentlemen. The term yeoman is sometimes considered identical with the forty shillings freeholder, possessed of the elective franchise.

YEO'MANRY, a volunteer force of cavalry in Great Britain, numbering in 1880, 14,511 of all ranks, and costing the country annually about £80,000. It was formed during the wars of the French Revolution, and then comprised infantry as well as cavalry; but the whole of the infantry corps, and many of the cavalry, were disbanded after the peace of 1814. The organization of the corps is by counties, under the lords-lieutenant. The men provide their own horses and uniform; in consideration of which they receive annually a clothing and contingent allowance of £2 a man, are exempt from taxation in respect to the horses employed on yeomanry duty, and draw during the annual training 2*s*. a day for forage, besides a subsistence allowance of 7*s*. a day. If called out for permanent duty, they receive cavalry pay, with forage allowance. The yeomanry are available in aid of the civil power; and in time of invasion, or apprehended invasion, the sovereign may embody them for service in any part of Great Britain, under the provisions of the Mutiny Act and Articles of War.

YEOMEN OF THE GUARD, a veteran company, consisting of 100 old soldiers of stately presence, employed on grand occasions, in conjunction with the gentlemen-at-arms, as the body-guard of the sovereign. These Yeomen were constituted a corps, in 1485, by King Henry VII., and they still wear the costume of that period. Armed with partisans, and in the quaint uniform, the men present a curious sight in the 19th century. The officers of the corps are a captain (ordinarily a peer), a lieutenant, and an ensign. There is also a 'Clerk of the Cheque and Adjutant.' All these appointments are held by old officers, and are considered as important prizes. The whole charge is borne by the sovereign's civil list. The headquarters of the corps is at the Tower of London, where the men are popularly known as *Beef-eaters* (q. v.).

YEO'VIL, a small municipal borough of Somersetshire, 20 miles south of Wells, on the borders of Dorsetshire, a busy, handsome place, built of red brick and yellow Hamhill (a neighboring quarry) stone, and situated in a pleasing district on a hill-side sloping to the Yeo. The church of St. John, a structure of the 15th c., is much admired. The height of the side aisles, and large size of the windows, give it grace and lightness, and hence it has been called the 'Lantern of the West.' There are several other churches, besides schools, almshouses, and other charities. Kid and other gloves are here more extensively manufactured than in any other town in England. There are about 20 manufactories, in which are produced about 10,000 dozen pairs of gloves per week. The females, who sew the gloves, work at home. Woollen manufactures and leather-dressing are also carried on. Pop. (1871) 8527; (1881) 8480.

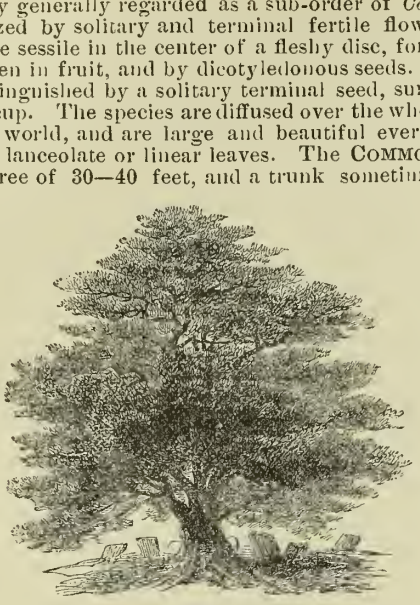
YE'RCUM, another East Indian name of the plants called Mudar (q. v.), and their fibre.

YE'SSO, YEZO, or JESSO, the most northerly of the four principal islands, which compose the empire of Japan. Of late Y. has been thoroughly explored, and extensive measures have been taken to colonize the island and develop its natural resources. The area is about 35,000 square miles, and the population about 140,000, chiefly resident in the south; the hairy Ainos thinly occupy the north. The Ainos, a distinct race from the Japanese, are stupid and good-natured; they are of broader and heavier make, and have a heavy growth of thick black hair, the chest and limbs being frequently overgrown. (See Miss Bird's *Unbeaten Tracks in Japan*, 1880.) Y. is mountainous, with volcanoes; it is rich in fine timber and in valuable minerals, especially coal; the rivers and coasts abound in fish. Bears, wolves, and deer are found. The chief towns are Matsumai (q. v.), Hakodadi (q. v.), and Sapporo.

YE'THOLM, a parish of Scotland, in the N.E. of Roxburghshire, bordering on England, 15 miles E.N.E. of Jedburgh. The Beaumont Water runs through the parish, and on either side of

this stream are the villages of Kirk-Yetholm and Town-Yetholm, the former being the headquarters of the gipsies in Scotland. According to the census of Scotland for 1881, the village of Yetholm contained 746 inhabitants.

YEW (*Taxus*), a genus of trees of the natural order *Taxaceæ*, which is very generally regarded as a sub-order of *Coniferæ*, and is characterized by solitary and terminal fertile flowers, with a solitary ovule sessile in the center of a fleshy disc, forming a sort of drupe when in fruit, and by dicotyledonous seeds. The genus *Taxus* is distinguished by a solitary terminal seed, surrounded by a succulent cup. The species are diffused over the whole northern parts of the world, and are large and beautiful evergreen trees, with narrow lanceolate or linear leaves. The COMMON YEW (*T. baccata*), a tree of 30—40 feet, and a trunk sometimes of great



Yew (*Taxus baccata*).

thickness, branching a few feet above the ground, and forming a large and dense head, is a native of the middle and south of Europe and of Siberia. Noble specimens of it are to be seen in many parts of Britain. It attains a great age, at least 300 or 400 years. Its wood has been much used from very early times for making bows, for which it is preferred to every other kind of wood. It is very hard, and reckoned almost equal to boxwood for fine work. The heart-wood is of an orange-red or deep-brown color. The fruit is red, and was long reputed poisonous, but the pulpy part is not so; the seed, however, is a dangerous poison. The leaves also are a powerful narcotic; and although they are sometimes given as a vermifuge, their use is attended with danger. —The IRISH YEW (*T. fastigiata* of Lindley; *T. Hibernica* of Hooker), originally discovered in Ireland, and now very common in pleasure-grounds, is by many supposed to be a mere variety of the common species, with upright fastigiate habit, but it differs also in having the leaves scattered, whilst those of the Common Yew are in two rows.—The NORTH AMERICAN YEW (*T. Canadensis*) is of humbler growth.

The name JAPAN YEW is sometimes given to *Podocarpus macrophyllus*, a tree of a genus nearly allied to *Taxus*, and recently separated from it. It is a large and stout tree, a native of Japan; its wood much valued for cabinet-work. Other species of *Podocarpus* are natives of the warmer parts of Asia, of Chili, New Holland, &c. *P. nucifer* is a lofty tree of the northern provinces of Japan and mountains of Nepaul, from the seed of which an oil is extracted, fit for culinary purposes, although the seed itself is too astringent to be eaten. To the order or sub-order *Taxaceæ* belongs also the genus *Salisburia* (see GINGKO), the genus *Dacrydium* (q. v.), and *Phyllocladis*, a genus in which the foliage, as in *Salisburia*, has a remarkable resemblance to the fronds of ferns. *P. trichomanoides* is a large New Zealand tree.

YEZD, a considerable city of Western Persia, situated on the south-west of the great desert of Khorasan, in lat. 32° 10′ N., long. 54° 50′ E. It is the great emporium of the internal commerce of the empire. Manufactures of silk stuffs, velvets, cotton and woollen fabrics, arms, and loaf-sugar are carried on, and the bazaars are spacious and well supplied. Pop. 40,000. This includes about 4000 Guebres (q. v.). The latter are exempt from military service, and are now said to be well treated, both by the authorities and inhabitants. They complain, however, of grievances, of which complaint was made to the Shah when in London, by their kindred and co-religionists, the Parsees of Bombay, in June 1873. See Report by Mr. Ronald Thomson, Persian Secretary of Legation, on the Population, &c. of Persia, 1868, and *Times* of June 28 and July 16, 1873.

Y'GGDRASIL, the name given in Scandinavian Mythology to a tree, the greatest and most sacred of all trees, which was conceived as binding together heaven, earth, and hell. It is an ash, whose branches spread over all the world, and reach above the heavens. It sends out three roots in three different directions: one to the Asa-gods in heaven, another to the Frost-giants, the third to the under-world. Under each root springs a wonderful fountain, endowed with marvelous virtues. From the tree itself drops a honey-dew. Among its branches and roots, several animals sit or run about: an eagle, a squirrel, four stags, a serpent, all having their own proper names. The serpent, Nithhöggr, lies at the under-world fountain and gnaws the root of Y.; the squirrel, Ratatöskr, runs up and down and tries to breed strife between the serpent and the eagle, which sits aloft.

Of this old-world myth too imperfect an account has survived to enable us to read its meaning. Some writers in the middle ages bring it into connection with the Cross. It is striking to find Virgil (*Georg.* ii. 291) describing the ash as sending its branches as high into the air as it sends its roots into the earth—

> Æsculus in primis, quæ quantum *vortice ad auras*
> *Ætherias*, tantum *radice in tartara tendit.*

Remarkable coincidences, although of a fragmentary kind, are also found in eastern traditions.

Jacob Grimm sees an intimate connection between the world-tree Y. and the *Irmenseule*, of which numerous traces are to be found in the records of German antiquity. This is described by Rudolf of Fuld as a great trunk of a tree set upright, and worshiped in the open air; the name *Irminsul*, he explains as meaning the universal or all-sustaining pillar (Ger. *Säule*, pillar). Such a tree-idol was destroyed by Charles the Great in his conquest of the Saxons in 772, at a place called Heresburg, in Westphalia, which was a chief seat of the pagan religion of the Saxons. The word *irmin*, Ang.-Sax. *eormen*, was frequently compounded with other words in the earlier stages of the Teutonic languages, in the sense of universal, greatest of all. As the primitive nature-worship tended more and more to the personification of particular powers, these trunk-idols were associated with particular divinities, and perhaps had an image set upon them, or were cut into some rude resemblance, as in the case of the Greek pillar-images called *hermæ* (see HERMES). The coincidence of the names *irmin* and *hermæ*, which may, however, be casual, has not failed to be remarked. The Christmas tree of modern Germany may be some kind of offshoot of the old notion of Yggdrasil.

Y-MOTH (*Plusia gamma*), a beautiful species of Moth (q. v.) common in Britain and throughout great part of Europe, about an inch in entire length, without reckoning the antennæ, which are not quite half an inch. The color is lilac, variegated with brown, the upper wings beautifully marbled, with a shining mark nearly in the form of the letter Y, or of the Greek γ (Gamma), whence the names. The lower wings are dirty white, with a broad smoky border, and a white fringe, spotted with black. This moth flies about during the day in summer and autumn. It is very swift of flight. It lays its eggs on the under side of leaves. The caterpillar is slightly hairy, green with a yellow line along each side, and five white ones down the back. It feeds on the leaves of a great variety of plants, as peas, beans, turnips, cabbages, hemp, clover, oats, and other grasses. It sometimes ravages gardens, but more in France than in Britain.

YOGA (from the Sanscrit *yuj*, join; kindred to the Lat. *jung-* Gr. *zeug-*, Gothic, *jiuk;* hence *junction*, and figuratively, 'concentration, religious or abstract contemplation') is the name of one of the two divisions of the Sânkhya philosophy of the Hindus. See SANKHYA. While the first of these divisions, the Sânkhya proper, is chiefly concerned in teaching the *tattwas*, or principles of creation, and the successive development of the latter, the main object of the Yoga is to establish the doctrine of a Supreme Being, and to teach the means by which the human soul may become permanently united with it; and since the Sânkhya proper is silent on the creation of the world by a Supreme Being—whence it was charged, though unjustly, by its opponents, with being atheistical—the Yoga, which is called theistical, is considered to be its complement. According to *Patanjali*, the reputed author of this system, the term *Yoga* means 'the hindering of the modifications of thinking;' and by such modifications, which, he says, may be accompanied with afflictions, or be free from them, he understands 'the three kinds of evidence—viz., perception, inference, and testimony—misconception or incorrect ascertainment, fancy, sleep and recollection.' The 'hindering of these modifications' is, according to him, effected either by a repeated effort to keep the mind in its unmodified state, or by dispassion, which is the consciousness of having overcome all desires for objects that are seen (on earth) or are heard of (in Scripture).' Dispassion is conducive to meditation; this, again, is of different kinds, and is attained either 'impetuously'—in adopting various transcendent methods—or 'by a devoted reliance on *Îs'wara*, the Lord.' This Lord, or Supreme Being, Patanjali then defines as 'a particular *Purusha*, or spirit, who is untouched by afflictions, works, the result of works or deserts; in whom the germ of omniscience reaches its extreme limit; who is the preceptor of even the first, because he is not limited by time; and whose appellation is Om, the term of glory

This word is to be muttered, and its sense is to be reflected upon, for 'from it comes the knowledge of Îs'wara and the prevention of 'the obstacles' which impede Yoga.

These obstacles, Patanjali says, are 'illness, apathy, doubt, listlessness about the accomplishment of meditation, want of exertion, attachment to worldly objects, erroneous perception, failure to attain any stage of meditation, or inability to continue in the state of meditation when it has been reached.' There are several other methods to prevent these obstacles from distracting the mind, and impeding its steadiness. One, for instance, consists in pondering over one single accepted truth; another in 'practising benevolence, tenderness, complacency, and disregard towards all objects in possession of happiness or grief, virtue or vice;' another, 'in forcibly expelling or retaining the breath;' another, in 'dwelling on knowledge that presents itself in dream or sleep;' &c. When all these modifications have disappeared, the mind becomes free from 'the tingeing' of the exterior world, as the pure crystal is free from the color that seems to belong to it, when a colored substance is seen athwart it. After having described the various modes in which the mind may appear changed into the likeness of what it ponders, the author of this system then proceeds to explain the practical Yoga, by which 'concentration' may be attained. It comprises, according to him, mortification, the muttering of certain hymns, and a devoted reliance on the Lord. Through it, meditation is established, and *afflictions* are got rid of. By afflictions, again, he understands ignorance, egotism, affection, aversion, and tenacity of life; which terms are then the subject of an especial investigation into the nature of what is to be got rid of, of what is not desired to be got rid of, of what is constituted by the cause, and of what is the constitutive cause.—There are eight means or stages subservient to the attainment of concentration—viz., forbearance (*yama*), religious observance (*niyama*), postures (*âsana*), regulation of the breath (*prân'âyâma*), restraint of the senses (*pratyâhâra*), steadying of the mind (*dhâran'â*), contemplation (*dhyâna*), and profound meditation (*samâdhi*). —The first stage, *forbearance* (*yama*), consists in not doing injury to living beings, veracity, avoidance of theft, chastity, and non-acceptance of gifts; they are the universal great duty.—The second stage, *religious observance* (*niyama*), comprises purity—external as well as internal—contentment, austerity, muttering of the Vedic hymns, and devoted reliance on the Lord.—The third stage of Yoga, *postures* (*âsana*), is defined by Patanjali as 'that which is steady and comfortable' at the same time.

The commentators mention several varieties of such postures. According to an interesting treatise on the Yoga philosophy by Navînachandrapâla, one of these, called *Siddhâsana*, is practised by placing the left heel under the anus, and the right heel in front of the genitals, by fixing the sight upon the space between the eyebrows, and, while in this motionless attitude, meditating upon the mysterious syllable *Om* (q. v.). Of the posture called *Padmâsana* the same treatise says, that it consists in placing the left foot upon the right thigh, and the right foot upon the left thigh, in holding with the right hand the right great toe, and with the left hand the left great toe, the hands coming from behind the back and crossing each other; while the chin rests on the interclavicular space, and the sight is fixed on the tip of the nose. When the command of such postures is attained, Patanjali says, the Yogin does not suffer either from cold or heat, hunger or thirst, or similar afflictions. The fourth stage, *regulation of the breath* (*prân'âyâma*) is threefold, according as it concerns exhalation or inhalation, or becomes tantamount to suspension of the breath, the latter also being termed *kumbhaka* (from *kumbha*, a jar), because 'the vital spirits then are as motionless as water is in a jar.' Through such a regulation of the breath, the obscuration of the pure quality of the mind is removed, and the latter becomes fit for acts of attention. Navînachandrapâla describes different processes of the Prân'âyâma as selected from different authorities. One, for instance, consists, according to him, in the act of inhaling through the left nostril for 7·6788 seconds, suspending the breath for 30·7152 seconds, and exhaling through the right nostril for 15·3576 seconds; then inhaling through the right nostril for 30·7152 seconds, exhaling through the right nostril for 7·6788 seconds, suspending the breath for 30·7152 seconds, and exhaling through the left nostril for 15·3576 seconds; lastly, inhaling through the left nostril for 7·6788 seconds, suspending the breath for 30·7152 seconds, and exhaling through the right nostril for 15·3576 seconds.

To the *kumbhaka*, of which there are eight varieties, the same author observes, two processes are indispensable: sitting in one of the postures described; and, by means of an incision in the frænum linguæ, and milking, as it were, the tongue, causing it gradually to become so lengthened as to allow the rima glottidis to be shut by pressing back the epiglottis with the point of the retroverted tongue. Such *kumbhakas*, it is supposed, produce the most wonderful effects: some of them cure diseases of the head and lungs, dropsy, &c.; others make proof against all sorts of inflammation and fever; the eighth or last variety of the *kumbhaka*, especially, cures all diseases, purges from all sins, promotes longevity, enlightens the mind, and awakens the soul.—The fifth stage of Yoga, the *restraint of the senses* (*pratyâhâra*), means the withholding of the senses from their respective objects, and the accommodating them entirely to the nature of the mind. According to an authority quoted by Navînachandrapâla, a Yogin's senses are suspended when he can suspend the respiratory movements for 10 minutes and 48 seconds.—This stage is preparatory to the sixth, or *the steadying of the mind* (*dhâran'â*), which means the freeing of the mind from any sensual disturbance, by fixing the thoughts on some part of the body, for instance, on the naval or the tip of the nose. This stage, it is supposed, can be accomplished when the Yogin is able to suspend his respiratory movements for 21 minutes and 36 seconds; and, according to Navînachandrapâla, it is effected by different processes—muttering the syllable *Om* 144,000 times, fixing the eyes upon the tip of the nose, or the space between the eyebrows, for two hours, swallowing the tongue for two hours, &c.—*Contemplation* (*dhyâna*), the seventh stage of Yoga, is the fixing of the mind on the one object of knowledge, the Supreme Spirit, so as to exclude all other thoughts. It is practised in consequence of the 'steadying of the mind,' as defined before; and, according to the authority quoted by Navînachandrapâla, a man can accomplish it when he is able to suspend his respiratory movements for 43 minutes and 12 seconds.—The eighth and last stage of Yoga, *profound meditation* (*samâdhi*) is the perfect absorption of thought into the one object of meditation, the Supreme Spirit; it is devoid, as it were, of any definite character, which would suggest a term as applicable to it.

In such a state, Navînachandrapâla says, 'a Yogin is insensible to heat and cold, to pleasure and pain: he is insensible to blows and wounds, to the effects of fire; he is the same in prosperity and adversity; he enjoys an ecstatic condition. He is free from lust, fear, and anger; he is disengaged from all works. He is not affected by honor and dishonor. He looks upon gold, iron, and stones with the same unconcerned eyes. He is the same in love and in hatred; he is the same amongst friends and enemies.' And according to the authority he quotes, such a state may be attained by a man who can suspend his respiratory movements for 1 hour, 26 minutes, and 24 seconds.—The last three stages are also comprised under one distinctive name, *Sam'yama*, or 'restraining,' because it is chiefly on the perfection attained in these three collectively that depend the wonderful results which are promised to a Yogin when he applies them to the contemplation of special objects. Such results are, for instance, a knowledge of the past and future, a knowledge of the sounds of all animals, of all that happened in one's former births, of the thoughts of others, of the time of one's own death, a knowledge of all that exists in the different worlds, of stars and planets, of the structure of one's own body, &c. There are especially, however, eight great powers which a Yogin will acquire when properly regulating and applying the *sam'yama*—viz., the power of shrinking into the form of the minutest atom; that of assuming a gigantic body; that of becoming extremely light; that of becoming extremely heavy; that of unlimited reach of the organs (as touching the moon with the tip of a finger); that of irresistible will; that of obtaining perfect dominion over the inner organs of the body; and that of acquiring mastery over everything.

If the Yogin applies *sam'yama* to the contemplation of the smallest divisions of time, and the successive order in which such divisions occur, he obtains a discrimination which enables him to understand the subtle elements, and to see all objects at once. When his intellect has become free from all considerations of self, and his spirit is no longer subject to the result of acts performed, and when both have thus attained the same degree of purity, the Yogin obtains eternal liberation.—In the last chapter of his work, Patanjali then shows that these perfections are not always obtained by Yogins in one birth, but that *Prakr'iti*, or nature (see SANKHYA), generally in a succession of births, brings to maturity the result obtained in a prior birth. He thus makes nature, not actions, the cause of each effect; meritorious actions merely serving, according to him, to remove the obstructions which, from bad actions, would arise to its regular progress, just as water would take its natural course after the husbandman, who would want to lead it from field to field, had removed the obstructions that lay in its path. After having then taught that the result of actions, in successive births, consists in the recollection of a prior state, and in the obtainment of a special (existence, a special duration of life, and special enjoyments); and after having discussed the different influences to which the mind may become subject in its union to different objects, Patanjali winds up with describing the mode in which final liberation gradually takes place. First, he says, when a person has obtained the discrimination conveyed by the Yoga doctrine, all ideas of self—such as, I am different from another—cease. In consequence, thought is turned inward, and this is the commencement of liberation. But, as still recollections, derived from former existences, sometimes prevail in his

mind, they must be abandoned by him in the same way as he has to overcome the afflictions, above specified. When he has succeeded in this, his knowledge will have become so infinite, that but little will remain for him to be known. Then the cosmical *gun'as*, or qualities, too (see SANKHYA), having accomplished the main object of spirit, will have gradually arrived at the end of their functions, and, as a consequence, matter will become separated from spirit. This is *kaivalya*, or true liberation, for the mere power of the mind to retain its nature after dissolution has taken place, is not yet true liberation.

The practical part of the Yoga was admitted into the later Vedânta (q. v.). Its ethical portion is especially dwelt upon in the celebrated episode of the Mahâbhârata (q. v.), the *Bhagavad-gîtâ*. But the great power it has at all periods exercised on the Hindu mind, is less derived from its philosophical speculations or its moral injunctions, than from the wonderful effects which the Yoga practices are supposed to produce, and from the countenance they give to the favorite tendency of orthodox Hinduism, the performance of austerities. It is needless, however, to say that frequently these practices were and are merely a cloak for imposture and hypocrisy, and that the professional Yogins (q. v.), numbers of whom are met with throughout India, are often nothing but lazy mendicants or jugglers, who, by impressing the vulgar with a belief in their supernatural powers, convert it into a source of an easy livelihood. Such followers of the Yoga pretend, for instance, to foretell future events; they deal in palmistry, and profess to cure diseases. There are instances, too, where, for a handsome consideration, they allow themselves to be buried for a certain time, so as to exhibit the power of the Yoga. Two such cases are related as authentic in the treatise of Navînachandrapâla; and it would appear from them, that a human being, after having undergone certain preparations, such as the Yoga prescribes them, may be shut up in a box without either food or drink, for the space of a month, or even forty days and nights, and yet remain alive. The author of the treatise endeavors, indeed, to show that the rules laid down by the Yoga regarding the mode of respiration, the postures, and the diet of a Yogin, may have been founded on a careful observation of the nature and habits of hibernating animals; and in support of this view, he enters into a detailed investigation of the effect of the Yoga practises on animal life. If, as it seems, his statements are correct, much of what otherwise would be incredible in the accounts given of the performances of Yogins, could be received as true, because admitting of explanation.

The system of *Patanjali* was taught by him in a little work called *Yogasûtra*, which consists of four Pâdas, or chapters, each comprising a number of Sûtras (q. v.). The oldest commentary on it is ascribed to a *Vyâsa* (q. v.); and this was commented on by *Vachaspati-Mis'ra*. Of other commentaries, those by *Vijnânabhikshu*, *Bhojadeva*, and *Nâgojibhat't'a* are the most approved of. —For a fuller enumeration of works on the Yoga, see *A Contribution towards an Index to the Bibliography of the Indian Philosophical Systems*, by Fitzedward Hall (Calcutta, 1859). The first two chapters of the Sûtras have been translated, with annotations, founded on the commentary of Bhojadeva, by the late J. R. Ballantyne (Allahabad, 1853); and a paraphrase, but somewhat too free, of the same commentary is contained in the 4th vol. of William Ward's *View of the History, Literature, and Religion of the Hindus, &c.*, 4 vols. (London, 1817—1820). For a brief account of the system, see also the 1st vol. of H. T. Colebrooke's *Miscellaneous Essays*, 2 vols. (London, 1837); and for the practice of the Yoga, *A Treatise on the Yoga Philosophy*—that referred to above —by N. C. Paul (i. e., Navînachandrapâla), (Benares, 1851).

YOGIN, a follower of the Yoga system of Hindu philosophy (see YOGA), but in popular acceptation a term generally denoting a Hindu ascetic or devotee, a man who has entered the fourth stage of religious life as described in the S'âstras. A large class of such persons forms a division of the votaries of S'iva. See S'AIVAS.

YOKOHAMA (Japanese for 'Cross Shore'), a town of Japan, in the island of Nipon, and the port for the foreign trade of Yedo. It is situated on the south side of a bight of the bay of Yedo, about 17 miles from Yedo, and opposite to Kanagawa. In 1854, it was only a small fishing village, but after it supplanted Kanagawa as the treaty port of Yedo in 1859, it rapidly increased. The Japanese government built at a great outlay solid granite piers and landing-places, a large custom-house, official residences, and shops for Japanese traders; besides houses and godowns for the foreign community and merchants. It now extends along the sea-shore for about a mile and a half, and is two or three streets deep. Pop. (1879) 67,499. The custom-house is nearly in the center of the town; and east and west of it, lie respectively the foreign and native quarters. The shops are filled with goods to suit the foreign taste—such as lacquered ware of rare quality and bronze-work, baskets and porcelain, fancy silks and embroidery, curiosities and articles of *vertu*.

Since the recent changes in the policy of the Japanese government, great improvements have taken place in the native quarter. Broad and cleanly streets are rapidly superseding the former dirty and narrow thoroughfares. A canal is drawn as a cordon around the settlement on the land-side, and in 1871 the Japanese government widened and deepened it very considerably. Other important undertakings have recently been carried out, the chief of which is a railway from Y. to Yedo. Gas was introduced in 1872.

In the last years of the decade 1870–1880, the imports into Y. (cottons, woollens, metal objects, &c.) reached a value of 25,000,000 yens or dollars; the exports (silk, tea, rice, copper, &c.), of 30,000,000 yens. In 1880 the imports from Great Britain were worth £3,290,900; the exports thither, only £531,600.

YONGE, CHARLOTTE MARY, a novelist of merit and popularity, was born in the year 1823. She is a daughter of a Hampshire country-gentleman. The work by which she is best known is *The Heir of Redclyffe*, which had great success, and has gone through several editions. Besides this, she is the author of *Heart's Ease, Dynevor Terrace, The Daisy Chain, The Lances of Lynwood, The Little Duke*, &c. These works exhibit much literary accomplishment, and have secured for Miss Y. a public of her own. The spirit which pervades them is pure, amiable, and pious; and commonly the stories are more or less contrived as vehicles of the High-Church opinions to which the writer is warmly attached. Considerable sums accruing from the sale of her writings she is said to have devoted to the aid of religious missions in New Zealand. In addition to the fictions by which she is chiefly known, Miss Y. has published a work *On Christian Names, their History and Derivation*, in which much curious erudition is displayed; *Life of Bishop Patteson* (1873); and several historical works.

YO'NKERS, a city of New York, U. S., on the E. bank of the Hudson River, 16 miles N. of New York City Hall. In 1872 the town of Y. was divided, the northern part being constituted the city of Y.; the southern portion became part of New York City in 1874. Pop. (1880) 18,892.

YONNE, a department in the north-east of France, bounded on the N. by the department of Seine-et-Marne, on the E. by Aube and Côte-d'Or, on the S. by Nievre, and on the W. by Loiret. Area, 2860 sq. m.; pop. (1881) 357,020. The department is watered by the river Yonne, which flows across it in a north-east direction. The surface is hilly, many of the hills being covered with fruitful vineyards, the intervening valleys being beautiful and fertile. The vineyards yield annually upwards of 22,000,000 gallons of wine. There are some fine forests in the department. The climate is generally healthy, except in the south-west, where the marshes often give rise to fever. The soil produces abundance of grain, but the cultivation of the vine is of the greatest importance, the best wines produced here being those of Chablis, Joigny, Auxerre and Tonnerre. The chief mineral products are red granite, marble, lithographic stones, pavement, red and yellow ochre, iron. There are manufactures of cottons, woollens, beet-root sugar, bricks, tiles, &c. The chief exports are timber, corn, and wine. It is divided into five arrondissements—viz., Auxerre, Avallon, Joigny, Sens, Tonnerre. The railway from Paris to Lyon passes through the department. The capital is Auxerre; the other chief towns are Avallon, Joigny, Sens, and Tonnerre.

YORK, HENRY BENEDICT MARY, DUKE OF, Cardinal, and Bishop of Frascati, the last male descendant of the royal House of Stuart, was the second son of James (III. of England), commonly known as the Pretender. He was born at Rome, March 26, 1725; and after the failure of the attempt of his elder brother, Charles Edward, in 1745, resolved to enter the church. He was admitted to tonsure and minor orders by Benedict XIV., and created Cardinal in 1747. Clement XIII. consecrated him Bishop of Corinth *in partibus infidelium*, and afterwards of the suburban see of Frascati, where he took up his residence. He also enjoyed, through the favor of the crown of France, the revenues of two abbeys, which he held *in commendam*, as well as a pension from the Spanish court; and the liberal charity with which he dispensed his income among the poor, and for the other charitable and religious necessities of his diocese, endeared him to his flock. These resources were lost at the Revolution; but, nevertheless, in the distresses of the holy see which ensued, Cardinal Y. sold his family jewels for the purpose of relieving Pius VI. in his necessities.

On the occupation of Rome, he withdrew to Venice; but he returned in 1801, on the restoration of the papal authority under Pius VII. George III., having become aware of the failure of his former means of income, granted him a pension of £4000 a year, which he accepted, and enjoyed till his death. Those to whom a printed record of the 'Last of the Stuarts' may be interesting, will find a small collection of his 'Pastoral Letters,' in a 4to volume published in Rome, and entitled *Appendix ad Tusculanam Synodum a Celsitudine Regia Emmentissimi Henrici Episcopi*

Tusculani (Rome, 1764). He was appointed by Pius VII. Dean of the Sacred College, and held several other dignities, and was much respected, as well by the Italians as by foreigners visiting Rome. He died at Frascati, July 17, 1817, at the advanced age of ninety-two. His last will, which is a very interesting document, is printed by Artaud in his *Vie de Pie VII.* His monument, by Canova, in St. Peter's, was erected by order of the Prince Regent, afterwards George IV.

YORK, House of. See Plantagenet.

YORK, the capital of Yorkshire, is situated at the junction of the rivers Ouse and Foss, the three Ridings of the county meeting at the same place, and is nearly equidistant from London and Edinburgh. It is the seat of an archbishopric, a county in itself, and a municipal and parliamentary borough. The government is vested in 12 aldermen and 36 councilors, of whom one, as in the case of London, is Lord Mayor. It returns two members to parliament. Pop. of parliamentary borough (1871) 50.765, (1881) 59,596; of municipal borough (1871) 43,796, (1881) 54,198. Under the new territorial army organization, completed in 1876, Y. is the center of the northern military district, a general officer's command.

Y. is amongst the most ancient of British cities. Before the Roman invasion, it was one of the chief towns of the Brigantes, the most numerous and powerful of the British tribes. It was constituted a Roman station, under the name of *Eboracum*, by Agricola about 79 A.D., and was very soon the principal seat of Roman power in the north, perhaps in Britain. While the Roman dominion existed in the island, Y. was a city of the first importance. Here Hadrian lived and Severus died. Here, too, died Constantine Chlorus, the father of Constantine the Great, and here, as many believe, his greater son was born. When the emperors visited the province, Y. was their chosen residence, and it was the abode of the imperial legates when the emperors were absent. Little is known of the city for a century after the departure of the Romans, about 409 A.D., but it certainly suffered much during the long conflict between the Britons and the Picts, against whose incursions Y. was a material defence. It afterwards became the capital of Northumbria. The first metropolitan church in England was built here by Edwin, the Northumbrian king whom Paulinus baptized; and here also Edgar, the first sole monarch of England, held, in the year 966, the Witenagemot. William the Conqueror was long unable to overcome this stronghold of the north, notwithstanding his coronation by its archbishop, Aldred. One Norman garrison, numbering 3000 men, was put to the sword in 1069; but William exacted a terrible vengeance in the following year, when he laid waste the whole country between Y. and Durham.

The first English parliament was held at Y. in 1160 by Henry II., and for 500 years afterwards parliaments continued to be summoned occasionally to the ancient city. Under Henry III., the courts of King's Bench and Exchequer sat at Y. for seven years; and for a few months Richard II. removed thither the courts of King's Bench and Chancery. During the insurrections consequent upon the dissolution of the monasteries by Henry VIII., Y. was seized by the insurgents of the 'Pilgrimage of Grace;' and in its immediate neighborhood, Fairfax, in 1644, conquered Prince Rupert on Marston Moor. The city and castle, already besieged, surrendered to the Parliamentarians a few weeks after. The British Association was organized at Y. in 1831, and here the jubilee meeting was held in 1881.

A city so ancient necessarily presents many interesting memorials of antiquity. There are remains or memorials of Roman towers and temples, and of the earliest British churches. One of the most magnificent of the Anglo-Saxon churches was erected at Y. in the 8th c., and this, destroyed by fire, rebuilt, enlarged, and changed from time to time, is now known as York Minster. A portion of the original church was disinterred during the excavations which followed the latest burning of the minster, in 1829. The present structure takes rank with the finest specimens of Gothic architecture in the world. It was mainly built in the 13th and 14th centuries. Its length, from base to base of the buttresses, is 524 feet, and its extreme breadth 250 feet, being 24 feet longer than St. Paul's Cathedral, and 149 feet longer than Westminster Abbey. The magnificent east window is 75 feet high and 32 feet broad, and contains about 200 compartments, each a yard square, representing scriptural subjects. War and fire have conspired to deform or destroy this splendid cathedral. Twice it has been burned down, once in 1069, and again in 1137, each time to rise more beautiful than before. During the times of the Commonwealth, much damage was done by war and wantonness, and several of its older monuments were mutilated or broken up. In 1829, it was set on fire by Jonathan Martin, a maniac; and the roof of the choir, 222 feet long, with all the woodwork on each side, was destroyed. While this disaster was being repaired, a workman's candle was carelessly left burning, one night in 1840, and again a terrible fire broke out, destroying the south-western tower, with its splendid peal of bells, and the roof of the nave. The cost of the repairs exceeded £100,000.

A monastery of Benedictine monks was built, or rather completed, at Y. in the time of William Rufus, which was in great part reconstructed about the end of the 13th century. Its abbot had a mitre and a seat in parliament. Some portions of the original building yet remain. Thirteen seceders from this monastery established, in 1131, the neighboring Abbey of Fountains, near Ripon, under Cistercian rule. On the site of the Benedictine monastery, now stand the museum and gardens of the Yorkshire Philosophical Society. The same order had a priory dedicated to the Holy Trinity in Micklegate, and a nunnery outside the walls at Clementhorp. Besides these, the Dominicans, Franciscans, Augustinians, and Carmelites had each a monastery, and the Gilbertines a priory, within the city. In the immediate neighborhood were 16 hospitals. At the Reformation, Y. contained 41 parish churches, 17 chapels, 16 hospitals, and 10 religious houses. Twenty-two of the churches yet remain, and several new churches have been built. The Roman Catholics have a fine pro-cathedral. There are numerous dissenting places of worship.

The educational institutions of Y. are numerous and useful. Notable among them are St. Peter's School, founded in 1557; Archbishop Holgate's Free School, dating from Henry VIII.; the Blue Coat School for boys, and the Gray Coat for girls, supported chiefly by annual subscriptions; and the Yorkshire School for the Blind, conducted in a palace originally built for the Lord President of the Council of the North. Y. publishes one daily and three weekly newspapers.

A fine art exhibition was held at Y. in 1879; the building erected for it contains a concert-hall and picture galleries. The Yorkshire Philosophical Society was formed in 1822, and possesses a handsome building and gardens on the site of St. Mary's Abbey, with a museum, rich in antiquarian relics and specimens illustrative of natural history. Among other public institutions are the County Hospital, the first established in England north of the Trent; the Lunatic Asylum; the Dispensary; the Friends' Retreat; and many charitable foundations for the benefit of poor persons. The ancient castle, with the exception of its imposing Clifford's Tower, is superseded by the modern and commodious assize courts. The Guildhall, a fine Gothic building, was erected in 1446. There are also convenient assembly and concert rooms, and a creditable theater.

Whatever the trade of York may have been in ancient times—and old writers speak of it in glowing terms—it counts for little now. The making of leathern gloves, combs, glass, &c., supplies employment to many; some find employment in iron-foundries, in flax-spinning, and the manufacture of linen; and of late, the construction of railway carriages has become part of the city industry.—See Drake's *Eboracum;* Browne's *History of the Metropolitan Church of St. Peter's, York;* Britton's *Cathedral Antiquities —York;* Hargrave's *History of York;* Gent's *York;* Wellbeloved's *Eburacum, or York under the Romans.*

YORK, a shire-town of Pennsylvania, on Codorus Creek, 10 miles south-west of the Susquehanna River, 28 miles south-south-east of Harrisburg, at the intersection of several railways. It has a spacious granite court-house, numerous churches, handsome residences, six banks, seven newspapers. Pop. in 1870, 11,003; (1880) 13,940.

YORK, a river of Virginia, formed by the union of the Pamunkey and Mattapony, flowing south-east to the Chesapeake Bay, nearly opposite Cape Charles. It is 40 miles long, and from one to three miles wide. Yorktown, an ancient but decayed port, on the right bank, eleven miles from its mouth, was the scene of Lord Cornwallis's surrender, October, 19, 1781.

YO'RKSHIRE, which is larger in territorial extent than any other two counties in England, is situated nearly in the center of Great Britain, about midway between London and Edinburgh. 'Its extreme points,' says Allen, in his History of the county, 'lie between the parallels of 53° 18′—54° 40′ N. lat., and between 2° 40′ of W.—0° 10′ of E. long. from Greenwich. On the N. side, it is separated, in its whole extent, from the county palatine of Durham, by the river Tees; from the mouth of the same river to the entrance of the Humber, the whole E. side is bounded by the German Ocean; on the S. side it is divided from Lincolnshire by the rivers Humber and Trent. The boundaries between Y. and the counties of Nottingham, Derby, Cheshire, Lancashire, and Westmoreland are merely conventional, being indicated by no natural feature of the country.' The longest diagonal of the county, north-west to south-east, extends about 130 miles; the shortest, south-west to north-east, about 90. It contains about 6095 square miles, or 3.882,851 statute acres. It is divided into three Ridings, North, East, and West, and a small district not included in any of the three, the Ainsty of York. The Ridings (a corruption of tri-thing or thirding) date back to Saxon times, and are peculiar to Yorkshire. Each has a separate military and civil jurisdiction, and each its own lord-lieutenant and public buildings.

The North Riding contains 11 wapentakes; the East, 6; the West, 9. In the whole county, besides the archiepiscopal city, there are 59 market-towns, and 1639 parishes, townships, and places. The North Riding (including for Parliamentary purposes the Ainsty aad City of York) returns 2 county and 12 city and borough members; the East Riding, 2 county and 2 borough members; the West Riding, 6 county members (2 for the Eastern Division, 2 for the Northern, and 2 for the Southern) and 16 borough members. In 1871, the population was 2,436,355; in 1881, 2,886,306. Three-fourths of the whole number are resident in the West Riding. Between 1801 and 1871 the population increased by 184 per cent.; between 1871 and 1881, by 18·5 per cent.

The history of the county in early times may be mainly read, in that of its chief city. Apart from the events which transpired at, and in connection with York, there is little to be recorded. It was originally occupied by the Brigantes, and was subjected by the Romans under Agricola about 71 A.D. When the Roman occupation ceased, it was long and greatly troubled, first by Pictish, and then by Saxon incursions. Under Saxon rule, the traces of Brigantian occupancy were soon obliterated, only the rivers, mountains, and a few remarkable natural curiosities retaining their British names, while all things else received Saxon designations. The county formed part of the kingdom of Northumbria, taking the name of Deira (the Country of Deer), when that kingdom was divided. In the troublous times which preceded the Conquest, many battles were fought against invading Danes, and generally with success. At Stamford Brig, a few miles from York, Harold, the last of the Anglo-Saxon kings, defeated the united Danish and Norwegian armies, three weeks before he fell before the Normans on the fatal field of Hastings. Among the more notable events of later history, may be named the battle of Wakefield, where the Duke of York was defeated by Queen Margaret in 1460; the battle of Towton Field, near Tadcaster, fought on Palm Sunday in 1461, the most sanguinary conflict of the bitter war between the rival Roses; and that of Marston Moor, which gave the final blow to the falling fortunes of Charles I. Since that time, with slight exceptions, the history of Y. has been one of peace and prosperity.

The surface of the county is greatly diversified. On its north-western border runs a range of lofty hills, many of them containing extensive caverns, and giving birth to wild and romantic streams. Here is Ingleborough, 2361 feet above the sea-level, with its marvelous cave, half a mile long, full of beautiful stalactites; Whernside, 2384 feet high, with its subterranean cataract of 75 feet in Weathercote Cavern; and the vast mass of Mickle Fell, 2600 feet, which overlooks the waters of the Tees and Lune. Eastward, far away, rise the Hambleton and Cleveland Hills. Lower down are the Wolds, a line of chalk hills stretching from Flamborough Head to Ferriby on the Humber. The hills and dales of Craven, which cover a large tract of country in the west, abound in natural beauty. Right down the center of the county, from the Tees to the Humber, runs the great Vale of York. Across its northern border flows the Tees. Coming southward, we find the dales of the Swale, the Ure, the Nidd, the Wharfe, the Aire, the Calder, and the Don, all on the western side of the county, each sending a river to the central vale, where the united waters, with the Derwent and a few smaller tributaries from the east, form the Ouse; while the Ouse, after uniting with the Trent, becomes the Humber estuary, which rolls eight-tenths of the Y. waters to the sea. The Ribble, rising in Craven, passes by Preston, and falls into the Irish Channel, and is the only Y. river which finds a western outlet. The Esk joins the German Ocean at Whitby, and the Tees between Redcar and Hartlepool.

Geologically, Y. is too large a subject for us to do more than touch. The Vale of Y., rarely more than 100 feet above the sea, has on its western side the long slow elevations which culminate in the Pennine chain, while on the east rise the lower but more sudden eminences of the Wolds and the high grounds of Hambleton and Cleveland. On the west are the millstone grit and mountain limestone, the two coming together in lofty opposing eminences in many parts of Craven, where, along the line of what is called by geologists the 'Craven Fault,' the limestone rises into magnificent cliffs many hundreds of feet in height, and nearly 2000 above the level of the sea. The limestone is in many places very rich in lead-ore. On the east lie the Chalk Wolds, and the Oolitic and Lias formations, with the Kimmeridge Clay of the Vale of Pickering, and the accumulations of sand, gravel, and other sediments which make up Holderness. In the south-western district is a splendid coal-field, intermixed with ironstone, extending over 600 sq. miles. Valuable deposits of iron ore have also been discovered recently in Cleveland, in the north-eastern part of the county.

In the north-west, the lower parts of the North Riding, Craven, and the East Riding, the land mainly supplies occupation to the inhabitants. Craven is almost purely a grazing district, and so are most of the upper lands and dales in the county. Excellent corn is grown in the vales of York and Cleveland, and the East Riding has many large and excellent farms. The horses of Y., both for the race-course and for use, are too well known to need eulogy. The manufactures of the county are immense. Leeds is the center of the woollen, as Bradford is of the worsted trade. Sheffield is the principal seat of the cutlery manufacture; while the Cleveland district is rapidly rising into importance for mineral wealth and enterprise. The large ironworks of Low Moor, Bowling, and Rotherham, and the flax and linen manufactures of Leeds and Barnsley, merit a passing notice, with the blankets and cloths of the Huddersfield district, and the new llama and alpaca industry introduced at Saltaire near Bingley, by Sir Titus Salt. Harrogate, Ilkley, Askern, and Croft are the principal inland health-resorts of the county; Scarborough, Filey, Bridlington, and Whitby take the lead on the coast.

The public works of Y. rank with the finest in the kingdom. Among them are the Aire and Calder Navigation, 15 miles long; the Calder and Hebble Navigation; the navigation of the Don and Sheffield region, 40 miles; and the Huddersfield Canal, one of the most surprising engineering works in England. This canal is 20 miles in length, and rises between Huddersfield and Marsden by 42 locks to the height of 656 feet. At this elevation, the highest canal-level in the country, it passes by a tunnel more than three miles long under Standedge, a range of hills between Marsden and Saddleworth. The canal terminates near Dukinfield. Add to these the Leeds and Liverpool Canal—which cost 46 years of labor, and is 129 miles long—besides many smaller, but very costly undertakings, and some idea may be formed of the activity of Y. in this direction. Its railway communications are excellent, and grow in number and completeness every year. On these lines, in consequence of the mountainous districts through which many of them pass, are to be found some of the longest and most difficult tunnels, viaducts, bridges, embankments, and cuttings which have yet been attempted by engineers in England.

A very brief reference to the antiquities and natural curiosities of the county must suffice. Traces of great Roman roads are found in many places, as well as of Roman, Saxon, and Danish encampments. In the Wolds are many tumuli; and it is supposed by some that the singular and imposing mass of rocks called Brimham Crags, which overlook Nidderdale, about four miles from Pateley Bridge, was once a Druidical temple. The ruins of ancient abbeys and priories are numerous and beautiful. Few can rival the glories of Fountains and Rievaulx, and the scenery which encompasses Bolton Priory is delightful. Besides these, there are the ruins of Kirkstall, Roche, and Selby in the West Riding; St. Mary's at York; Jervaux, Byland, and Whitby in the North Riding; and many others. Of castles, we may name in the West Riding, Conisborough Castle, near Doncaster, one of the oldest and most interesting ruins known to antiquaries; Knaresborough, Pontefract, and Skipton, the last still used as a residence: in the North Riding, Richmond, with its unrivaled Norman keep; Middleham Castle, where the king-maker, Warwick, lived, and where Edward IV. was imnmred; and Bolton Castle, the prison for a time of Mary Queen of Scots: in the East Riding, Wressle Castle, once the home of the Percies. Of old York Castle, nothing now remains but its massive Clifford's Tower.

The lover of the picturesque will find the Y. scenery full of charms. The rapid of Caldron Snout, on the Tees, 200 feet in descent; High Force, on the same river, a perpendicular fall of 69 feet over a cliff of greenstone marble; Aysgarth Force and Hardraw Force, on the Ure; the Strid, immortalized by Wordsworth, in Bolton Woods on Wharfe; the magnificent Gordale Scar and Malham Cove, each nearly 300 feet in height, on the upper waters of the Aire; and the uncounted glens and streams among its myriad hills, are sufficient to indicate the attractions of its river and mountain aspects. It would require a volume to do them justice.—See Allen's *History of the County of York;* Whitaker's *Histories of Richmondshire, Craven, and Leeds;* Hunter's *Hallamshire;* Gent's *York, &c.*, Philips's *Geology of Yorkshire*, and *Rivers, Mountains, and Sea-coasts of Yorkshire.*

YO'RUBA, or YARRIBA, a country of Guinea, West Africa, lying to the east and north-east of Dahomey, in N. lat. 6°—9°, and E. long. 2°—6°. Its area is about 70,000 sq. m.; and the pop. is estimated at 2,500,000. Palm-oil, cotton, and ivory are the principal articles of export. Lagos (q. v.) is the port through which trade with foreign countries is chiefly carried on. There are numerous large towns in Y., but the people are little if at all less barbarous in their customs than their neighbors of Dahomey.

YO-SE'MITE, YO-HAMITÉ, or AHWAHNÉ, a valley and waterfall of California, in the east of the state, about 57 miles from Coulterville, on a large feeder of the San Joaquin, and on the western side of the Sierra Nevada. The scenery of California is remarkable for its combination of loveliness with sublimity; and in no part of the country yet explored are these characters so strikingly displayed as in the Y. valley—a valley of from 8 to 10 miles long, and a litle more than a mile wide; in some places filled with noble oaks, in others opening out into broad grassy

fields; with a river rushing through it about 40 yards in breadth; pine-covered mountains towering with very steep slopes to the height of 3500 feet; a precipice or 'bluff' in one place rising perpendicularly 3089 feet above the valley; in another, a rock almost perpendicular, 3270 feet high; waterfalls pouring over its sides from heights of 700 to almost 1000 feet; and one great waterfall, broken into three laps, but of which the whole height is 2550 feet. Of the other waterfalls on the sides of the valley, the Pohono, or Bridal Veil Waterfall, is particularly to be remarked for its beauty, as well as for its height, which is 940 feet, and almost unbroken. The Y. Valley, first entered by white men in 1855, has begun to attract visitors since California has become peopled, and has already its hotels and guides, like the valleys of Switzerland and the Falls of Niagara.

YOU'GHAL, a seaport, parliamentary, and municipal borough of the barony of Imokilly, county of Cork, Munster, Ireland, situated in lat. 51° 57′ N., long. 7° 52′ W., on the estuary of the Blackwater, 157 miles south-west from Dublin. The pop., which, in 1851, was 7410, and in 1861, 6328, was, in 1871, 6081, of whom 5346 were Roman Catholics, 584 Protestant Episcopalians; in 1881, it was only 5826. The town has some structures of interest—the parish church, which is formed of the nave and aisles of the ancient collegiate church, built by the Earl of Desmond in 1464; the 'clockgate;' and Sir Walter Raleigh's house, which remains nearly in its original state. There is a handsome Roman Catholic church, as also churches of the several other denominations; two convents; several schools; a fever hospital, a lying-in hospital, and several other benevolent institutions. The trade of Y. is considerable, but lies chiefly in the export of agricultural produce. The harbor, which is obstructed by a bar, does not admit vessels of more than 400 or 500 tons burden; the fisheries are extensive and valuable, and employ a considerable number of hands. There are several remains of buildings, civil, ecclesiastical, and military; and, according to the local tradition, the potato was first planted at Y. by Sir Walter Raleigh. Y. returns one member to the imperial parliament. The constituency in 1878 was 266. Its municipal affairs are managed by commissioners, 21 in number. The rateable value of property is £9540.

YOUNG, ARTHUR, an eminent writer on agriculture, was born September 7, 1741, and educated at Lavenham in Suffolk. In 1758, he was apprenticed by his father, a doctor of divinity and clergyman of the Church of England, to a mercantile house in Lynn. But Y. had no liking for business, and devoted much of his attention to literature. On his father's death, in 1759, he undertook the management of a small farm, of which his mother had a lease. Six years afterwards, he became a farmer on his own account in Essex. He seems, at the same time, to have acted as a parliamentary reporter; and as he only saw his farm from Saturday till Monday, it need not be wondered that he found it unprofitable.

At the end of five years, he gave £100 to a practical farmer to take the lease off his hands. In the meantime, however, he had made notes of the results of numerous experiments on his farm, which he afterwards published, under the title of *A Course of Experimental Agriculture*. His first successful book was, *A Tour through the Southern Counties* of England, which was followed by other works describing the state of agriculture in various parts of England, and in Ireland. The enthusiasm of Y., and his lively style, made his writings popular, and by them the knowledge of many judicious practices, confined to one locality, was spread throughout the whole empire. In 1784, Y. began the publication of the *Annals of Agriculture*, of which 45 vols. 8vo were published. Three years later, he was invited by Count de la Rochefoncauld to make a tour in the south of France. What he saw, induced him to undertake a series of tours in France, through a great part of which he traveled leisurely on horseback. The result was his most important work, *The Agricultural Survey of France*. The author did not confine his attention to agriculture, but described the social and political condition of the people in a lively and truthful manner, and his work has become, in consequence, the most reliable source of information regarding the state of France just before the Revolution. In 1801, the French Directory showed the value attached to the writings of Y., by ordering the whole of his agricultural works to be translated into French. They were published at Paris, in 20 vols. 8vo, under the title of *Le Cultivateur Anglais*. In 1808, Y. received a gold medal from the English Board of Agriculture, 'for long and faithful services in agriculture.' He died April 12, 1820.

YOUNG, BRIGHAM, American Mormon leader, was born at Whittingham, Vermont, June 1, 1801, and was the son of a small farmer proprietor. In 1832, having become converted to Mormonism, he was made an elder of the Church of the Latter-day Saints, and began to preach at the Mormon settlement at Kirkland, Ohio. In 1835, he was appointed one of the twelve apostles of the Church, and sent as a missionary to the New England States, where he was very successful in making converts. After the Mormons had been driven from Kirkland to Missouri, and from the latter to Illinois, and the murder of Joseph Smith by a mob (1844), Y. was chosen President in his place. The year following, the charter of Nauvoo was repealed by the legislature of Illinois; and after a cannonade of three days, the Mormons were driven from their capital and temple, and led by President Y. to Utah, where they arrived, after a toilsome journey, July 24, 1847. Next year, the great body of Mormons arrived and founded Salt Lake City; and in 1850, President Fillmore appointed Brigham Y. governor of the territory for four years. In 1854, in consequence of the Mormons setting the Federal laws at defiance, by having in 1852 proclaimed polygamy as the 'celestial law of marriage,' Colonel Steptoe was appointed governor in Y.'s place; but on visiting Utah, he thought it an unsafe residence, and resigned. The Mormon President exercised supreme authority, and said: 'I am and will be governor, and no power can hinder it until the Lord Almighty says: "Brigham, you need not be governor any longer."' In 1857, a new governor, Cumming, was appointed, and sent with a force of 2500 United States troops to protect him and the Federal officers; but Y. forbade them to enter the territory, and cut off the supply-trains. A compromise was, however, effected, the Mormons pardoned, and the troops remained until 1860. The determination of the United States to abolish polygamy, and the appointment, in 1869, of a new U. S. governor, contributed somewhat to reduce Y.'s authority. In 1874 his fifteenth wife petitioned the U. S. courts for a divorce, and separated from him. Y. died August 29, 1877, leaving a fortune of two million dollars to 17 wives and 56 children. See MORMONS, SALT LAKE CITY, and UTAH.

YOUNG, EDWARD, the author of the well-known *Night Thoughts*, was born in the year 1684, at Upham, in Hampshire, of which parish his father was at that time rector. He was educated at Winchester School, and afterwards, in 1703, went to Oxford. In 1708 a law fellowship in All Souls College was conferred on him by Archbishop Tenison. With law, however, he seems pretty much to have declined to meddle, occupying himself, by preference, with poetry and religious studies. In 1714, he obtained his degree of B.C.L.; and that of D.C.L. followed in 1719. Meantime, he had come before the world as a poet, by publishing, in 1713, an *Epistle to George, Lord Lansdowne*, on his being created a peer. For Y., who continued through life one of the most persevering and audacious toadies that ever flattered a patron, this was a characteristic beginning. In the same year he also published two other poems of some length, entitled respectively *The Last Day*, and *The Force of Religion, or Vanquished Love;* the year following, he again flowed forth in *A Poem on the Death of Queen Anne*. These performances procured him some amount of immediate reputation. In 1719 he ventured on the more ambitious effort of a tragedy, which, under the title of *Busiris*, was brought out at Drury Lane. The piece had a fair success, through which means it probably was that he attracted the notice of the strange and eccentric Duke of Wharton, with whom, in the end of that year, he was induced to go for a short time abroad. The duke seems to have entertained for him a real kindness, and to have treated him with much liberality. At the duke's death, Y. set forth certain claims against his estates, which he succeeded in making good to the extent of an annuity of £200. The details of the case are perplexed, and need not here be entered into. They involve nothing dishonorable to Y., yet convey a somewhat unpleasing impression that the pious author of the *Night Thoughts*, in his extreme solicitude about the next world, contrived to keep a pretty sharp eye to his little pocket-interests in the present one.

In 1721, was produced his tragedy, *The Revenge*, which, though unsuccessful at the time, has since had greater acceptance, and is the only one of his pieces still occasionally acted. His third and last attempt in this field, *The Brothers*, was produced in 1753. Between 1725 and 1728, appeared in succession his satires, under the title of *The Love of Fame, the Universal Passion*. These had a great success, and brought to their fortunate author money as well as fame. They abound with wit and vivacious observation, and even now will very well repay perusal. Of *The Instalment*, a poem, issued in 1726, and addressed to Sir Robert Walpole on his being made a Knight of the Garter, it seems enough to say, that inasmuch as we incidentally hear from Swift of a pension granted him, we may surmise that this was the service to the public by which he had contrived to earn it. In 1727, Y., having taken holy orders for the purpose, was appointed one of the royal chaplains; and in 1730, he became rector of Welwyn, in Hertfordshire. The year after, he married Lady Elizabeth Lee, daughter of the Earl of Lichfield, and widow of Colonel Lee. He is supposed to have been very happy with her, as he exhibited great grief on her death in 1741. It is believed that from his solemn meditations on the event, he got the suggestion of the *Night Thoughts*, begun shortly after, and published 1742—1746. By this work almost solely it is that he has continued to be remembered. His mind retained its activity to the last. He published various other works,

now so entirely forgotten that it would be waste of time to enumerate them; and in 1762, superintended a collected edition of his works, in 4 vols. 12mo, from which he had the grace to exclude certain of the most fulsome of his dedications, probably as having served their turn, and not likely to be of further use. His death took place on April 12, 1765. Since that time his *Night Thoughts* has passed through editions innumerable, and is more or less familiar to every reader. It displays much gloomy force of pious reflection; and has passages of fine imagination, frequently somewhat marred by an epigrammatic mannerism of expression. Certain of its sententious lines have passed into common use, and become in a manner proverbial.

Though now somewhat declined from the estimation in which he was long held, Y. must continue, on the strength of it, to hold a distinct and even high place in that interval in our literature which divides the artificial and so-called classical school of Pope from the return to a simpler and more natural manner, heralded some time afterward by Cowper. If we except his one great weakness of character—an inordinate appetite for preferment and worldly honors, which sought its gratification in ways somewhat servile and unworthy—there seems every reason to believe that Y. was, on the whole, a very excellent and worthy man, and sincerely devout Christian.

YOUNG, THOMAS, M.D., one of the most ingenious and original philosophers of this century, and almost as eminent for his scholarship and his linguistic discoveries, as for his contributions to science, was born at Milverton, in Somersetshire, on the 13th of June 1773. His parents, Thomas and Sarah Young, were Quakers of the strictest sect; and Y. had the impression that the peculiar doctrines of the Quakers had a favorable influence upon his character and career. In particular, he connected with the Quaker doctrine of divine suggestion the perseverance with which he followed up any pursuit in which he engaged, to which he, like Buffon, was disposed to attribute all the discoveries which his genius enabled him to make. Wonderful stories of his youthful precocity have been recorded, and they seem to have more truth in them than such stories usually have. In 1780, he was sent, to a boarding-school at Stapleton, near Bristol, where he remained two years; he was afterwards put to a school at Compton, in Dorsetshire, kept by a Mr. Thompson, who appears to have been an able and judicious teacher. When he left Compton, in his 14th year, besides having a great knowledge, for his age, of Greek and Latin and of Mathematics, he had learned French and Italian, and without any tuition, had made considerable progress in Hebrew, Persic, and Arabic. In 1787, he went to live with Mr. David Barclay of Youngsbury, near Ware, in Hertfordshire, an eminent member of the Society of Friends, partly as the fellow-pupil, partly as the tutor of that gentleman's grandson, Hudson Gurney.

A Mr. Hodgkin was called in to assist the studies of the two lads, but Y. soon proved to be superior in acquirements to his instructor, and virtually the three became fellow-students. Mr. Hodgkin published in 1793 a work entitled *Calligraphia Græca*, which he dedicated to Young. Y. continued to live with Mr. Barclay till 1792, spending the summer months in Hertfordshire, and the winter in London, studying Greek and Latin, the modern languages, the Oriental as well as the European, the higher mathematics, and natural philosophy, and, by way of amusement, botany and zoology. He taught himself to write Latin with fluency and elegance, and to write Greek verses, which received the commendation of some of the best judges of the time. During the winters of 1790 and 1791, he attended lectures on chemistry in London. It may be remarked, that neither then nor at any subsequent time did he show much disposition towards experimenting; his bias seems to have been towards the pure rather than the observational sciences.

Towards the end of 1792, under the advice of Dr. Brocklesby, an eminent London physician, his mother's uncle, who had been greatly impressed by his abilities and attainments, he began to study medicine; and he attended medical lectures for two years in the schools of London, and afterwards for a year at the University of Edinburgh. After going to Edinburgh, Y. gave up the Quaker dress and the more inconvenient of the Quaker customs; he took lessons in music and dancing, mixed freely in society, and occasionally went to the theater. These changes, though not intended to go further, eventually led to his complete estrangement from the Society of Friends. From Edinburgh he went to the German university of Göttingen, from which, after nine months' residence, he got the degree of Doctor of Medicine. He continued upwards of a year longer in Germany, and visited various medical schools, returning to England in February 1797. At that time, the membership of the College of Physicians was restricted to graduates of Oxford and Cambridge; and to qualify himself for it, Y., on his return, entered as a fellow-commoner at Emanuel College, Cambridge, at which he remained until he took his degree in 1799. In the year 1800, having become a member of the College of Physicians, he took up his residence in London, and began to practise as a physician. He took the degree of M.B. at Cambridge in 1803, and that of M.D. in 1807. His uncle, Brocklesby, who died in 1797, had left him £10,000, besides his house in London, with his furniture, library, and collection of pictures, so that he was in possession of a moderate competency.

In 1801, he was appointed Professor of Natural Philosophy in the Royal Institution, then newly established, and he began to deliver lectures early in the following year. As a lecturer, he was not popular, his style being too condensed, and the matter of his lectures unsuited to the miscellaneous audiences of the Royal Institution. He published in 1802 a *Syllabus of a Course of Lectures on Natural and Experimental Philosophy*, in which, among other things, he first announced his great discovery of the law of the Interference of Light (see INTERFERENCE), which by itself, as Sir John Herschel has remarked, would have procured him a scientific immortality. It was this discovery which first fairly turned the balance of evidence in favor of the undulatory as against the molecular theory of light (see UNDULATORY THEORY OF LIGHT). It is Y.'s most important contribution to science. He had been elected a Fellow of the Royal Society as soon as he was 21; in 1802, he became its foreign secretary, a post which he retained till the end of his life. He resigned his professorship on his marriage, in 1804, fearing that his filling a chair of science might interfere with his success as a physician. The lectures which he delivered as professor were the foundation of the *Course of Lectures on Natural and Mechanical Philosophy* which he published in 1807—a great work, embodying a complete system of natural and mechanical philosophy, on which he was engaged for nearly five years. A new edition of these Lectures was published in 1845, edited by Professor Kelland of Edinburgh. Y.'s doctrine of Interference was at first unfavorably received by scientific men in England: it was attacked and ridiculed in the *Edinburgh Review;* and so little interest was taken in the subject, that of a pamphlet which Y. published in answer to the *Edinburgh Review*, only a single copy was sold. As has often happened, the first recognition of the importance and ingenuity of this and others of Y.'s speculations came from the scientific men of the continent.

Y. was admitted a Fellow of the College of Physicians in 1808, and was elected one of the physicians of St. George's Hospital in 1810. He afterwards published several medical works, which, though they were little more than compilations, and are now forgotten, show that he was thoroughly versed in the history of diseases and of medical opinion. His hospital practice, too, is said to have been successful; but he had but little success in getting patients. He retired from practice—retaining, however, his connection with St. George's Hospital—in 1818, on his appointment to be Secretary of the Board of Longitude. On the dissolution of the Board of Longitude, he became the sole conductor of the *Nautical Almanac;* and afterwards, when the system of life insurance began to be popular, he held, along with this post, the office of scientific adviser of a life insurance company. During the last years of his life, he was a member of a council appointed to advise the Admiralty in scientific matters.

Y.'s greatest achievement, after his great discovery of the law of Interference, was made in connection with the subject of Hieroglyphics (q. v.). He was the first to hit upon the process of investigation by means of which the received interpretation of hieroglyphics has been arrived at. His discovery, originally published in papers written for the Society of Literature, and afterwards in the *Encyclopædia Britannica*, was given to the world in a book in 1823. In his later years, much of his attention was given to this and cognate subjects. He was engaged on an Egyptian Dictionary at the time of his death. His miscellaneous writings, contributions to the Transactions of learned and scientific bodies, to Reviews, and to the *Encyclopædia Britannica*, were very numerous. Three volumes of them, two consisting of Scientific Papers, edited by Dean Peacock, the third of Hieroglyphical Essays and Correspondence, edited by John Leitch, were published in 1855.

He died, after several months of failing health, and a short period of severe illness, on the 10th May 1829. His character seems to have been singularly amiable, and to have endeared him to a multitude of friends, by one of whom, Dr. Peacock, Dean of Ely, an ample biography of him was published in 1855. Y. was, two years before his death, elected a foreign Associate of the Academy of Sciences at Paris, succeeding to the illustrious Volta.

YPRES, or YPEREN, a town of Belgium, formerly fortified, in the province of West Flanders, is situated in a fertile plain on both sides of the Yperlee, about 29 miles south-south-west of Bruges (53 by railway). The marshes around the town at one time rendered it very unhealthy, but considerable improvement has been effected in this respect by drainage. Y. was at one time one of the most important manufacturing towns in Flanders, the number of inhabitants in the 14th c. being 200,000, and the number of looms 4000. Its staple manufacture consisted of the cloth called, according to some, after the name of the town, Diaper.

The only remnant of its once flourishing manufacture is the Cloth-hall (*Les Halles*), standing in the great market-place, a building of prodigious size, in the form of a trapezium, in a rich style of Gothic architecture, and surmounted by a stately square tower or belfry, with a clock and chimes. It was begun in 1230, and continued till 1342; the east end, supported on pillars, being added in 1730. One of the wings is now used as the *hôtel-de-ville*, and other parts are occupied by different public establishments and concert-rooms. The cathedral of St. Martin is a fine Gothic edifice, with an altar of Carrara marble, a richly carved pulpit, and a picture doubtfully attributed to Van Eyck. Other buildings are the churches of St. Peter, St. James, and St. Nicolas, the old castle-ward, two colleges, several hospitals, barracks, numerous boarding and day schools, &c. The chief modern manufactures are thread, lace, linens, woollens, cottons, silk, ribbons, leather, oil, soap, tobacco. There are many tanneries, oil-mills, salt-works, dye-works, breweries. The town is connected with the Yser by canal, and is a station on the West Flanders Railway. Pop. (1876) 15,515.

Y. is a very old town, its origin dating from the 9th and 10th centuries. In 1688, it was strongly fortified by Louis XIV., and in the great European wars was frequently subject to sieges.

YPSILANTI, a Fanariot family, which falsely pretends to be descended from the imperial stock of the Comneni, has furnished various champions of the Christian population under Turkish rule. The first of these, PRINCE CONSTANTINE Y., was born in 1760 at Constantinople, and for his translation of the works of Vauban, was raised to high official rank by Sultan Selim III., and was subsequently appointed hospodar of Moldavia in 1799, and of Walachia in 1802. His administration of the government of these provinces was marked by wisdom and energy; but his ill-concealed sympathies with Russia led (1806) to his dismissal and flight to Transylvania. Re-established in the government of Walachia by the Russians, he showed his hatred for the Porte by inciting (1807) the Servians to insurrection; but finding soon after that his allies, the Russians, had views and aims quite inconsistent with his, and unable to strive with both Russians and Turks, he took the oath of allegiance to the czar, and retired to Kiev, where he died 28th July 1816. He has left numerous works, composed in Italian, French, and Turkish.

His three sons, Alexander, Demetrius, and Nicolas, followed up the same course of policy. The eldest, ALEXANDER, born in 1783, served for some time in the Russian army, and was chosen by the 'Hetairists' as their chief in 1820. In promotion of the cause of Roman independence, he collected a large sum by subscription in Russia, and afterwards invading Moldavia, succeeded in raising an insurrection in both principalities. But, little suited by natural gifts to guide the movement he had originated, he was attacked by the Turks near Galatz, totally defeated, and forced to take refuge in Austria, where he was arrested and imprisoned. Released after a time, but broken in spirit by chagrin and privations, he retired to Vienna, where he died 31st January 1828.—His younger brother, DEMETRIUS, who was born 25th December 1793, also commenced his career in the Russian army, and joined his brother in his schemes for emancipating from servitude the Christian population of Turkey. Sent to Greece, armed with powers from his brother, he took a glorious part in the capture of Tripolitza (October 1820), but was less successful in the following year in his attack on Eubœa. His gallant defence of Argos against the Turks, stopped the victorious march of the latter, and gained (1823) for him the honorary titles of President of Argos, Prince of the Peloponnesus, President of the Legislative Council, and Senator. His stubborn resistance (1825) to the victorious Ibrahim at Napoli was another valuable service to Greece.

In 1827, the grateful Hellenes made him commander-in-chief of their forces; but some difference arising between him and the President, Capo d'Istria, he resigned his post in January 1830. He died at Napoli di Romania, 16th August 1832. Y. was insignificant in appearance, but had the soul of a hero; and was as deaf to the allurements of pleasure as to the promptings of ambition.

Y'SSEL or IJSSEL, a river of the Netherlands, formed by the junction at Doesburg, in Gueldres, of the Oude (*Old*) Yssel from Westphalia and the New Yssel, an offset of the Rhine, cut by Drusus. After this it flows north and latterly north-west past Zutphen and Deventer, forming part of the boundary between Gueldres and Oberyssel, and, passing Kampen, falls into the Zuider Zee, after a course of about 80 miles, forming at its mouth a delta, which is gradually increasing. The principal affluents are the Borket, the Schipbeek, and the Grift.—There is another river of the same name, a branch of the Rhine, in the province of Utrecht.

Y'STAD, a seaport town in the extreme south of Sweden, on the Baltic, in the laen of Malmöhus, and about 30 miles south-east of Malmö. The town is well built, and has a handsome market-place, two churches, a town-house, barracks, &c. There is a good harbor, and a brisk and improving trade is carried on, steamers plying to Stockholm, Lübeck, Kalmar, Stettin, Stralsund, and Copenhagen putting in here. It has manufactures of tobacco and snuff, chicory, soap, woollen cloths, and leather; there is also some shipbuilding. Pop. (1880) 7025.

Y'TTRIUM is a very rare metal, whose oxide is the earth *Yttria*, which is found in the Scandinavian mineral *Gadenolite* (a silicate of yttria, glucina, and an oxide of cerium and iron), in *Yttrotantalite*, and in one or two other very scarce minerals. Neither the metal, the oxide, nor the salts of the oxide are of any practical importance. According to Mosander, three bases have been confounded under the single name of yttria; to the most abundant of these he gives the name *yttria*, while he distinguishes the others as *erbia* and *terbia*.

YUCATA'N, See MEXICO.

YU'CCA, a genus of plants of the natural order *Liliaceæ*, natives of North and South America, and some of which are often cultivated in gardens on account of the singularity and splendor of their appearance. *Y. gloriosa* is a native of Virginia and of more southern parts of North America, but quite hardy in England. It has a stem about two or three feet high, the upper part of which produces a great tuft or crown of large sword-shaped evergreen leaves, each terminating in a sharp black spine. From the center of this crown of leaves arises the flower-stalk of three feet or upwards in height, branching out on every side so as to form a great panicle. The flowers are bell-shaped and drooping, white with a purple stripe on the outside of each segment of the perianth. The fibres of the leaves are used by the American Indians to make a sort of cloth and cordage.—The other species have a general resemblance to this in habit and appearance. The fibre of the *Yuccas* is similar to that of the *Agaves* and *Bromelias*, and probably is often included under the name *Pita Flax* or *Pita Fibre*.



Yucca gloriosa.

YUDHISHT'HIRA. See PAN'D'AVAS.

YUGA (from the Sanscrit *yuj*, join; kindred to the Lat. *jung*, the Gr. *zeug-*, Gothic, *juk;* hence, literally, junction) denotes, in Hindu mythology and astronomy, a long mundane period of years, which is preceded by a period called *Sandhyâ*, 'twilight,' and followed by a similar period called *Sandhyâm's'a*, 'portion of twilight.' Manu, the Mahâbhârata, and the Purân'as name four such periods, three of which have already elapsed—viz., the *Kr'ita-*, *Tretâ-*, and *Dwâpara-Yuga;* while the fourth, or *Kali-Yuga*, is that in which we live. The Kr'ita-Yuga, according to these works, consists of 4000 divine years, its Sandhy'â of 400, and its Sandhyâm's'a likewise of 400 divine years. The Tretâ-Yuga consists of 3000, and its Sandhyâ and Sandhyâm's'a of 300 divine years each; the Dwâpara-Yuga of 2000 divine years, with 200 such years to its Sandhyâ, and 200 to its Sandhyâm's'a; and the Kali-Yuga of 1000 divine years, with 100 such years to its Sandhyâ, and 100 to its Sandhyâm's'a. And since a divine year comprises 360 solar years of mortals, a year of men being a day of the gods, these Yugas, with their Sandhyâs and Sandhyâm's'as, would severally represent 1.728.000. 1,296,000, 864,000. and 432.000, or in the aggregate, 4,320,000 solar years of mortals—a period called Mahâyuga, or 'a great Yuga;' 4,320,000,000 years being a day and night of Brahmâ. See KALPA. The notion on which the theory of these Yugas and their Sandhyâs and Sandhyâm's'as is based, as may be easily inferred from the foregoing statement, is that of a descending progression, 4, 3, 2, 1, each of these units multiplied by 1000, and in the case of the periods preceding and following the Yuga, by 100 years. The deteriorating process thus indicated in the succession of these Yugas, is also supposed to characterize the relative physical and moral worth of these mundane ages. 'In the Kr'ita-Yuga,' Manu says, 'men are free from disease, attain all the objects of their desires, and live 400 years; but in the Tretâ and the succeeding Yugas, their life is lessened gradually by one quarter.' . . . 'In the Kr'ita-Yuga, devotion is declared to be the highest object of men; in the Tretâ, spiritual knowledge; in the Dwâpara, sacrifice; in the Kali, liberality alone.' See also for other passages the article KALIYUGA.

The present or Kaliyuga of the world commenced in the year 3101 B.C., when in the year 1867, therefore, 4968 years of the Kaliyuga would have expired. The term Yuga is sometimes also applied to other divisions of time. The Vishn'u-Purân'a, for

instance, mentions, besides the Yugas above named, a Yuga which consists of a circle of five years, called *Sam'vatsara Parivatsara, Idvatsara, Anuvatsara,* and *Vatsara;* and a Yuga, or cycle of five years, is, as Colebrooke states, likewise the cycle described in the astronomical treatises connected with the Vedas. The use of the term Yuga, however, in such a special sense is not frequent, whereas its application to the four mundane ages is that which generally prevails in the classical and medieval Sanscrit literature.

YULE, the old name (still in provincial popular use) for Christmas. It points to heathen times, and to the annual festival held by the northern nations at the winter solstice as a part of their system of sun or nature worship. In the Edda, the sun is styled *fagrahvel* (fair or shining wheel); and a remnant of his worship, under the image of a fire-wheel, survived in Europe as late at least as 1823. The inhabitants of the village of Konz, on the Moselle, were in the habit, on St. John's Eve, of taking a great wheel wrapped in straw to the top of a neighboring eminence, and making it roll down the hill, flaming all the way. The old Norse *hvel*, A.-S. *hveol*, have developed into Icel. *hiol*, Swed. and Dan. *hjul*, Eng. *wheel;* but from the same root would seem to have sprung old Norse *jol*, Swed. and Dan. *jul*, A. S. *geol*, Eng. *Yule*, applied as the name of the winter solstice, either in reference to the conception of the sun himself as a wheel, or, more probably, to his wheeling or turning back at that time in his path in the heavens. For the general nature of the festival, and the way in which the observances were overlaid, or transformed and masked by the Christian institution, see CHRISTMAS. The burning of the *Yule-log* (or *Yule-clog*) testifies to the use of fire in the worship of the sun (see BELTEIN).

YUNNAN, a province in the S.W. of China, bounded N.W. by Tibet and Burmah; N. by Szechuen; E. by Kweichow and Kwangsi; and S. by Annam, Laos, and Siam. The area of Y. is estimated at 108,000 square miles, and the population at 5,600,000. The general character of Y. is that of an extensive, uneven, highland plateau; between the leading ranges of mountains which run north and south are numerous deep defiles, and fertile valleys through which run some large rivers. The Yang-tze-Kiang skirts the northern border; and the south is drained by tributaries of the Irrawadi, the Salwen, the Mekong, and the Sonka, flowing through Burmah, Siam, and Tonquin. The soil is more fertile, the climate is milder (though often pestilential), and the land more thickly peopled in the south than in the north, where fogs and mists abound, and render the country almost uninhabitable. Minerals abound, but the mines are unworked; and owing to the absence of communication, there is little or no outside trade. The most practicable trade routes are by the Yang-tze from Shanghai, by the Canton River from Canton, and in the west by the route from Burmah by Bhamo on the Upper Irrawadi. Since 1836, there have been various attempts made by the British and French governments, and by private travelers, to penetrate to Y. from the south, and open up a trade route from the Indo-Chinese peninsula, through Burmah, the Laos country, or Tonquin. In an expedition from the Yang-tze to Burmah in 1875, Mr. Margary met his death at Manwyne, within the frontier of Y. Colquhoun and Wahab journeyed in 1882 from the Canton River to the Irrawadi, and saw a large tract of South Y. hitherto unexplored. In the unexplored recesses of Y., branches of the great Mongolian stock meet and mingle with the Burmese, Tai, Tibetan, Mon-annam, and other races. In 1855, the Mohammedans of Y. asserted their independence, and for a few years maintained it against China; but on the reconquest of the territory by the Chinese, and the murder of the Mohammedan ruler, the empire of the Panthays (q. v.) became extinct. These civil conflicts have been disastrous to the welfare of the country. The capital, Yunnan-fu, on the N. shore of Lake Chin, has considerable trade. See Anderson's *Mandalay to Momien* (1876), and Colquhoun's *Across Chrysê* (1883).

YVERDUN, or YVERDON (German, *Ifertem*), a well-built, industrious town in the Swiss canton de Vaud. It is 25 miles north of Lausanne, and is an important railway center. The old castle, built in 1135, was used by Pestalozzi as an educational institute; and at Y. the great French *Encyclopédie* was published. Pop. 6000.

YVETOT, an old town of France, in the dep. of Seine-Inférieure, is situated on an elevated and fertile plain, 23 miles north-west of Ronen. There are manufactnres of linen, cotton, calico, and velvet, and a considerable trade in cattle and agricultural produce. Pop. 8000. The town and territory of Y. was long a sovereign principality (till 1681), and the Lord of Y. was popularly styled 'Roi d'Yvetot.'

Z.

THE last letter of the English and other West European alphabets, had no place in the original Latin alphabet, but was adopted in the time of Cicero from the Greek along with *y* (*υ*), and thus stood last. In Greek, it had the sixth place, and had the power of a double consonant, being equivalent to *ds* or *sd;* in Latin, its use was confined to words of Greek origin. In High-Ger., in which it is pronounced like *ts*, it corresponds to *t* in the Low-Germanic and the Scandinavian tongues, e. g., *zeit* = Eng. *tide* (time). In Ital. *z* or *zz* mostly takes the place of the Lat. *ti*, as in *negozio* = *negotium, palazzo* = *palatium*, and is pronounced *ts*, or, preceded by *n*, *ds*. In Eng. and in Fr., it represents the flat sibilant sound of which *s* is the sharp. But in Eng., as in the vast majority of cases *s* has always been employed to represent the flat sibilant sonnd as well as the sharp (e. g., in almost all plurals, as *bones, cards*, in words like *revise*, &c.), there is a tendency to drop the nse of *z*, except in a few individnal words, such as *size, prize*. Many maintain the use of *z* in words derived from the Greek, especially from verbs in *izo*, as *baptize*, and also in words formed on the analogy of these, as *legalize;* but even the advocates of this rule do not act on it consistently, and the mere English scholar is fairly puzzled. This is one of the points of English orthography most urgently calling for return.

ZAANDAM, or SAARDAM, a town in N. Holland, is situated on both banks of the Zaan, at its entrance into the Ij (a deep and narrow bay of the Zuider Zee), now converted into land intersected by canals, bearing rich crops. Z. lies 5 miles north-west of Amsterdam on the other side of the bay. In former times, shipbuilding was largely carried on, but has nearly ceased. The whale-fishing, which, in 1701, employed 35 ships, has been abandoned. There is still a considerable shipping-trade. The principal industries are sawing wood, preparing vegetable oil—chiefly from colza—manufacturing paper, grinding grain, mustard, dyestuffs, snuff, &c., making starch, rope-spinning, and iron-founding. At a distance, the town looks like a forest of windmills. Z. is a pleasant place, and many of the inhabitants are reputed to be wealthy. In 1697, Peter the Great worked in one of the shipbuilding yards as a carpenter, and the house in which he lived is carefully preserved. It was visited in 1814 by the Emperor Alexander of Russia, and is now enclosed with another building to prevent exposure to the weather. There are two Dutch Reformed churches, one Lutheran, two Baptist, and two Roman Catholic churches, a Jewish synagogue, and several institutions for orphans and old people. Two public schools, a school of design, and two poor schools are maintained by the town. Pop. (1873) 12,026; (1875) 12,346.

ZABERN (the Roman *tabernæ*, tavern) is the name of three German towns on the west side of the Upper Rhine, one of which was French till 1870. The first two are in the Palatinate (Rhenish Bavaria)—viz., Berg-Zabern, a town of about 3000 inhabitants, on the Erlenbach, occnpied chiefly with agriculture and some small manufactures; and Rhein-Zabern, about four miles further east, on the same stream, with little more than 2000 inhabitants, noted for the two battles fought there and at the village of Jokgrin, abont two miles further south, between the Austrians and the French, 29th June and 20th August 1793.

The other, which, to distinguish it from these, is called Alsace-Zabern (French *Saverne*), till the war of 1870 in the French dep. Bas Rhin, is now capital of a circle in the German imperial territory Alsace-Lorraine. It is sitnated on the Zorn, which flows into the Rhine, on the Paris and Strasburg Railway and highway, and also on the Marne and Rhine Canal. The town contains a palace and college, and had (1880) 6605 inhabitants, employed in making

cloth, pottery, leather, and hardware, and in the transport of wood from the Vosges Mountains. It belonged in the 12th c. to the bishops of Metz, and afterwards to those of Strasbourg. There are still some Roman antiquities in the college. In 1696, the fortifications were razed. The stately palace was rebuilt by Cardinal Louis de Rohan, famous in the story of the Diamond Necklace (q. v.); it served in 1817 and 1818 as barracks for the Austrian army of occupation; in 1852 it became a home for the widows and daughters of the members of the Legion of Honor; and now it is again a barrack. The surrounding scenery is rich in ruins and picturesque effects. A spiral walk, called the Zabern Path, about nine miles long, leads, with many windings and 17 covered bridges, to the top of the Vosges, from which the spectator looks down on Alsace as a garden. The Pass of Zabern, or Saverne, which divides the Upper and Lower Vosges, is only 1325 feet high. The railway, the canal, the Zorn, and highway, all run side by side along the charming valley; and there is a constant succession of bridges, embankments, viaducts, and tunnels, throughout the 45 minutes' journey from Z. to Saarbourg.

ZA'BISM. In the article on SABÆANS (q. v.), we spoke chiefly of certain inhabitants of Arabia Felix, the 'Sabaioi' of the Greeks, or 'Sabæi' of the Romans. It appears that this name was, in the 4th c. A.D., superseded by that of Himyarites, and belonged to many tribes, that derived their descent from one Sabâ ('a descendant of Eber, or descendant of Noah'), who also was called Abd Shemesh—Servant of the Sun. These Sabæans, who considered themselves pure autochthons, in contradistinction to the immigrated tribes, have often been confounded with a number of other peoples of antiquity, and with professors of many forms of religious belief and speculation; in fact, the confusion that has sprung out of the unwieldy mass of information found respecting these many varieties, and which has been hopelessly mixed up by many generations of orientalists and theologians, is almost without parallel. We shall not here survey the manifold systems and theories that have been evolved from time to time, and handed down carefully, but we shall rather—in the main following Dr. Chwolson—enumerate the principal stages of Z. as it appears, considered as a religious phase of mankind. We must premise that we exclude at once those imaginary Zabians who were taken by the medieval Arabic, Jewish, and Persian writers to be identical with heathen or star worshipers, as well as those who, like the ancient Chaldæans, the ante-Zoroastrian Persians, the Buddhists, &c., were vaguely called by that name by Mohammedan and other writers of the 12th c. These writers all start from the notion that idolatry, star-worship, and Sabæism were identical, and they called nearly all those who were neither Jews or Christians, nor Mohammedans or Magians, heathens or Sabæans. Z. had then become, like Hellenism, from being a *nomen gentile*, an appelative. Confining ourselves to historical Z., we have to distinguish (1) the Chaldæan Zabians of the Koran. These are the 'Parsified' Chaldee heathens or non-Christian Gnostics—the ancestors of the present Mendaïtes, or so-called Joannes Christians, who live not far from the Persian Gulf, and speak a corrupt kind of Chaldee-Aramaic; and (2) the Pseudo Zabians, or Syrian Zabians (in Harran, Edessa, Rakkah, Bagdad), or, since 830—831 A.D., remnants of the ancient Syrian but Hellenized heathens. These disappear (as Zabians) since the 12th c., but perhaps still exist, under some other name, in Mesopotamia. It is those Pseudo-Zabians who spoke the most refined Syro-Aramæan dialect. They form the chief representatives of Z. emphatically deserving of the name.

The first named, or Chaldæan (Babylonian) Zabians, who transferred that name to the Harranic Zabians, and were of great influence upon the development of these latter's peculiar speculations, are the people meant under that designation by the Koran, and by the Mohammedans of this day. They are, as we said, also known as Christians of St. John, or Mendaïtes. Among the Nabathean heathens of the north-east of Arabia and the extreme south of Mesopotamia, near Wasith and Bassra, there arose, in the last decennium of the 1st c. A.D. a man named Elxai (Elchasai = Scythianus), born in the north-east of Parthia (probably an adherent of Zoroastrianism, perhaps also acquainted with Buddhism), and spread among them Parsee ideas and Parsee religious rites and customs. They called themselves Mendaïtes—i. e., Gnostics. Many of their religious legends and tales they adopted at a later period from their Jewish and Mohammedan neighbors—chiefly, it is presumed, with a view of making themselves less hated by the ruling Mohammedan powers. They received the name of Ssabiin from their constant washings, and purifications and baptisms. Their Arabic neighbors occasionally translated this word into the Arabic Al-Mogtasilah, 'those who wash themselves.' About a hundred years after the foundation of this sect by Elchasai, Manes was born of Mendaïte parents, and was brought up among the Mendaïtes. He remained faithful to this creed up to his 24th year, at which period he founded the new sect of Manichæans (q. v.), which did not at first depart so considerably from Mendaïsm as it did at a later period (see MANICHÆANS). To these aboriginal Zabians there succeeded, in 830 A.D., a totally different kind of sect under the same name—viz., the Harranian Syrians. They themselves derived their denomination from one Zâbî, who is variously called a son of Seth, son of Adam, or a son of Enoch or Idris, or a son of Methuselah, or of some fictitious Badi or Mari, a supposed companion of Abraham; while the Mohammedan writers, who, like the Greeks, endeavor to derive everything from their native tongue, either declare it to be derived from *ssaba*, 'to turn, to move,' because they turned to the paths of untruth, instead of that of the true religion—i. e., Islam; or, as the Zabians themselves sometimes explain it, 'because they have turned *to* the proper faith.'

Another Arabic derivation makes them take their name, still more absurdly, from a root *ssabaa* = to fall away from the proper religion, or to turn one's head heavenwards—i. e., for the purpose of worshiping the angels and the stars, &c. European scholars have for the most part followed either Brooke or Scaliger, who variously hold the name to have sprung either from an Arabic root, which would point to their having come from the 'east,' or, again, from the Hebrew word for 'Host,' viz., of heaven, which they were supposed to worship. The real state of the case, however, is that, whatever the derivation of the name, it did not originally belong to the Harranians, as we have stated already, but was assumed by them, for the purpose of evading the Mohammedan persecutions, from the people mentioned in the Koran.

But it is by no means easy to say who these so-disguised Harranians really were, and what, since it was neither Judaism, nor Christianity, nor Mohammedanism, nor Magism, their religion really consisted of. Former investigators mostly took them to have been a distinct race and people, and their religion to have been composed of Chaldaism, Parsism, Judaism, Christianity, Neo-Platonism, Gnosticism, and Cabbalistic speculations. This, however, is far from being the fact. Broadly speakly, they might perhaps best be described as Syrians, who, partly descended from Greek colonists, had been subject so long to Syrian influences that they became in a manner Syrianized. Their religion was heathenism, the old heathenism of their Syrian fathers, which had, with incredible obstinacy, resisted not only Christianity, but rendered even Mohammedan ill-will harmless by stratagem. There can, however, be no doubt about certain foreign non-pagan elements having crept into it during the early Christian centuries. Eclecticism prevailed at that period, and it was not only Greeks and Romans that found the influence of foreign, chiefly eastern, metaphysical speculation irresistible. But apart from that peculiar syncretism, we find many other new additions to Harran idolatry in the shape of Zabism. There are, first of all, a certain number of legends about biblical personages from whom they pretend to be descendants—legends which, it may be presumed, they only, for the nonce, permitted to belong to their sacred traditions.

There are further a number of laws of purity and impurity, and of sacrifices, which strongly remind of Judaism. Again, names of Greek and Roman gods, such as Helios, Ares, and Kronos, occur, a circumstance that perhaps may be explained from the prevailing tendency of the period of exchanging the names of native divinities for Greek and Roman names. Besides these foreign elements, there are certain metaphysical and physical views incorporated in their creed which are distinctly traceable to Aristotle, and finally, the theurgico-Neo-Platonic religious philosophy of heathenism, such as it is found in Porphyry, Proclus, Iamblichus, and the rest. All these apparently incongruous elements, however, infused into it by the circumstances of the period, do not prevent Z. from being in reality heathenism. Were further proof needed, we should find it in the words of a celebrated Zabian, Thabît ben Korra, quoted by Barhebræus, in the shape of a panegyric on the town of Harran and its heathenism, uttered, as Barhebræus says, in his 'purblind obstinacy.' After speaking of Christianity—not to its advantage—for some time, Thabît rejoices over the blessings that still belong to his native place. Harran, through its having kept itself utterly unsullied by that faith. 'We,' he continues (the Zabians or Harranians), 'are the heirs and progenitors of heathenism, which has once been gloriously spread over this globe. Blessed is he who bears his burden for heathenism's sake, with firm hopes. Who has civilized the world and built its cities, but the nobles and the kings of heathenism? Who has constructed the harbors and has made the rivers navigable? Who has taught the hidden science? To whom else has the deity revealed itself, given oracles, and told the things of the future, but to the most celebrated men among the heathen? . . . . Heathens have done all these things. They have brought to light the healing of souls; they have taught their salvation; they have also made manifest the art of healing the body; they have filled the world with institutions of government and with

wisdom, which is the highest good. Without heathenism, the world would be empty and poverty-stricken, and swallowed up by great misery.'

Without entering into a detailed account of the many sources whence our information is derived with regard to the creed itself, we shall briefly indicate that they are written in Arabic, in Hebrew, and in Greek. The former are the most copious; those in Hebrew are chiefly represented by Maimonides; and the Greek are ascribed to various pseudonymous writers, among whom figure Aristotle and Hermes Trismegistus. From their various, and, to a great extent contradictory statements, we owe the following indications regarding the principal points of this creed. The Creator, it teaches, is in his essence, primitivity, originality, eternity, One; but in his many manifestations in bodily figures, manifold. He is chiefly personified by the seven leading planets, and by the good, knowing, excellent, earthly bodies. But his unity is not thereby disturbed. It is, the Zabians say, 'as if the seven planets were his seven limbs, and as if our seven limbs were his seven spheres, in which he manifests himself, so that he speaks with our tongue, sees with our eyes, hears with our ears, touches with our hands, comes and goes with our feet, and acts through our members. Nothing, we are told, is more foreign to Z. than—what holds good of the creed of the Sabæans only—rude star-worship. Z., according to the authority of Sharastani, expresses the idea that God is too great and too sublime to occupy himself directly with the affairs of this world; that he therefore has handed over the ruling of it to the gods, and that he himself only takes the most important things under his special care; that, further, man is too weak to address himself directly to the Highest, that he therefore is obliged to direct prayers and sacrifices to the intermediate deities to whom the rule of this world is intrusted. Thus the veneration shown to planets, and even the worshiping of idols, is nothing but a symbolical act, the consequence of that original idea. There are many gods and goddesses in Z. of this intermediate stamp. It is not the planets themselves, but the spirits that direct and guide them and deliver them which are taken as deities of this kind—deities that stand to the spheres in the relation of soul to body. Apart from these, there are those gods who cause or represent every action in this world. Every universal natural deed or effect emanates from a universal deity, every partial one from a partial deity that presides over part of nature.

Everything that appears in the air, which is formed near the sky or arises from the earth, always is the product of certain gods, that preside over these manifestations, in such a manner that the rain in general, as well as every special drop of it, has a presiding numen. These spirits also mould and shape everything bodily from one form into the other, and gradually bring all created things to the state of their highest possible perfection, and communicate their powers to all substances, beings, and things. By the movement and guidance of these spiritual beings, the different elements and natural compositions are influenced in such a way that the tenderest plant may pierce the hardest cliff. He who guides this world is called the first spirit. These gods know our most secret thoughts, and all our future is open to them. The female deities seem to have been conceived as the feeling or passive principle. These gods or intelligences emanate directly from God without his will, as rays do from the sun. They are, further, of abstract forms, free of all matter, and neither made of any substance nor material. They consist chiefly of a light in which there is no darkness, which the senses cannot conceive, by reason of its immense clearness, which the understanding cannot comprehend, by reason of its extreme delicacy, and which fancy and imagination cannot fathom. Their nature is free from all animal desires, and they themselves are created for love and harmony, and for friendship and unity. They are not subject to local or temporal changes, and they rule the heavenly bodies, without finding the motion of the most heavy too heavy, or that of the lightest too light. Their existence is full of the highest bliss, through their being near to the Most High, whom day and night they praise, without ever feeling fatigue or lassitude, to whom they are never disobedient, but whose will they always fulfill with supreme delight. They have a free choice, and always incline to the good. 'These spiritual beings, our lords and gods, are our intermediators and advocates with the Lord of lords and God of gods.'

All substances and types of the bodily world emanate from the spiritual world, which is the one from which everything flows, and to which everything returns, and which is full of light, sublime and pure. These two worlds correspond to each other, and are to each other like light and shadow. The way to approach these gods, and, through them, the highest essence, is by purifying our souls from all passions, by keeping a strict guard over our words and deeds, by fasting, heartfelt prayer, invocations, sacrifices, fumigations, and incantations. By steadfastly persevering in these and similar acts of devotion, man may reach so high a step of perfection that he may communicate even directly with the Supreme Power. The planets, as the principal representative and intermediate gods, are to be carefully observed, especially as regards—1, the houses and stations of the planets; 2, their rising and setting; 3, their respective conjunctions and oppositions; 4, the knowledge of the special times and seasons, the hours and days of the ruling of special planets; 5, the division of the different figures, forms, climates, and countries, according to their dominant stars—the prevailing notion of the Zabians being, like that of the Chaldees and the sect of the so-called Mathematicians (according to Sextus Empiricus), as well as of the Neo-Platonists in general, that everything below heaven was subject, in a manner, to the influence of stars, or the spirits that inhabit and rule them. Every substance and every action, every country and every hour, has its special planetary deity. It is therefore well to study carefully the special conjunctions and figures, as well as the special mixtures of incense, which might cause the individual numen to be propitious. Thus, e. g., according to the Zabian belief, the first hour of Saturday stands under Saturnus, and it is therefore right and advisable to select at that time such prayers, seals, amulets, dresses, and fumigations as might be supposed to be particularly pleasing to that planetary god.

In order to address themselves to *visible* mediators, some of the Zabians are supposed to have directed their devotions to the stars themselves. But they soon found how futile a worship it was that addressed itself to things that appeared and disappeared in turn. They therefore manufactured permanent representatives of them in the shape of idols—idols wrought in as complete accordance as possible with the theurgical rules derived from the nature of the deity to be represented. They were of gold, to represent the sun; of silver, to indicate the moon. The very temples in which they were placed were of as many corners as were supposed to correspond to the form of certain stars.

We know but little with regard to the cosmogonical notions of the Zabians. Sharastani, one of our principal authorities, only quotes 'Agathodæmon' as his authority for their assuming five primeval principles, viz.: the Creator, Reason, the Soul, Space, the Vacuum. Out of these, all things are composed. According to another source (Kathibi), however, the Zabians assumed two living and active principles—viz., God and the Soul; further, a passive one, Matter; finally, two which are neither living nor passive—viz., Time and Space. Matter seems to have been held by them to be primeval and everlasting, and to it alone the existence of evil is attributable. God created the spheres only, and the heavenly bodies therein. It is these spheres (fathers) which carry the types or ideas to the elementary substances (mothers), and out of the combination, conjunction, and motion of these spheres and elements, the varying earthly things (children) are produced. Matter is, as we said, because of its defective nature, the source of evil, of ignorance, of folly; whilst the form is the source and fountainhead of the good, the right, the knowledge, and the understanding. Z. further assumes a renewal of this world after each great 'world-year'—a space of 36,425 ordinary years. At the end of these periods, the plants, the animals, and the men that had existed within it, cease to propagate themselves, and a generation of each of them, different from all previous ones, springs into life. How far this theory is identical with the Babylonian, Egyptian, and Indian theories on the same subject, we cannot here investigate; suffice it to call attention to the striking likeness apparent in them all.

Man, the Zabians teach, is composed of contradictory elements, which make him the vacillating, struggling creature he is. Passions and desires rule him, and lower him to the level of brute creation, and he would utterly lose himself, were it not for such religious rites as purifications, sacrifices, and other means of grace, by which he may be enabled to approach the great gods once more, and to attempt to become like unto them. There are different kinds of souls; or rather man's soul partakes partly of the nature of the animal soul and partly of that of the angelic soul. The soul never dies, and punishments and rewards will affect only it, but not everlastingly. But rewards and punishments will not be wrought in any other future world, but in this, only at different epochs of existence. Thus, all our present joys are rewards for good deeds done by us in former epochs; and the sorrows and griefs we endure, spring in the same manner from evil actions we committed at former stages. As to the nature of the general (world-) soul itself, they say that it is primitive, for if it were not so, it would be material, as every newly-created being partakes of the material nature. Yet a material soul would be an impossibility. 'The soul, which is thus an immaterial thing,' says Kathibi, 'and exists from eternity, is the involuntary reason of the first types, as God is the first cause of the intelligences. The soul once beheld matter, and loved it. Glowing with the desire of assuming a bodily shape, it would not again separate itself from that matter of which means the world was created. Since that time, the soul forgot itself, its everlasting existence, its original abode, and knew nothing more of what it had known before. But God, who turns all things to the best, united it to matter, which it loved, and out of this union the heavens, the elements, and other composite things arose. In order that the soul might

not wholly perish within matter, he endowed it with intelligence, whereby it conceived its high origin, the spiritual world, and itself. It further conceived through it that it was but a stranger in this world, that it was subject to many sufferings in it, and that even the joys of this world are but the sources of new sufferings. As soon as the soul had perceived all this, it began to yearn again for its spiritual home, as a man who is away from his birthplace pines for his homestead. It then also learned that, in order to return to its primitive state, it had to free itself from the fetters of sensuous desires, and from all materialistic tendencies. Free from them all, it would regain its heavenly sphere again, and enjoy the bliss of the spiritual world.'

From all this, it will be seen, as we stated at the outset—that the Zabians, about whom so much has been theorized and fabled, were simply heathens who had to a certain extent adopted and modified Neo-Platonic ideas, such as floated in the mental atmosphere of the early Christian centuries. It would be needless to enter into a discussion about the semi-fabulous personages to whom they ascribe the foundation of their creed, such as Agathodæmon, Arani, Hermes, and the rest; or some of those mentioned by other writers, such as Zerdusht, Nawassib, Orpheus, and the rest.

The life of this sect was but short. After having first been on terms of great friendship with the ruling powers of Mohammedanism as well as with Christians and Jews, and having filled many of the highest and most responsible posts at the courts of the kalifs, they were by degrees made the butt of fanaticism and rapacity. Muleted, persecuted, banished at different periods, they disappear from history since the middle of the 11th century. Some obscure remnants of them seem to have survived in remote corners of Mesopotamia, but they, too, no longer adhere to the original creed, but are mixed up with the Meudaïtes, mentioned above, and the Shemsijeh, or sun-worshipers. Thus obscurely ended a sect which, for 200 years, had produced a host of men pre-eminent in every branch of learning and literature, in philosophy, astronomy, history, natural history, poetry, medicine, and the rest. Many of these men, whose name and fame reached Europe, were confounded with their Mohammedan contemporaries, chiefly because they lived in Bagdad, at that time the center of learning, the seat of the kalifs and the high dignitaries of state. The Mohammedans, however, had so high an appreciation of Zabian learning, that it became proverbial amongst them, and they could explain it only by tracing it to a supernatural source, notably to Hermes (Trismegistus), the father of the Zâbî, mentioned above.

We have in our sketch mainly followed Chwolson, who, aided by profound learning and acumen, has been the first to clear up the nature of Z., this terrible stumbling-block of many generations of investigators.—For detailed information on it and all the many other points connected with it, we must refer our readers to the large work in which he has embodied the results of his investigations, *Die Ssabier und der Ssabismus* (2 vols. St. Petersburg, 1856). See also NEO-PLATONISTS, GNOSTICS.

ZACATE'CAS, capital of the Mexican state of that name, is situated in the windings of a deep valley or ravine, between high hills, about 320 miles north-west of Mexico. It is built over a vein of silver, which has been deeply explored. The streets are narrow and crooked, but it has a fine appearance from a distance, owing to the size and massiveness of its churches, and the elegance of some of its residences. There are also a college, a gunpowder mill, and a mint. Pop. 30,000.

ZACHARIAS, a Roman pontiff, successor of Gregory III. in 741, who is noticeable as one of the series of Greek prelates by whom the destinies of Rome and Italy were much influenced in the 7th and 8th centuries. The name of Z., moreover, deserves honorable mention in connection with a work of benevolence and charity, which the Roman Church afterwards consecrated by intrusting it to a special religious order—viz., the redemption of captives from the pagan masters by whom they had been held in slavery. During the troubles arising out of the Lombard invasion, Z., by his interposition in more than one instance in favor of the city of Rome with the Lombard kings, contributed to that prestige of the Roman see, which eventually led to its obtaining the leadership of Italy, and in the end the temporal sovereignty of Rome and the adjoining territory. Z. died at Rome on the 14th March 752.

ZADO'NSK, a town of Russia, in the government of Voronej, 50 miles north of the town of that name, and about 230 south of Moscow, on the left bank of the river Don. Pop. (1880) 9100. The trade of the town is not extensive, owing to the close neighborhood of the commercial towns Eletz and Voronej. The manufactures are insignificant. Z. possesses a renowned cloister.

ZAFARA'N-BO'LI, a town of Asia Minor, in Anatolia, about 190 miles east-north-east of Scutari, at the junction of two small affluents of the Chati-su. It has four handsome mosques, a church, large baths and khans, and extensive suburbs. It has a considerable trade in saffron (whence its name), which is cultivated extensively in the surrounding country. Pop. supposed to be about 15,000.

ZAFFRE, crude oxide of cobalt, made by roasting cobalt ore and reducing it to powder, with the addition of about three parts of the finest white sand used by glass-makers. It is extensively prepared in Saxony, and is often imported into Britain. When fused into a glass, it is intensely blue, and is much used by enamelers and porcelain manufacturers as a blue color.

ZÄ'HRINGEN, a small village near Freiburg, in Baden, in the Breisgau, formerly a province of Austria, but annexed to Baden in 1805. It is historically noteworthy for the ruined castle from which the Dukes of Zähringen took their name, the ancestors of the reigning House of Baden (q. v.). The Hapsburgs (q. v.) are traced to the same stock. Guntram or Gunthrun the Rich, Count of Breisgau—son of the famous Erchanger, who raised himself to the dignity of Duke of Swabia and was beheaded for treason in 917—is assumed as the founder of the House of Zähringen. The Zährings claim to be descended from his eldest son, Gebhard; the Hapsburgs, from the younger, Langelin. After the death of Duke Berthold I., 1077, the House was divided into two lines—the ducal or Zähring line, which became extinct in the male line in 1218, with Berthold V., the founder of Bern; and the markgraf or Baden line, from which the present House of Baden is descended. The ducal Zährings exercised a beneficent sway over a great part of Switzerland.

ZAIRE. See CONGO.

ZA'MA, a city and fortress in Numidia, about 300 miles south-west of Carthage, near which Hannibal was defeated by the Younger Scipio, 201 B.C. The flower of Hannibal's forces consisted of a small veteran army that had shared his fortunes for many years; most of the rest were of inferior quality, of many races, variously organized, and of suspicious fidelity. But his greatest deficiency was in cavalry, an arm with which he had repeatedly decided the victory in former battles. In Scipio's army, on the other hand, Numidians, under Masinissa, were present in overwhelming numbers. The onset of Hannibal's elephants, of which he had 80, was defeated and made worse than useless by the wise precautions of Scipio; the cavalry on his flanks were scattered by the furious charge of Masinissa and Lælius; his front line of mercenaries beaten back by the more numerous and better-disciplined Romans. His veteran infantry, hemmed in on all sides, fought with the courage of despair, and were cut to pieces. Hannibal having done everything, both before and during the battle, which could secure the victory, escaped with a few horsemen. Of the Carthaginians, 20,000 were left dead on the field, and an equal number taken prisoners. Of the victors, 2000 fell in the action.

ZAMBE'SI RIVER AND REGION. The extensive region in South-east Africa, known to medieval geographers under the general name of the empire of Monomotapa, is shown on old maps as drained by a river called Zambese, or Zambere, on the banks of which appear large towns, of which the mythical 'Vigita Magna' was supposed to be the most famous. The course of the stream, which is the modern Z., is, however, pretty correctly delineated, and even a small lake is shown in connection with it, not far from the real position of Lake N'gami, whose existence we only became aware of a few years ago, and which we now know may be considered one of the most southern collections of inland waters which communicate with the Z. River and the more eastern lakes. The Nyassa or Maravi, as well as the more northern lakes, Victoria N'yanza and Tanganyika (the latter in connection with the Nile basin), are also given with such a degree of accuracy that it plainly shows, that in compiling these early maps, the distinctive features of the region must have been well known—principally, it is supposed, from Arab sources, various settlements of that people inhabiting the east and south-east coast of Africa from the Red Sea to Sofala.

Although the lower region of the Z., for a distance of at least 300 miles from its mouth, has been in possession nominally of the Portuguese since the beginning of the 16th c., forming the captaincies of Rios di Senna, Tete, and Quilimane, yet it is only within the last few years, through the indefatigable exertions of Dr. Livingstone (1851—1856, and 1858—1864), Mr. Oswell, Dr. Kirk, Mr. T. Baines, Mr. James Chapman, Charles Andersson, Major Pinto, and other explorers, that we have got anything like an accurate or scientific idea of this vast region, which extends from 8° to 21° of S. lat., and from 14° to 37° of E. long.; and the total length of what may be considered the main stream (called Leambye in its upper course), from its mouth to the point shown on Dr. Livingstone's map, where the Leeba River, which proceeds from Lake Dilolo—on the summit of the watershed which divides the rivers running north-west into the Atlantic from those running south-east into the Indian Ocean—joins it, cannot be less than 1200 miles.

The river-basin of the Z. is coterminous, on the north, with a

large area of the Congo River system, and the great lakes that drain into it; on the south and west, an obscurely marked watershed, crossing the Kalihari Desert, separates it from the Orange River basin and the rivers that run through Ovampo Land into the Atlantic; while on the south-east, a well-defined mountain-range divides the rivers flowing into the Z. from those which form the Limpopo River, running into the Indian Ocean.

The name of Z. is preserved from the mouth of the river, or rather a short distance above it, to the junction of the main stream with the Chobe, in lat. 17° 31′ S., long. 25° 13′ E. Thence to its junction with the Leeba (Liba), coming from Lake Dilolo, the Z. is called Leeambye (Liambai); and at the junction (lat. 14° 10′ S., long. 23° 35′ E.) it turns suddenly to the north-east. Part of the basin of the upper Z. was explored by Major Serpa Pinto in 1878–79. Crossing from the west several of the headwaters of the Cubango (Andersson's Okavango), formerly thought to connect with the Z., Pinto found that the source of the Cuando (Kwando —Livingstone's Chobe), the chief tributary of the Z., is about lat. 13° S. and long. 19° E. He passed several of its upper branches, and descended to the Leeambye by another tributary called Nhengo. The Cuando is a fine large stream, draining a large area of fertile country, and receiving several navigable affluents. Lake Dilolo, from which the Leeba flows, seems to have an outlet both to the north and to the south. The northern outlet probably runs into one of the tributaries of the Congo.

In the region where the Leeba joins the Leambye, the main stream is often as wide as the Thames at London Bridge, and perhaps as deep. From the confluence to the Victoria Falls, there are many long tracts over which vessels as large as the Thames steamers could freely ply. But there are serious obstacles in the way of anything like navigation for hundreds of miles at a stretch —as seems now to be possible on the Congo (Livingstone) above the Yellala Falls. Large areas in this region are liable to be flooded, and to stand under water for considerable periods at a time.

This part of Central South Africa may be considered as an extensive plateau or table-land, from 3000—4000 feet above the sea-level, with an outer fringe or border of basaltic rocks, cutting through which, the Z. River forms one of the most striking scenes in the physical geography of the universe—namely, the Victoria Falls of Livingstone, or Mosiotunya, or 'Smoke sounds there' of the natives. Here, a few miles to the east of where the Chobe joins the Z., the latter—a stream of 1000 yards in width—plunges down into a chasm more than 100 feet deep, forming an immense crack in the basaltic rock at right angles to its course, and is carried along in a narrow channel some 30 miles in the same direction. Within a distance of 220 miles above the falls, the river has seventy-two cataracts and rapids.

The Cubango (the Okavango of Andersson), draining a large district of the Benguela highlands, was supposed to run into the Z.; but according to Pinto it passes through Lake N'gami, and emerging as the Botletle, ends in the Makarikari, an enormous basin into which many rivers run and are evaporated. In its lower course the Z. varies in width from 500 yards to two miles and more, in the rainy seasons.

From the Portuguese town of Tete downwards, it is navigable, although with difficulty in the dry season; and it passes through one or two narrow rocky gorges in the Lupata Mountains, which form ugly rapids, except when the river is in full flood. About 80 miles from the mouth, it receives from the north the waters of the Shire, which runs out of Lake Nyassa, the Maravi of old geographers, an extensive sheet of water above 300 miles long, and 50 miles across at its widest part, extending between lat. 11°—14° 30′ S., and it enters the low country about 50 miles from the ocean, where it divides into many branches, forming a large delta, of a very unhealthy character. The most northern stream is called the Kwaka, or Kilimane, or Quilimane River; and the most southern and deepest channel, the Luabo. At Kilimane, or Quilimane, about 18 miles from the sea, is the residence of the Portuguese governor of the region; but there are various other entrances used by slavers and contrabandists, which are not very accurately laid down in our charts; and it is both difficult and dangerous to enter the river without a competent pilot.

The Victoria Falls are estimated to be 2500 feet above the sea-level. Tete is considered to be 400 feet; and the rapids of Lake Nyassa, where the Shire issues from it, are 1552 feet above the same; while Lake Shirwa, a smaller lake, south-east of Nyassa, is 2000 feet.

The natives inhabiting the coast region drained by the Z. must be considered of the pure negro type; while the Makololo, who were found in the central and upper country, belong to the Betjuana family. According to Major Pinto this tribe has now ceased to have a separate existence. In the reign of the third king of a dynasty of conquerors, the Lunas, the former masters of the country, again came into possession, and early in 1878 the remaining Makololos were put to death. On the Upper Z. between the Cuando and Cubango, Major Pinto discovered the Mucassequares, a tribe of Ethiopian origin, of a yellowish white color. The Zulu tribe of Amatabele, under Mosilakatze, who inhabit the high region dividing the Limpopo from the Z. basin, have overrun and conquered nearly all the tribes south of them. The slave-trade is actively carried on in the countries nominally claimed by the Portuguese; unsuccessful attempts were made a few years ago to plant an episcopate and civilize the natives, through the influence of missionaries.

All the usual tropical productions are found, but owing to the disturbed state of the native tribes, are but little cultivated. The animal kingdom is very similar to that of the adjacent regions of South Africa; and an immense quantity of ivory is exported both from the west and east coasts. The prevalence of the Tsetse (q. v.) makes traveling difficult in the interior. Extensive coal-fields exist, and gold is found in the neighborhood of Tete and Senna.—See the *Travels* of Livingstone; T. Baines's *Explorations;* Andersson's *Okavango; to the Victoria Falls of the Zambesi*, by Ed. Mohr (1876); and Major Serpa Pinto's *How I crossed Africa* (1881).

ZA'MIA, a genus of plants of the natural order *Cycadaceæ*, of which the species are found in the tropical parts of the world. They have a tree-like stem, with a single terminal bud and pinnate leaves. The wood consists of concentric circles, with very loose cellular zones between them. The male and female flowers are on separate plants, in tessellated catkins, the scales of which differ in form in the male and female plants. The central part of the stem contains much starch, especially in old plants, and a kind of sago or arrowroot is made from some of them. The central part of the stem of the Bread-tree (*Z. cycadis*), of South Africa, which is about six or seven feet high, with a scaly stem, is much used as an article of food by the Kaffirs and Hottentots, who prepare it by wrapping it in a skin well rubbed with grease, burying it in the ground until it undergoes putrefaction, bruising it between two stones, making it into cakes, and baking it in wood-ashes. There are numerous fossil species of Zamia. Closely allied to it is the fossil genus *Zamites*.

ZAMIO'STROBUS, the generic name given to several cones from the Secondary and Tertiary strata, because they were supposed to be the fruits of fossil zamias. But Mr. Carruthers has shown (*Journal of Botany*, January 1867) that they belong to true Coniferæ. He has, however, in the same paper, described six species of fruits belonging to zamia-like cycads, to which he has given the generic title of *Cycadeostrobus*. They are all from the Secondary rocks. No cycadean remains whatever have yet been found in newer deposits.

ZA'MITES, the generic name under which are included numerous forms of zamia-like leaves which occur in Secondary strata. No certain traces of the trunks have yet been found associated with them, and only one species (*Z. gigas*) is accompanied with fruit, and this is so anomalous that it casts considerable doubt on the determination of the affinities of the foliage.

ZAMO'RA, a very ancient town of Spain, capital of the province of that name, is situated 40 miles north of Salamanca, and 132 north-west of Madrid, on the right bank of the Douro, which is here crossed by an old stone bridge. It is the see of a bishop suffragan of Santiago. Z. was of great importance in the Moorish times, and is said to have been enclosed by seven lines of walls, with a moat between each. It is entered by seven gates, is surrounded by a wall, has a massive square tower with Norman arches, and many interesting remains of mediæval architecture. *La Magdalena*, a church of the Templars, but afterwards belonging to the order of St. Juan of Jerusalem, is a simple solid edifice of the 12th c., slightly modernized. There are 20 other churches, besides a theological school, barracks, a prison, a normal and other schools, a library, museum, &c. It has manufactures of serges, linens, leather, hats, liqueurs, brandy, and a considerable trade in wine and grain. Sir J. Moore urged the Junta of Salamanca to repair the defences of Z., and receive there his stores, but his retreat had commenced before they had done deliberating. Had Z. been made tenable, Moore would have fallen back on it, instead of on Corunna. The French afterwards got possession of it, and although no resistance was made, the town was sacked, neither age nor sex was spared, and the principal persons were executed. It was again plundered by the French, and has never recovered these visitations. Pop. 14,000.

ZA'MOSC, one of the most strongly fortified towns of Russian Poland, in the government of Lublin, 45 miles south-east of Lublin, and 140 south-east of Warsaw, surrounded by water and a marsh. All the houses are built in the Italian style with arcades. There is a large and beautiful castle opposite the former university, town-hall and arsenal, four churches, monasteries, theater, &c. There are beer and porter breweries. Pop. (1880) 8733.

ZAMOUSE (*Bos brachyceros*), a species of ox or buffalo, found in the tropical parts of Western Africa. It is the *Bush Cow* of Sierra Leone. It differs from the buffalo and all other *Bovidæ* in several important particulars, especially in the very large size and

peculiar fringing of the ears, and in the total want of dewlap. The forehead also is flatter than that of the buffalo. The color is nearly uniform, a pale chestnut. The hair is thin, and nearly erect. The ears have three rows of long hairs springing from the



Zamouse (*Bos brachyceros*).

inside, and a tuft of long hairs at the tip. There is a considerable space on the forehead between the horns, which are not long, extend outwards and upwards, are suddenly incurved, and very sharp.

ZA'NESVILLE, a city of Ohio, U. S., on the left bank of the Muskingum River, and opposite the mouth of Licking River, 54 miles east of Columbus, is a regular well-built town, in a beautiful and fertile valley, with steamboats to the Ohio, and several railways. An iron railway bridge of 538 feet crosses the river, and bridges connect it with its suburbs, Putnam and South and West Zanesville. It has abundant water-power, and rich coal and iron mines; cotton, woollen, nail and glass factories; iron foundries, 22 churches, public and free high schools; 5 or 6 newspapers; &c. Pop. (1860) 9229; (1870) 10,011; (1880) 18,113.

ZANGUEBA'R. See ZANZIBAR.

ZA'NTÉ (ancient *Zacynthus*), one of the principal Ionian Islands, about 9 miles from the west coast of the Morea, and 8 south of Cephalonia, is about 24 miles long, 12 broad, and has a superficies of 156 sq. miles. The greater part of the island consists of a plain, stretching from north to south, with a breadth of from 6 to 8 miles, bounded on the west by a line of hills. The vine is extensively cultivated on the plain, and the wine produced is considered to be of a superior quality. Currants, produced from a dwarf species of vine, originally brought from Corinth, are the staple product, 14,255,764 lbs. being exported in 1876. Pomegranates, olives, melons, peaches, and citrons also are grown.

Z. is said to have been colonized by Achæans from the Peloponnesus; and it is mentioned in Homer with the epithet 'woody,' which, however, is not apt at the present day, although it is justly called, in an Italian proverb, 'the flower of the Levant.' It is subject to frequent earthquakes, which, it would seem, are likely to recur about once in 20 years. The most notable mineral feature of Z. is its pitch-wells, described by Herodotus, which are situated about 12 miles south of the town of Z., in a marshy district. Pop. (1879) 44,522.—ZANTE, the capital, is the largest town in the Ionian Islands, and is situated at the head of a small bay or harbor on the east coast, on the site of the ancient town, of which the only remains are a few columns and inscriptions. The houses stretch along the semi-circular outline of the bay to the distance of a mile and a half, and extend up the slope of the castle-hill. Most of the streets are narrow, but clean, and the older houses built in the picturesque Venetian style; the huge lattices of wooden framework, resembling those employed in eastern harems, with which the windows used to be fitted, are being rapidly abolished. The principal street is broad and handsome, the churches are numerous, and the market-place spacious. The harbor of Z. has been greatly improved of late years; it is now protected by a long mole, and has a light-house, but is still somewhat exposed and insecure. A magnificent and extensive view is obtained from the citadel in the highest part of the town. Z. is the see of a Greek protopapas, and of a Roman Catholic bishop. Pop. 17,000.

ZANZIBA'R, or ZANGUEBAR. The territories of the Sultan of Z. comprise all that part of the east coast of Africa included between Magdashooa, situated in 2° N., and Cape Delgado in 10° 42′ S. lat. They are bounded on the N. by the independent tribes of Somal and Gallas, and on the S. by the Portuguese province of Mozambique. The extent of the coast is about 1100 miles, and parallel to it are numerous islands, the most important of which are Zanzibar, containing the capital of the same name, Pemba, and Máfia (Monfia on the charts). The territories on the mainland have no defined limit towards the interior, being occupied by heathen tribes, over whom the sultan's authority is hardly even nominal beyond the sea-board.

The soil along the coast is fertile in rice, millet, peas, beans, melons, pumpkins, the sugar-cane, cocoa-nut, banana, plantain, &c., and the forests supply the caoutchouc tree and many valuable species of timber. Cattle, sheep, and fowls are plentiful, and tropical wild animals abound. Rice, sugar, molasses, ivory, gums, gold, and cowries are exported. The heat on the coast is excessive, and the climate very unfavorable to Europeans. The name Z. is applied to the coast from 4° N. to 12° S.

The island of Z., by far the richest and most important part of the sultan's dominions, is distant from 20 to 30 miles from the African coast; it is about 48 miles in length, and from 15 to 30 in breadth. It contains an area of about 400,000 acres, and the soil is in most parts of exceeding fertility; being covered with woods and plantations, and the frequent rains causing perpetual verdure, it everywhere presents a delightful appearance. It is very flat, the highest point being not more than 300 feet, composed entirely of coral, and abundantly watered by rivulets, which flow at all seasons of the year. The principal products are cocoa-nuts, cloves, rice, sugar-cane, manioc, millet, and fruits in the utmost abundance, especially oranges of the finest quality, which can be purchased at the rate of 1000 for four shillings. The island is intersected by paths and green lanes in every direction, affording a never-ending variety of pleasant walks and rides. The country-houses of the Arab proprietors, and the huts of their slaves, are thickly dotted over the surface, surrounded with gardens and fields. The hedgerows are covered with flowering creepers, and pine-apples grow amongst them in wild profusion. In many parts are glades of undulating grass-land, of park-like appearance, dotted with gigantic mango trees; the ponds are covered with rushes and water-lilies; and the air is perfumed with the blossoms of the orange and clove. The pop. of the island is estimated at about 100,000. The town contains about 60,000 permanent inhabitants; while probably from 30,000 to 40,000 strangers come from Arabia, India, and the northern parts of Africa during the season of the north-east monsoon.

The chief people are the Arab landed proprietors, who form a sort of aristocracy, possessing large plantations and numerous slaves; besides these, there are slaves, free blacks, natives of the Comoro Islands and Madagascar, and from 5000 to 6000 natives of India, who keep nearly all the shops in the town, and through whose hands nearly all the foreign trade of the place passes. The language of the court and of the Arab population is Arabic, while the slaves and the free black population speak a dialect called *Kisawahéli*, one of the great family of South African languages.

The climate of Z. is extremely equable and salubrious, the thermometer having probably never risen as high as 90°, nor fallen lower than 70°. Nearly 200 inches of rain fall during the year, of which half at least falls in March, April, and May.

The capital is extensive, but, like most oriental towns, it is narrow, irregular, and ill built; the houses of the principal inhabitants, and of the European residents, are large flat-roofed buildings, generally with an interior courtyard; and some of them, and especially the palace of the sultan, may almost claim to be magnificent.

The trade is very considerable. In 1875 it was estimated as follows: Imports, £600,000; exports, £580,000. The imports consist of cotton goods, brass wire, beads, arms, &c.; and the exports of gum-copal, cloves, ivory, cocoa-nut oil, sesame, dye-stuffs, and a great variety of other articles.

The sultan has a small standing army of about 1400 paid soldiers, capable of increase by conscription and recruiting. The fleet, which, in 1871, consisted of a sailing frigate of 24 guns, 1 corvette (21 guns), 1 steam corvette (9), and 2 yachts (6 and 4 guns), was almost entirely destroyed in the hurricane of 1872. The earliest settlement of Arabs on the east coast of Africa occurred about 924 A.D.; and for several centuries, flourishing republics, governed by elders, elected by the citizens, existed along the coast. Vasco da Gama visited Z in 1499, and in 1503 the dominion of Portugal was recognized by the inhabitants, who agreed to pay an annual tribute; but the Portuguese never held it for very long periods. About 1735 A.D., they were finally expelled, and in 1784, the island was taken by the Imaum of Muscat, in whose family the government remained until the death of Seyed Saeed bin Sultan, in 1854, when the Arabian possessions fell to his son, Seyed Thoweni, and Z. and its dependencies to Seyed Majid (died 1870), elder brother of the present ruler, Seyed Barghash, who has entered into treaties with Great Britain for the suppression of the slave-trade, and who visited England in 1875.

ZA'RA (ancient *Jadera*), the chief town of Dalmatia, on the coast of the Adriatic, 73 miles north-west of Spalatro, and about 128 south-east of Trieste. Till 1873, Z. was strongly fortified. It is built in the form of an oval, on a narrow promontory separated from the mainland by a moat, across which is a drawbridge. The town is entered by two gates, one from the sea, called Porta-Marina, supposed to be partly of Roman construction; and one from the landward side, called Porta-di-Terra-Firma.

The ramparts, of Venetian construction, and partly planted, afford a fine promenade to the inhabitants. There is a spacious and well protected harbor, which, however, is somewhat shallow. The streets are generally narrow and ill paved, and the drainage defective; the town is not well supplied with water. Of its churches, the most noteworthy are its cathedral, founded by Henry Dandolo, Doge of Venice, and the church of the patron saint, St. Simeon. There are many convents and monasteries; a lyceum, gymnasium, and other schools; a barrack, and a naval and military arsenal; hospitals, a theater, museum, and other public buildings. There is a lofty marble column, which is all that is left standing of an ancient Roman temple; there are also the remains of a Roman aqueduct. Z. is the seat of the government of Dalmatia, and the see of a Roman Catholic archbishop. The commerce is unimportant. Many of the inhabitants are engaged in fishing and in the coasting-trade. The chief manufactures are rosoglio, maraschino, leather, silk and linen fabrics. Pop. (1880) 11,861, Italians by descent, and speaking the Italian language. Anciently, Z. was the capital of Liburnia, in Illyricum; and under Augustus it was made a Roman colony.

ZARAGOZA. See SARAGOSSA.

ZARAI'SK, a Russian town, in the government of Riazan, 32 miles north-west of the town of Riazan, and 80 south-east of Moscow, a few miles from the right bank of the Oka, a tributary of the Volga. The town was founded in the 13th c.; and in 1531, Ivan the Terrible erected on the site of the old fortifications a strong fortress, which thrice resisted the assaults of the Tartars, and which still exists. Another noteworthy object is the Cathedral of St. Nicolas, which dates from 1631. There are manufactures of soap and candles, as also several tanneries and breweries; these, however, produce only sufficient to meet the wants of the inhabitants. The commerce of the town has greatly declined since 1847, when the new road of Riazan was opened, leaving Z. out of the way. Pop. (1880) 5050.

ZA'RSKOE-SE'LO, or SAINT SOPHIA, a town of Russia in the government of St. Petersburg, and seventeen miles south from the city of St. Petersburg, with which it is connected by a railway. It has a college and a military school. The palace of Z. is a summer residence of the emperor, founded by Peter the Great in 1710, and the favorite abode of Catherine II. The church of St. Sophia is a miniature copy of the mosque of that name at Constantinople. Population in 1867, 6741.

ZE'A (ancient *Ceos*), an island of the Grecian Archipelago, one of the Cyclades, 13 miles east of Cape Colonna; 14 miles in length, and 8 in greatest breadth. It is somewhat egg-shaped. Its surface rises from the coast in terraces, culminating in the center in Mount St. Elias, whose lat. is 37° 37′ N., and long. 24° 21′ E. The climate is healthy, and the soil fertile. The products are wine, fruit, barley, cotton, and silk. Attention is paid to the rearing of cattle and silkworms. Pop. 4300. Pliny says that Z. was once united to Eubœa, but that four-fifths of it were carried away by the sea. Z. was the birthplace of the lyric poets Simonides and Bacchylides. The island once possessed four towns, but there is now only one, *Zea*, situated on the north-west slope of the hill, about 3 miles from the coast, on the site of the ancient *Iulis*, of which the most important remain is a colossal lion, about 20 feet in length, lying a short distance east of the town. A few remains are also still to be found on the sites of the other three ancient towns. The harbor of Z., Port St. Nicholas, about 3 miles from the town, admits the largest vessels, and is well frequented.

ZEA. See MAIZE.

ZEBI'D, a town of Arabia, district of Yemen, on the river Zebid, 15 miles from its mouth, 115 miles south-west of Senaa, and 60 north of Mocha. The town is of great antiquity, on account of which and of the dark color of the bricks of which it is built, it has a somewhat gloomy appearance. Z. is strongly fortified, being surrounded by high walls, said to be a league in circuit, flanked with numerous towers. It possesses a large mosque, with an elegant octagonal tower. Z. was formerly a place of much commercial importance, but it has declined into comparative insignificance, owing to the accumulation of sand in the mouth of the river. Pop. 7000.

ZE'BRA, a name sometimes given to all the striped *Equidæ*, all of which are natives of South Africa, and thus including the Dauw (q. v.) and Quagga (q. v.); but also, in a more restricted use, designating a single species, *Equus* or *Asinus Zebra*, a native of the mountainous districts of South Africa. In the whole group, the characters more resemble those of the ass than of the horse; the tail is furnished with long hairs only towards the tip, and the hind-legs are without warts; the neck is full and arched; the mane stands erect. The Z. is about 12 hands high at the shoulder. It is of a light and graceful form, with slender limbs and narrow hoofs; the head light, the ears rather long and open; the ground color white, or slightly tinged with yellow; the head, neck, body, and legs striped with black, the neck and body transversely, but not regularly; the head with bands in various directions, the legs with irregular cross stripes. The Z. lives in small herds, inhabiting the most secluded spots. Its senses of sight, smell, and hearing are very acute, and the least alarm is sufficient to make a whole herd scamper off, with pricked ears and whisking

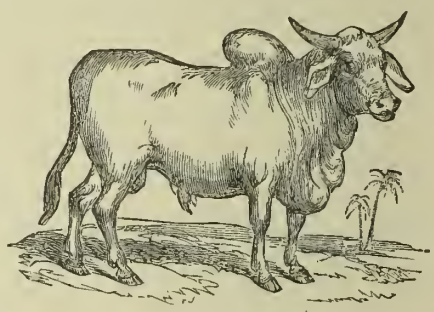


Zebra (*Asinus Zebra*).

tails, to inaccessible retreats among the mountains. When attacked, however, and compelled to defend themselves, zebras do it vigorously, the herd forming in a compact body, with their heads towards the center, and their heels towards the enemy, repelling even the lion and leopard by their kicks. The Z. has been domesticated, and used as a beast of burden, but generally shows a vicious and untractable disposition. The flesh is eaten by the natives and hunters of South Africa. A hybrid has been produced between the Z. and the ass.

ZEBU', one of the Philippine Islands (q. v.).

ZEBU, INDIAN OX, or BRAHMIN OX, a kind of ox, very nearly allied to the common ox, of which naturalists generally regard it as a mere variety, although some think it a distinct species (*Bos Indicus*). The most conspicuous distinctive character is a large fatty hump on the back, above the shoulders. The legs are also rather more slender and delicate than in the European ox. The hump attains a very great size in animals plentifully supplied with food, and not compelled to work; in those which are ill fed or hard worked, it is comparatively small. It is alleged



Zebu or Indian Ox.

that intermixture takes place freely with the common ox, and that there is no difference of anatomical structure, but these statements require verification. Mr. Vasey found the number of caudal vertebræ in the Z. to be only 18, whilst in the common ox it is 21. The period of gestation in the Z. is also said to be 300 days, whilst in the common ox it is 270. The Z. is diffused over India, China, the Asiatic Islands, Madagascar, and the east coast of Africa. There are many breeds, differing very much in size; the largest being larger than any oxen of Europe, whilst the smallest are not much larger than a large mastiff. The hump of the largest breeds is said to be sometimes 50 lbs. in weight. English residents in India esteem the hump as delicious for the table. There are hornless breeds; but most of the breeds have short horns. There is a breed with two fatty humps, one placed immediately behind the other, which is common in the vicinity of Surat. The voice of the Z. resembles the grunting of the yak, almost as nearly as the lowing of the ox. The Z. is used in India both as a beast of draught and of burden. It is yoked in the plough. It is occasionally used for riding. It can travel from 20 to 30 miles a day. It is very gentle and docile.

The Brahminy or sacred bulls of the Hindus, consecrated to Siva, are all of this kind of ox. They are caressed and pampered by the people, and to feed them is deemed a meritorious act of religion. The Brahminy bull may go where he pleases; it is not lawful to beat him, even if he be eating a valuable crop, or if he enter a shop and devour the articles exposed for sale. He soon learns to despise shouting, which is the ordinary expedient to drive him away, and makes himself at home everywhere.

ZECCHI'NO. See DUCAT.

ZECHARI'AH, called in the book of prophecy which goes under his name, 'the son of Berechiah, the son of Iddo,' but in Ezra, 'the son of Iddo,' was born in Babylonia during the captivity, and accompanied the first band of exiles on their return to Palestine under Zerubbabel and Joshua. Very little is known of his personal history, but enough to assure us that he was a man of influence and a leader among his countrymen. He combined in himself the offices of priest and prophet. Ezra expressly ascribes to Haggai and him the merit of stirring up, by their prophetic inspiration, the patriotic enthusiasm of the Jews to complete the rebuilding of the Temple. Later traditions, which are probably more or less in the line of historic fact, state that he assisted in providing for the service of the Temple (various of the liturgical psalms being ascribed to him), and that he was a member of the great Synagogue (q. v.).

The prophecies of Z. may be divided into three parts: the first (chapters i.—viii.) consists mainly of a series of visions relating to the building of the Temple, the glory of the city, the removal of all abominations out of the land, &c., and winds up with a prediction that Jerusalem will become, as it were, a center of religious worship to all the world. The second (chapters ix.—xi.) threatens Damascus and Phœnicia, and the cities of the Philistines with ruin; predicts that Judah will be greater than Javan (Greece), that Israel and Judah will be reunited—though almost immediately he symbolically shows the impossibility of this—and that both Assyria and Egypt will be humbled. The third part sets forth that dark times for Judah are drawing nigh, which shall be as an ordeal for the nation. After sore trial, it shall come forth thoroughly purged from iniquity, and then the Lord will appear in his glory on Mount Olivet, fight victoriously against the hosts of heathendom, and compel all who are not destroyed by his wrath to worship Him at Jerusalem. A millennium of holiness will then begin: 'In that day shall there be upon the bells of the horses, "Holiness unto the Lord" . . . . yea, every pot in Jerusalem and in Judah shall be holiness unto the Lord of hosts' (xiv. 20, 21).

Numerous biblical critics, both in Germany and England, consider the first part only to be the work of Z., and it cannot be denied that the internal evidence strongly favors this supposition. There is a unity, consistency, and sequency in the visionary predictions, and a harmony both of style and matter—the imagery bearing very distinctly the impress of those two master-spirits of the exile, Ezekiel and Daniel—that no candid critic can overlook, while the remaining chapters are totally unconnected in subject with what precede; contain no allusion to the post-exilian age, and speak of idols and false prophets in a way that would be utterly meaningless if applied to the times subsequent to the return from the captivity. The style also is quite different; is softer, richer, more poetical. The spirit of Ezekiel is exchanged for that of Jeremiah or the younger Isaiah. Whether these chapters are the work of one or two authors, has also been elaborately discussed, the evidence being, on the whole, in favor of the latter view.

ZE'CHSTEIN (Ger. mine-stone), a deposit of calcareous rock which covers the Kupfer-schiefer, and which received this name because it must be cut through before reaching the mineral-bearing beds beneath. It is the equivalent in Thuringia of the fossiliferous limestones of Permian age of the north of England.

ZEDEKI'AH, originally MATTANI'AH, the last king of Judah, son of the 'good Josiah' by his wife Hamutal, succeeded his nephew Jehoiachin. The latter having rebelled against his master, Nebuchadnezzar, king of Babylon, was besieged in Jerusalem, and taken prisoner, after a brief reign of three months. Nebuchadnezzar bestowed the vacant throne on Z., doubtless in the expectation of securing a faithful liegeman. If so, he was mistaken. Z. was a weak unwise ruler, probably incapable of political fidelity: in the phraseology of the Jewish historian, 'he did that which was evil in the sight of the Lord.' Forgetting his obligations to the Babylonish monarch, he lent a ready ear to the foolish braggadocia of the nobles and princes of Judah, and in spite of the earnest and reiterated remonstrances and warnings of Jeremiah, finally consummated his perfidy by forming an alliance with Egypt, the hereditary enemy of Assyria and Chaldæa. Swift destruction overtook the traitor. A Babylonish army invaded and ravaged the country, besieged Jerusalem, and after inflicting a crushing defeat on an Egyptian force that was marching to the relief of the city, reduced the inhabitants to such horrible extremities, that they could no longer hold out. Z., accompanied by his wives and children, fled in the darkness of night towards the Jordan, but was overtaken and made prisoner near Jericho. The monarch and his sons were sent to Riblah, at the north end of the valley of Lebanon, where Nebuchadnezzar then abode. The conqueror, with customary Asiatic cruelty, ordered the sons to be slain before their father's face, and then deprived the wretched parent of his eyesight. Thus maimed, and bound with fetters of brass, he was conveyed to Babylon (588 B.C), where he probably died. The Temple and city were destroyed, the inhabitants carried off into captivity, and the kingdom of David and Solomon ceased to have a place on the earth.

ZE'DOARY (Arab. *Jedwar*), the name of certain species of *Curcuma* (see TURMERIC), natives of the East Indies, the root-stocks (*rhizomes*) of which are aromatic, bitter, pungent, and tonic, and are used for similar purposes with ginger. They are more used in the East than in Europe, but are imported in small quantities, and sold under the name of Zedoary. The ROUND Z. of the shops is the produce of *Curcuma zedoaria*, a native both of India and China, having palmate root-stocks, straw-colored within. LONG Z. is produced by *C. zerumbet*, a native of various parts of the East Indies, having long palmate root-stocks, yellow within. Z. is a powerful sudorific.

ZEE'LAND, a province of the Netherlands, consists of the islands Walcheren, North Beveland, South Beveland, Schouwen, Duiveland, Tholen, West Flanders, and East Flanders. It lies between 51° 20′—51° 45′ N. lat., and 3° 21′—4° 15′ 54″ E. long., and has an area of 665 sq. miles. The boundaries are: South Holland on the N., the Easter Scheldt on the E., Belgium on the S., and the North Sea on the W. Pop. (1875) 184,215; (1880) 188,614, being 106 persons per square kilometre. Nearly three-fourths are Protestants, having 138 churches; the remainder, except 670 Jews, with 4 synagogues, are Roman Catholics, who have 36 places of worship. The provincial capital is Middelburg. Other important towns are Flushing; Goes (pron. *Huse*), in South Beveland; and Zierikzee, in Schouwen. The greatest part of the soil, which is a rich clay, has been redeemed from the sea; and almost in the center of Walcheren, South Beveland, and Schouwen, there are seen still the high mounds of earth called 'hills of refuge,' which the early inhabitants formed as places of safety for themselves and cattle when a high tide burst over the newly acquired lands.

The number of Polders (q. v.), or drained districts, in the province amounts to about 400. It is almost entirely arable, and produces the finest crops of wheat, barley, oats, rye, peas, beans, colza, beet, flax, hemp, canary seed, mangols, &c. Potatoes are extensively planted; and madder for the manufacture of dyeing material forms a valuable agricultural product. Horses, horned cattle, sheep, swine and goats are the stock. In many districts of Z., extensive orchards beautify the farms.

The neighboring seas abound with fish, and in Schouwen, many eggs are collected, myriads of water-fowls resorting thither to form their nests. The principal industries, apart from agriculture, are the preparing of madder for the market, weaving calicoes, rope-spinning, ship-building, beer-brewing, soap-boiling, making vinegar, salt, starch, tobacco, tile and brick, tanning leather, grinding corn, sawing wood, &c. The people of Z. are kind and hospitable, and in the country parishes, are much attached to their fairs, meetings for merry-making, and other old customs, which might with advantage be given up. Few marriages take place among the agricultural portion of the population till absolutely necessary, but a case of desertion rarely occurs, as it would utterly disgrace the young man who did so.

On the 15th of October 1866, a fine ship-canal through the island of South Beveland was opened, and takes the place of the Easter Scheldt. A railway from Flushing, through Walcheren and S. Beveland, communicates with the main Belgian lines at Roozendaal, and by Breda leads to Rotterdam, Amsterdam, or Germany.

ZEITHU'N, a town and district in the highlands of Cilicia, lying in 37°—38° N. lat. and 34°—35° E. long., inhabited by a community of Armenian Christians, virtually independent of the Turkish government, and forming in fact an Asiatic republic. Z. lies in the upper basin of the Jyhun or Pyramus where that river crosses the Taurus Mountains in descending from the table-land of Asia Minor to the low plain of Cilicia, which surrounds the north-eastern corner of the Mediterranean Sea. It is surrounded on all sides by inaccessible crags, except on the east, where it is bounded by the deep channel of the Pyramus. The hills are covered with magnificent pines, plane trees, and evergreen oaks. Springs and brooks, never dried up during the summer, irrigate the meadows in all directions; but the *soil*, although abounding in patches of great fertility, does not produce grain in sufficient quantity to supply the wants of the inhabitants. The mulberry trees are, however, numerous in the orchards, and give constant occupation to the women in feeding silk-worms. The men are chiefly engaged in smelting and manufacturing the iron supplied by the mountains into ploughshares, horse-shoes, nails, &c., which they exchange for corn and other articles at Marash and Kaisariyeh. The language of Z. is a rude dialect of Armenian, in which the only literature consists of popular songs not committed to writing.

Education is much neglected among children, who, except when intended for the priesthood, are not sent to school after the age of 10 or 12. The inhabitants, like the kindred race in Armenia, are free from Asiatic vices. They resemble Europeans in their respect for women. Crime is not frequent. No prisons exist, and

it is asserted that murder has never been committed in the country for the sake of gain. There may be exaggeration in these statements, but the Zeithumlus are certainly open-hearted mountaineers. They have, however, shown the greatest jealousy of foreigners; and until 1854, when their country was visited by M. Léon Paul, a French Protestant clergyman, we only knew of them from the statements of Armenian priests, and articles in the Armenian newspapers of Constantinople. Even now, our information about them is rather scanty. The government seems to be patriarchal, vested in elders of the people, with some prerogatives in the priesthood. When a grievance is felt, complaint is made to the priests, who meet in council, and refer the complaint to the elders assembled as a senate: they decide on the course to be taken. All offices are conferred by popular election, the executive power being placed in the hands of four princes. There are 20 villages in the district, and the chief town, Z., is said to contain 20,000 inhabitants. The Zeithumlus can muster an army of from 7000 to 8000 men to defend the mountains against the Turkish pashas; and they are in alliance with a neighboring Turcoman chief, also independent of the Turks, who brings 10,000 men into the field.

Z. is a relic of the Armenian kingdom of Cilicia, founded in the 11th, and destroyed in the 14th century. Since that period, the native populations have been gradually assimilating to the Turks, a change much favored by the extreme facility with which the Turkish language is acquired. It was not till after the Crimean War that the massacres in the East called special attention to the existence of Z. and other Christian communities in the East, which had some claim to European sympathy. An attempt by the Turks to settle Circassians near Z., gave Aziz Pasha of Marash an opportunity of attacking the Christians, and the atrocities committed remind one of the worst excesses of Cawnpore. The inhabitants defended themselves, however, with the greatest gallantry, twice defeating in the field large Turkish forces; and the struggle was at length terminated by the interference of the French and English governments at Constantinople, and the recall of the pasha. Unfortunately, the Turks were allowed to suppress the Armenian newspaper which acquainted the European public with what is taking place at Z., and we now hear little about it. But the Zeithumlus have from time to time to defend themselves against Turkish encroachment.

ZEITZ, a walled town of Prussian Saxony, in the government of Merseburg, 23 miles south-west of Leipzig, lies in a pleasant and fruitful district, on a steep slope, on the right bank of the White Elster, over which there is a stone bridge. The town is very old, and has some good old public buildings; a cathedral, and four other churches; a good library, containing 12,000 volumes, besides MSS.; asylums for orphans and lunatics, an old and new castle, &c. There are manufactures of cotton, earthenware, leather, calicoes, hosiery, gloves, &c.; several print-fields, breweries, and distilleries. In the neighborhood are extensive mineral-oil works. Pop. (1880) 18,265. It is a station on the Thuringian Railway.

ZELA'YA, a town of Mexico, in the state of Guanajuato, about 120 miles N.N.E. of the town of Mexico, with a fine cathedral. There are manufactures of cotton and saddlery. Pop. 14,000.

ZELLER, EDUARD, a distinguished German theologian and historian of philosophy, was born in Würtemberg in 1814, and studied theology at Tübingen and Berlin. He was one of the ablest and most pronounced of Baur's disciples (see BAUR), and his call to a theological chair at Bern in 1847, was the occasion of fierce controversy and opposition from the orthodox. In 1849 he was removed to Marburg; in 1862 became professor of philosophy at Heidelberg, and in 1872 at Berlin. Latterly he has almost solely confined himself to philosophical studies. His principal work is *Die Philosophie der Griechen* (3 vols., 1844—1852; 4th ed. 1876; Eng. trans. 1875). Amongst his other works are the notable book on the Acts of the Apostles (1854), *Das Theologische System Zwingli's* (1853), his essays (*Vorträge und Abhandlungen*, 2d ed. 1875), and his edition, with biography, of the works of his friend D. F. Strauss (1876–78).

ZEMINDA'R, the name given to the governors of districts or large towns in India, under the Mogul rule. Many of the zemindars occupied in India a position almost similar to the dukes and counts of Western Europe in the middle ages; they received from their superiors, the nabobs or provincial governors, fiefs of more or less extent, for which they paid a certain due annually, being then exempted from all other imposts whatsoever. The dues paid by the zemindars were of course exacted, with additions, from the ryots or cultivators, and constituted a large part of the imperial revenue. Under the British government, the same system of tax-collection is continued in Bengal, the zemindars in that presidency being looked upon as the hereditary lords or proprietors of their respective districts. The zemindars of the Coromandel district were formerly called *polyghars*. Under the zemindars were the *havildars*, or heads of villages, whose duty it was to collect their share of the tax imposed by the zemindar, and as, like their chief, they took care to collect an additional proportion for themselves, the most atrocious oppression was commonly practised; the 'nabob' pillaging the 'zemindars,' the 'zemindar' in turn plundering his 'havildars,' while the 'havildar' more than reimbursed himself at the expense of the Hindu villagers.

ZEND,* the language in which are composed the ancient sacred books of Zoroaster, first became known through Anquetil-Duperron (q. v.). Many scholars of eminence, like William Jones, Meiner, Henning, W. Erskine, and others, warmly contested the age of these writings. They held that the idiom in which they were couched had never been spoken in any part of Persia, but was a Sanscrit dialect which had been introduced from India for sacred use. The so-called Zoroastrian writings, they said, dated from the time of Ardeshir-Babegan, the first Sassanian, in 230 B.C., or had at least been rewritten and redacted at that time. The first who endeavored to lay the foundations for a real grammatical knowledge of Zend was Rask, the Dane, who, in 1816, undertook a journey to India and Persia, in order to make researches into the origin and nature of this language on the spot. Although he did not live to make known all the results of his investigations, he yet proved irrefutably that the sacred language of the Parsees was closely connected with that of the Brahmans; or, in other words, that Zend was akin to Sanscrit, and that, like the latter, it had retained some of the earliest formations of the Aryan dialects. Eugène Burnouf followed in his steps. He was indeed the real founder of Zend studies in modern Europe.

By the aid of his knowledge of Sanscrit and comparative grammar, he proceeded to decipher, for the first time, the sacred writings of Zoroaster in the original; while Anquetil-Duperron, who first made the *Zend-Avesta* known in a European garb, composed his translation only from a modern Persian translation. Both he and Bopp contended for the independent and ancient existence of Zend, holding that Sanscrit, being a new language which came from the north, was more likely to be derived from the Zend than the latter from Sanscrit. The opinion of Haug, the latest, and by far the most successful investigator of Zend language and literature, is, that Zend is almost identical with the most primitive—the Vedic—form of Sanscrit. We shall give in the following sketch the results of his studies, which unfortunately have as yet appeared only in the preparatory shape of essays.

The Zend idiom, in its widest sense, embraces two so-called 'Bactrian' dialects, which, together with the 'West Iranian' languages, i. e., those of ancient Media and Persia, form the stock of Iranian tongues. These tongues were once spoken in what the *Zend-Avesta* calls the 'Aryan countries' (*Airyâo danhâvô*). The former, the 'East Iranian' or 'Bactrian' branch, has survived in its two dialects, in the scanty fragments of the Parsee Scriptures only. The more ancient of them is called the 'Gâtha dialect, because the largest and most important pieces preserved in this peculiar idiom are the Gâthas, or songs; the younger or 'ancient Bactrian,' also 'classical Zend language,' is the one in which the greater part of the *Zend-Avesta* (q. v.) itself is written. Both dialects seem to have died out in the 3d c. B.C., leaving no linguistic progeny.

The general character of Zend, in its widest sense, is that of a highly-developed idiom, inasmuch as it is as rich in inflections (there are no less than three numbers and eight cases) as is the Vedic Sanscrit, and is richer even than the Latin in the variety of forms inherent in its verbs and nouns. There are numbers of compound words in it; and the whole syntax bears the stamp of an advanced stage of linguistic progress. A genuine sister of Sanscrit, Greek, Latin, and Gothic, it is yet only known to us, much as is the Hebrew, in its declining phase. The forms are no longer accurately kept distinct, and a return to the originally uninflected state is noticeable, principally in the verbs. It may be that the Bactrian grammar had never been properly fixed by rules, and that, in the absence of that tender care which the Brahmans took of the preservation of the Sanscrit texts and idiom, many corruptions and abbreviations gradually crept from the colloquial into the classical language of Zend, and were thus perpetuated in the surviving remnants. As soon as the language of the Zoroastrian books died out from daily use, these books were mechanically copied, time after time; and any number of blunders, unchecked by an understanding of the structure or the details of the language, crept in unheeded. The oldest copies are the best, comparatively speaking: the more modern the copy, the oftener the terminations are found as separate words; vowels are inserted according to the faulty pronunciation of the writer; and a number of other faults of omission or commission, are patent at first sight, solely due to carelessness and ignorance.

* Much uncertainty prevails as to the real meaning of the word Zend. The name *Zend-Avesta* (q. v.) is, by the native scholars, understood to mean commentary (*pehlvi*) and text, an opinion supported by the most eminent Zend scholar of our day, Dr. Haug. The opinion of Max Müller to the effect that Zend is identical with the Sanscrit chhandas—a name given to the Vedic hymns—and Avesta = avasthâna, a word which, if it occurred in Sanscrit, would mean settled text requires further confirmation.

Before indicating the general character of Zend, we shall briefly observe that its two dialects differ both phonetically and grammatically; and the phonetical differences are so great, that, at first sight, it would almost appear as if they were caused by different localities rather than ages, but, on closer inspection, it is found that the singing of the Gâthas, whereby certain vowels were lengthened out, has caused many of these striking peculiarities. Grammatically, the Gâtha dialect shows many deviations from Zend, traceable to the more primitive state of the Bactrian language which it represents. But the differences between the two are not so great as between the Vedic and the classical Sanscrit, and between the Greek of Homer and the Attic dialect. At most, the Gâtha may be reckoned to be one or two hundred years older than that classical Zend which formed the classical language of the ancient Iranian Empire, as depicted in the earlier parts of the *Shâh Nâmeh*.

There are twelve simple vowels and about fourteen diphthongs in Zend, for each of which there are special characters. Of vowels peculiar to this idiom, may be mentioned the *ã* (long, with a nasal sound), used chiefly in the genitive plural termination; further, the *ē*, which, in the Gâtha dialect, often replaces the final *ô* of the usual Zend, and which, by the frequency with which writers confound it with *î*, would also prove itself closely allied to that sound. There is, further, an initial *a* to be observed, which probably crept into the Zend text when they were transcribed into their present characters, which, no doubt, are borrowed from the Syriac. This *a* corresponds to the Aleph prostheticon of the Semitic idioms.

Again, the short vowels are always lengthened at the end of a word in the Gâtha dialect: owing most probably to the circumstance that the Gâtha literature—the most sacred hymns—were sung, and the singer's voice resting upon the final vowel, whether long or short, had the effect of lengthening it even in the MSS., written mostly from memory. Of consonants, there are six gutturals, 2 palatals, 4 dentals, 3 labials, 4 semivowels, 5 sibilants, 5 nasals. The roots are mostly monosyllabic, consisting occasionally of one vowel only, or being a combination of a vowel with a simple or double consonant, or of two consonants with a vowel between them; e. g., *i*, to go; *dâ*, to give; *gâ*, to go; *mere*, to die; *as*, to be; &c. Additional sounds added to the simple roots, enlarge and otherwise change the meaning of a word—*da*, to make, becomes, by the addition of *th*, *dath*, to place; from *mere*, to die, is derived *mereñch*, to kill. Three chief modifications are to be noticed in the verbal roots, irrespective of tense and mood—viz., the 'causal form,' expressing the idea of 'to make,' 'to get made,' which is formed by lengthening the vowel of the root, and adding the syllable *aya*, as in Sanscrit. Next stands the desiderative form, expressing the wish of obtaining anything, which is formed by the reduplication of the first syllable, and the addition of *s* to the crude form before the terminations. The last or intensive form, used to render the verb more emphatic, was originally produced by a simple reduplication of the root and the termination; afterwards, only the vowel of the first part was lengthened, and the consonats following were omitted.

Three voices—the active, middle or reflective (Lat. deponent) and the passive—obtain in Zend, as in Greek and Sanscrit; and there are four chief moods, which may be used in all these three voices—the indicative, subjunctive, potential, and imperative. The subjunctive is of a double nature, the one expressing the 'might, would, or should,' the other the 'may'—a feature lost in classical Sanscrit, and only to be met with in the ancient language of the Vedas. The potential, too, is of two kinds, corresponding to the Sanscrit 'potential' and 'precative.' There are as many tenses in Zend as there are in Sanscrit, though fewer than in Greek, which is, in this respect, the richest of the Aryan stock. There may be distinguished one formation for the present, four for the past, and two for the future.

The general scheme of the (active) present and imperfect is as follows:

PRESENT.	IMPERFECT.
Active Voice.	*Active Voice.*
Sing. 1. mi.	Sing. 1. m.
2. hi.	2. s, ô.
3. ti.	3. t.
Dual 1. vahi.	Dual 1. âva.
2. (lost.)	2. (lost.)
3. tô, thô.	3. tem.
Plur. 1. mahi.	Plur. 1. ma.
2. tha, dûm.	2. ta.
3. ñti.	3. en, añ.

The division of the 'crude' forms into ten classes, in use with the grammarians of Sanscrit, is also fully applicable to the Zend. Additions and reduplication make up the distinguishing features. The past tenses are likewise formed, as in the sister tongues, by augmentation, reduplication, or composition. Apart from those forms which are identical with those employed in Sanscrit, Greek and Lithuanian, Latin, and the ancient Teutonic languages, we find the use of two kinds of subjunctives. Equal richness of forms is found in the participle and the infinitive, whilst there are fewer gerundial forms than in Sanscrit. Nouns are formed out of roots by the addition of suffixes, which generally correspond to those of the cognate languages. There are three genders in Zend—masculine, feminine, and neuter. The comparative and superlative are formed very nearly as in Sanscrit and Greek. The number of compound nouns in Zend is somewhat less than in the Sanscrit and Greek, on account of its standing nearer the more simple Vedic idiom. There are three numbers and eight cases of inflection for singular and plural of nouns; while there are no less than five cases in the dual, no other Aryan language having retained more than three. The terminations of the cases (in words ending with a consonant) are somewhat according to the following scheme:

	SING.	DUAL.	PLURAL.
Nom.	s.	{ a.	ô (aç).
Accus.	em.	{ a.	ô, as.
Instr.	a.	{ bya.	bis.
Dat.	ê.	{ bya.	byô (byaç).
Ablat.	at.	{ âo.	byô.
Gen.	ô (aç).	{ âo.	am.
Locat.	i.	yô.	aêshu, aêshva, hva.
Voc.	= Nom.	"	

There are only pronouns of the first and second persons to be found in Zend, the third being made up by a demonstrative pronoun. There are some older forms to be found in the Gâtha dialect only. Most of the pronouns resemble closely the Sanscrit forms. The relative is sometimes used as a demonstrative. The numerals from one to ten are: aêva, dva (va, dugê, ayê), thri, chathware, poñcha (meñda), khshvas (khshvîdem), hapta, asta, nava, daça. The following numbers are formed by the addition of the single cardinal numbers to the ten or daça: 20 = vîçaiti, 100 = çatem, 200 = duye, çaitê, 1000 = hazanra, 10,000 = baêvare, 100,000 = ahôkhsta. The ordinals are: paoirya, first; bitya, second; thritya, third; khtûiryah, fourth; pnkhdha, fifth; &c. 'Multiplication numerals' are formed by addition of *keret* and *vat*—e. g., hakeret, once; bizhvat, twice; thrizhvat, thrice; &c. Particles and prepositions are often identical with those of Sanscrit. The latter may be separated from the verb, it forming part of it, as is the case in the Vedic and Homeric languages, but not in classic Sanscrit or Greek.

We have started with the now fully proved assertion that Zend is closely allied to Sanscrit, more especially to the ancient Vedic dialect. To the latter it bears about the same affinity which the different Greek dialects (Æolic, Doric, Ionic, Attic) bear to one another. The ancient Brahmans and the Parsees are but two tribes of the nation which is called Aryas both in the *Veda* and *Zend-Avesta*, the former somewhat to be compared to the Ionians, the latter to the Dorians. But in comparing Zend with Sanscrit, it is noticeable that it resembles more the primitive Vedic than the classical Sanscrit.

In verbal forms, chiefly moods and tenses, the classical Sanscrit is much poorer than it is in its primitive Vedic phase, having lost various forms of the subjunctive mood, most tenses of all other moods, except indicative, the manifold forms expressing the infinitive mood, while all these are found completely preserved in the *Vedas*, *Zend-Avesta*, and Homeric Greek. From these and many other signs, it would indeed follow as if the classical Sanscrit had been formed long after the separation of the Iranians from the Hindus. The differences between the Vedic, Sanscrit, and Zend are very minute in grammar, but important both phonetically and lexicographically, like the difference between the German and Dutch. But the philologist can easily transform, by slight phonetic changes, the Zend word into the Sanscrit one. As a striking proof of the original identity of grammatical forms between the two, the circumstance may be cited of their both exhibiting certain identical irregularities.

For *Zend Literature*, we may refer both to our articles on PERSIAN LANGUAGE AND LITERATURE and to ZEND-AVESTA. We confine ourselves here to a brief mention of the principal items. At the head stand the five Gâthas, which may safely be ascribed to Zoroaster and his disciples themselves. There is no doubt that what now survives is but a scanty fragment of what once existed of this literature. Probably they but represent a selection of verses considered most efficacious for putting down evil influences, and for increasing the welfare of the Zarathustrians. The Gâthas, as they now stand, may be compared to the Sâmaveda, which contains selections from the Rigveda, used at the Soma sacrifices. Next in order stand the Yasna, or seven chapters, containing songs and prayers, which dates from a much later period; and here again the first portion, or 'Younger Yasna,' is of still later date; and on the same line stands the Visparad, the collection of prayers called 'All Heads,' in 23 chapters.

The Vendidad, on the other hand, represents conversations held by Zoroaster with Ahuramazda on religious topics, and is most

likely the work of the high priests of the Iranian community of later periods. The Yashts, or songs and conversations, are the latest. The age of the different works mentioned is fixed by Haug in the following manner: The Gâthas about 900 or 1200 B.C.; the larger portion of the Vendidad at about 900 or 1000 B.C.; the younger Yasna, about 700—800 B.C.; the latest part of the Vendidad (the Pazend) being written as late as 500 B.C., when the collection of the different parts also seems to have taken place. This computation would give the Zend, or rather the famed Parsee literature, a range of about 800 years, or from 1200—400 B.C. Cf. Haug's *Essays on the Religion of the Parsees* (Bombay, 1862). See PERSIAN LANGUAGE AND LITERATURE, ZEND-AVESTA, ZOROASTER.

ZEND-AVESTA, or rather (as the Pehlvi books have it), AVESTA-ZEND, is the name of the sacred writings of the Parsees (q. v.). The word Avesta (*avasthâ*) means text, scripture; Zend, or Zand, translation or commentary *and* paraphrase. According to the last researches in this province, it would seem as if only a small portion of the entire collection now extant were formed by Avesta, or text, the rest being made up of Zend, or commentary, without text. The term Zend has indeed changed its meaning repeatedly. From an authoritative interpretation, emanating from the highest source, in time becoming embodied in the text itself, it came to denote, later, a translation into the native idiom of Persia (the Pehlvi), made by the Zoroastrian priests during the Sassanian period. There is further a special 'Zend doctrine' to be noticed, which differs considerably from that contained in the Avesta. A still further explanation of that Zend doctrine is the Pâzend, a word often to be met with in connection with Avesta and Zend. Of this we shall further have occasion to speak.

But before proceeding with an elucidation of the contents and purport of these Zend writings, we must devote a brief space to a sketch of their history, or rather of the different phases the acquaintance with them on the part of the West has undergone. The doctrine of the 'Magi,' as the ancient world was wont to call the priests of Zoroastrianism, as well as those of India, Persia, and Babylonia, is first alluded to in Jeremiah, where the chief of the Magi is mentioned among Nebuchadnezzar's retinue. In the New Testament (Matt. ii. 1), Magi come to worship Jesus at Bethlehem. The earliest account among Greek writers is furnished by Herodotus, who, on the whole, seems well enough informed for his time. Besides him, we hear of accounts by Ctesias, the Greek physician of Artaxerxes II., by Deinon, Theopompos, and Hermippos. But only fragments from their writings have survived, embedded chiefly in Plutarch and Diogenes Laertius. Pliny, Strabo, Pausanias, Dion Chrysostomus further enlarged the stores of knowledge, which, more or less trustworthy, may be gathered from independent sources. Omitting later Greek writers, such as Damascius, Theodorus of Mopsuestia, &c. we turn to Armenian writers of the 5th Christian century. Among them we find Eznik and Elizæus, from whose records we may gather that the Zoroastrians at their time were split into two parties, the one called Mog, the other Zendik; the former inhabiting chiefly the western parts—Media and Persia principally acknowledging the Avesta; while the latter, living principally in the east (in Bactria), followed the traditional explanations, or Zend proper.

To the Arabic writer Masudi (950 A.D.) we owe a comparatively correct account of the sacred book; while Sharastani (1153 A.D.) is perhaps the first among his countrymen who ranks the Zoroastrians with those other professors of Semitic creeds, the Mohammedans, Jews, and Christians, and not among the idolaters and pagans. In his time, they were already split into many sects, those who believed in the transmigration of souls, like the Brahmans, Buddhists, &c. As a successfully carried out piece of deception, it is to be noticed that Mohammedan writers, for the most part, seem to countenance the fable palmed upon them during the times of persecution by the Magi, that Zoroaster was identical with Abraham—in which there is not one atom of truth. The nations of modern Europe came into contact with the adherents of Zoroastrianism in the western parts of India, and in the 17th c., some MSS. of their sacred books were brought to England. But no one was able to read them; and Hyde himself, the celebrated Oxford scholar, was unable to make any use of them when, in 1700, he wrote his learned work on the Persian Religion. A sort of romantic freak first put Europe into the possession of the key to this book, the language of which had been lost for above a thousand years. A young Frenchman, Anquetil-Duperron, happened to see a few pages that had been copied from a Zend MS. in the Bodleian Library, and he instantly resolved to betake himself to India in quest of the original Zend writings. To achieve this purpose, he, being without means, had to go as a sailor on board a ship belonging to the French India Company, bound for Bombay, in 1754.

The French government, however, stepped in shortly afterwards, and furnished him both with money to purchase MSS., and with a pension that he might pursue his studies with greater ease. He prevailed upon several of the dustûrs, or learned priests, to introduce him into the mysteries of the holy language and rites, and further to sell him some of the most valuable works couched in it. When he considered himself sufficiently competent in Pehlvi and Zend, he commenced a translation of the whole Zend-Avesta in French, in 1759. Two years later, he returned to Europe; and having convinced himself, by a comparison with the Oxford MSS., that those he had acquired of the sacred writings were genuine, he went to Paris, where he deposited his treasures—180 MSS. in different oriental languages; and published, ten years after leaving India (1771); the first European translation of the Zend-Avesta, to which was added a great deal of supplementary matter, bearing more or less on the subject. The work created a profound sensation throughout Europe, but, after a while, voices began to be heard by no means so favorable as had been anticipated by the bold and persevering discoverer. Apart from the objections raised against the new book by Immanuel Kant the philosopher, on the score of its not containing any traces of philosophy, a much graver question was ventilated in England—viz., that of its authenticity. It was not that Anquetil was charged with forgery, but the priests, it was said, had found in him a ready dupe.

It was principally Sir William Jones, who, in a trenchant letter addressed to Anquetil-Duperron (in French, being, as Sir William Jones said, the only language which Anquetil understood—*a little*), tried to prove the utter untrustworthiness of the whole work. He was aided therein by Richardson, the Persian lexicographer, who, from four reasons, neither of which, however, is valid—came to the conclusion that the book was a spurious fabrication. While in France there was but one opinion on the subject—viz., that English scholars were trying to run down the work out of sheer spite and jealousy—the opinions of Germany were rather divided. Some, like Meiners and Tychsen, fully acceded to the proofs arrayed against it; but there arose another renowned German scholar, Klenker, who, in token of his complete and unreserved trust in the genuineness, set about translating Anquetil's French translation into German, adding several appendices, &c., and principally pointing out the now generally recognized agreement between the more important heads of the doctrines as contained in the book and in the classical writers. Thus matters stood for a long while. In Germany, Anquetil's translation, as rendered by Klenker, became the standard work even for theologians; in England, none any longer thought about it, it having been fully agreed upon by the highest authorities that it was nothing but a clumsy forgery. More than fifty years had elapsed from the appearance of that work, when a Dane, Rask, undertook to look into the matter.

Having himself acquired many Zend and Pehlvi MSS. in Bombay for the Copenhagen library, he wrote (1826) a pamphlet, in which he first showed not only the close affinity between the language of the Zend-Avesta and Sanscrit—which had been pointed out by Erskine and others before—and further proved it to be, not a corruption of Sanscrit, but a distinct language. He also proved that modern Persian was derived from Zend, as Italian from Latin—a step which at once removed all doubts about the genuineness of the work, and confirming, however, how, to a certain extent, Anquetil, to whom all praise was due for having been the first pioneer, had, through the absence of the requisite philological aids, been occasionally misled in his version in the most woeful manner. The learned dustur himself—with whom Anquetil communicated only in Persian—though well acquainted with the Parsee traditions, and favoring mostly the general sense of the passages, yet possessed no grammatical knowledge whatsoever of the language he pretended to teach. Rask had pointed out the way; Eugène Burnouf followed it. He indeed may be called the founder of Zend philology. For more than twenty years, this eminent scholar devoted all his energies to elucidating, commenting, and discussing this language and the sacred writings couched in it, and in publishing texts and translations. In Germany, Olshausen, Bopp, Müller, Brockhaus, Spiegel, Haug; in Copenhagen, Westergaard, have been busy ever since in editing and translating either portions of or the entire Zend-Avesta; and though the rediscovery of the language is by no means an accomplished task, yet, thanks to their indefatigable labors in this field, we are certain that, sooner or later, we shall be in the full possession of all the facts connected with the language and its sacred depository, the Zend-Avesta.

We now address ourselves to the book itself. We know, both from the Parsee traditions and from independent classical witnesses, that the Zend-Avesta was originally of very vast extent, incomparably vaster than the work that now exists under that name. Pliny speaks of 2,000,000 verses composed by Zoroaster; and an Arabic writer, Attavari, mentions the number of 12,000 cowskins (parchments) of which Zoroaster's writings consisted. No doubt these are but round Eastern figures; but it may safely be assumed that the sacred literature in question must once have

been of very great extent. The Parsees ascribe its loss to Alexander the Great, but it is more likely that their traditions in that respect refer to the Mohammedan conquests. Yet even then, the greater part of the sacred literature was already lost, and the date of Alexander may in so far be correct, that the Greek ideas that followed in his wake turned the believing minds from the primitive faith, and carried a gradual neglect and loss of the documents in which it was contained, with it. For 500 years—from the Macedonian conquest, 335 B.C., to the accession of the Sassanians to the throne of Iran, 235 A.D.—the Zoroastrian religion was not supported by any kings, and decayed in consequence. But when the Sassanians assumed the rule, their principal endeavors were directed to the revival of the ancient faith; and their unceasing researches after the ancient fragments of the Zoroastrian gospel have resulted in the small collection which we now possess. Yet the names and the summaries at least of all or most of the lost portions have survived. The whole scripture is reported to have consisted once of 21 nosks, or parts, each containing Avesta and Zend—that is, text and commentary on it. The number 21 was to correspond to the 21 words of which the most sacred prayer of the Zoroastrians (the Honovar) was composed.

The first of these sections comprised 33 chapters, containing the praise and worship of angels; the second (22 chapters) contained prayers and instructions to men about good actions; the third (22 chapters), an explanation of religious duties and commandments, and the way to avoid hell and acquire paradise; the fourth (22 chapters), knowledge of both this and the future worlds and their inhabitants, revelations concerning heaven, earth, water, trees, fire, men, and beasts, the resurrection of the dead, and the passing of the bridge Chinvat; the sixth (35 chapters) treated of astronomy, geography, astrology; the seventh (22 chapters), of food, lawful and forbidden; the eighth (50 chapters, of which, at the time of Alexander, only 13 were extant) treated of the different heads or chiefs in the creation; and the ninth (in 60 chapters) contained a code of laws for kings, governors, &c.—also a portion about the sin of lying; the tenth (60 chapters) treated of metaphysics, natural philosophy, divinity, &c.; the eleventh (60 chapters) treated of the reign of King Gustasp, and his conversion to the religion, and its propagation by him through the world; &c. Of all the 21 nosks, however, one only, the twentieth (in 22 chapters), called the Vendidad, has survived complete. This treats of the removal of uncleanliness of every description, from which great evils arise in the world. Some fragments of the other parts only, chiefly the fourth and eleventh, have survived. But there are now in sacred use among the Parsees other books either not included in the foregoing list, or but imperfectly indicated in it. Of the former are the Yazna (Izeshne) and the Visparad (Visporatu). To the latter class belong 24 sections called Yashts, and some small prayers of different kinds, such as Afrîgân, Nijâyish, Gâhs, and Sirozah, or Calendar.

Before speaking of these books, we shall say something about their authorship, for which point we further refer to ZOROASTER (q. v.). By the unanimous consent of both classical writers and the Persians, the whole bulk of the sacred literature is ascribed to Zoroaster himself. They were supposed to be the substance, or, as was held afterwards, the very words of divine revelations from God to the prophet, in the form of conversations. These revelations do not at first appear to have been committed to writing, but to have been orally preserved by his disciples and adherents, and to have been handed down by them to posterity. Surprising as this may seem at the sight of what has remained, as the infinitely larger bulk even of what has perished, it must be borne in mind that, e. g., the Vedas, the Talmud, and the Sunnah have been preserved equally faithfully in the mouths of many generations. The name Zoroaster or Zarathustra—in as far as to him is ascribed the authorship of the whole of the sacred writings—is to be taken collectively rather than individually, i. e., as indicating a school of successors and high-priests of the founder, who is designated Zarathustra *Spitama;* while the chief divines who took his place in after-times, were only called Zarathustra. That their decisions and sayings were afterwards 'hedged in' with the same reverence as those of the founder himself, need not be argued at length. All that can really be held to emanate from the prophet himself are the five *Gâthas*, which form part of the *Yazna* (Sansc. *yajna*, sacrifice). This Yazna consists principally of prayers to be recited at the sacrificial rites—such as the consecration of the Zoŏthra, or holy water; of the Bareçona, or bundle of twigs of a particular tree; the preparation of the sacred juice of a plant called homa—the Indian SOMA (q. v.)—taken to be an emblem of immortality; the offering of certain cakes; &c.

The whole of the Yazna now comprises 72 chapters, probably corresponding to the (twelve times six) 'seasons' during which Ahuramazda created the world. It consists apparently of two parts belonging to different periods. The older is written in what Haug calls the Gâtha dialect (see ZEND), and was considered sacred even at the time when the other books of the Zend-Avesta were composed. This 'older Yazna' was divided again into the Gâthas and some minor pieces. The former, five in number, are small collections of (metrical) sacred prayers, songs, and hymns, exhibiting philosophical and abstract thoughts about metaphysical subjects. The name itself signifies 'song.' Their metre resembles chiefly that of the Vedic hymns. They are without rhymes, and only the syllables are counted. The first bears the heading (which is also intended for the other four), 'The Revealed Thought, the Revealed Word, the Revealed Deed of Zarathustra the Holy; the Archangels first sang the Gâthas.' They are all more or less devoted to exhortations on the part of the prophet to forsake polytheism (the devas, or gods), and to bow only before Ahuramazda. The difference between monotheism and idolatry is pointed out in the respective sources whence they flow—viz., 'existence' and 'non-existence.' The mission, activity, and teaching of Zoroaster are dwelt upon more or less in all Gâthas, but chiefly in the second. To the other portion belongs further the 'Yazna of seven chapters,' which seems to have been composed by early disciples, and which consists of prayers in prose, addressed to Ahuramazda, the angels, the fire, the earth, the waters, and other spiritual beings—genii presiding over the different parts of the good creation; further, over devotion, speech, &c. There is further a chapter containing a formula by which the ancient Iranians were received into the new religious community. The so-called younger Yazna, written in the common Zend language, is of more varied contents, such as, an invitation to Ahuramazda and all the good spirits to be present at the sacrifice; further, pieces referring to the preparation and drinking of the homa juice; next, the praises of the genius Serosh, and a commentary on the most sacred prayers. The *Visparad*, which forms the next most important part of the Zend-Avesta, contains a collection of prayers, composed of 23 chapters, written in Zend (not Gâtha), and resembling the younger Yazna. They refer to the same ceremonies—the preparation of the sacred water, consecration of certain offerings, &c. Next are to be considered the *Yashts*, in 24 divisions. Yasht (*yêsti*) means worship by prayers and sacrifices, and in the Avesta indicates certain laudations of sacred persons and objects—yazatas (*izad*) = angels; and in so far different in nature from the invocations in the Yazna and Visparad, that, while in the latter the divine beings are invited promiscuously, the single Yashts are addressed to individual numina, such as the archangels, the sun, the heavenly water, the star Tisfrya, &c. In these songs—the work of Median bards, probably—are also found the primary sources of the legends contained in the Shâh-nâmeh (q. v.). Before speaking of the Vendidad, the 'Pentateuch' of the Zoroastrian 'canon,' we shall yet briefly mention some smaller pieces, which are now used as common prayers by the Parsees, such as the five *Nijâyish*, or praises addressed to the sun, the moon, the water, and the fire; the *Afrîgâns*, or blessings to be recited over a certain meal prepared for an angel or a deceased person; the five *Gâhs*, or prayers to the angels set over the five different times of the day and night; and finally, the *Sirozah*, or thirty days, being a calendar, or rather an enumeration of the thirty divine beings that preside over each of the days. It is chiefly recited on the thirtieth day after the death of a man.

The *Vendidad*, to which we now turn, is the code of religious, civil, and criminal laws of the ancient Iranians. It consists of 22 chapters or fargards = sections. It seems to have survived in a fragmentary state only, and is evidently the work of many hands and many centuries. It appears as if, starting from old sayings in the Avesta, the Iranian high-priests in various periods had interpreted them often at variance with each other: these their interpretations (Zend) were made the theme of further interpretations (Pâzend), and the three phases of interpretation were received in the course of time as equally authoritative among the faithful. There are three parts to be distinguished in the Vendidad. The first is introductory, containing an enumeration of 16 Aryan countries over which the Zoroastrian religion was spread; further, legends of King Yuria, and recommendations of agriculture. The second part (chaps. 4—17) forms, as it were, the groundwork of the Vendidad, treating of laws, ceremonies, and observances. The third part is a kind of appendix, treating of various subjects, chiefly of a medical kind, such as spells against diseases, &c. Here also ought to be mentioned the Bundehesh, written entirely in Pehlvi, which seems a compilation of several extracts and fragments of partly ancient, partly recent Zoroastrian writings, forming a sort of compendium or dogmatic handbook of Zoroastrianism. For an account of the latter, we refer to GUEBRES, PARSEES, and ZOROASTER.—Burnouf, *Vendidad-Sadé;* Olshausen, *Vendidad Zend-Avestæ*—French translation by Anquetil-Duperron, German by Klenker; Spiegel (the German text, with Spiegel's commentary, retranslated into English by Bleek); Rask, *Alter und Ächtheit der Zendsprache;* Haug, *Essays;* &c.

ZENGG, SENJ, or SEGNIA, an important free port of the Austrian empire, in Croatia, lies on the Adriatic, 71 miles south-east of Trieste, at the termination of the Josephine Road, opposite the island of Veglia. Z. is the see of a Roman Catholic bishop, has

a tolerably large and elegant cathedral, an upper gymnasium, a seminary for priests, an academy, and school of navigation; a small harbor (free), somewhat unsafe; and some trade in grain, honey, wax, wine, salt, tobacco, wood, fish, and cattle. Pop. (1869) 3496.

ZE'NITH, a word, like *Nadir* (q. v.), borrowed from the Arabic, is the name given to that point of the heavens which is directly overhead, i. e., in line with the spectator's position and the center of the earth. It is thus the upper pole of the spectator's horizon, as the nadir is the under pole. The word would seem to be connected with the Arabic *san*, a 'point.'

ZENJA'N, a populous and thriving town of Persia, in the province of Irak-Ajemi, about 170 miles north-west of Teheran, and 70 miles south-south-west of the Caspian Sea, on the table-land of Azerbijan, at the junction of the roads from Hamadan and Teheran to Tabriz, on a tributary of the Kizil-Ouzen, which flows into the Caspian. It is surrounded by orchards, has old walls, a palace, a mosque, bazaars, and a trade in carpets, woollen cloths, arms, lead, and gunpowder. Pop. estimated at 15,000.

ZE'NO, a philosopher of Elea, a town of Lucania, in Italy, was a favorite disciple of Parmenides. He visited Athens, and the illustrious Pericles was one of his pupils. According to the account usually given, on his return to Elea, he joined a conspiracy to deliver his native town from the tyrant Nearchus, and on the failure of his plot, was captured and put to the torture. On being interrogated as to his accomplices, he named the principal courtiers, and is said to have bit his tongue off, and spat it in the tyrant's face. However, the historical evidence for this account is unsatisfactory; and whether Z. perished in his attempt or survived the tyrant, is uncertain. He held the usual doctrines of the Eleatic school respecting the unity and immutability of all things, distrust in knowledge acquired through the senses, and reliance on pure reason. He did not deny that there were phenomena or appearances, but he maintained that these were not real existences. In this he anticipated the Berkeleyan theory. But he is chiefly remarkable for having been the first to employ the style of argument known by the name of Dialectics, in which error is refuted, and truth sought to be established, by the *reductio ad absurdum*—a method so skillfully employed afterwards by Socrates and Plato. He devoted his great powers of argumentation to enforce the doctrines first broached by Xenophanes, and more systematically developed by Parmenides. His works were in prose, but only small fragments have been preserved.

ZENO, founder of the Stoic philosophy, was born at Citium, in Cyprus. The dates of his birth and death are uncertain. He flourished in the early part of the 3d c. B.C., and was a contemporary of Epicurus. His father was a merchant, and on his trading voyages brought home with him from Athens some writings of the Socratic school. By these, Z. is said to have been attracted to the study of philosophy. At the age of 30, he was shipwrecked off the coast of Athens, and having lost his property, he willingly adopted the Cynic doctrines, in which contempt for riches is conspicuously taught. He attached himself first to Crates, but soon became dissatisfied with the coarse, ostentatious disregard for established usages, and the indifference to speculative inquiry, which characterize the Cynic sect. He next joined the school of the Megaric Stilpo, and there became proficient in the art of disputation. Still unsatisfied, he betook himself to Polemo the Academician. Having thus made himself master of the tenets of the various schools, he proceeded to open a school for himself, wherein he might show forth the result of all his inquiry, and develop his own peculiar system. See STOICS. He selected for the purpose the 'Painted Porch' (*Stoa Poikile*), from which his sect has got its name, and there, till his 98th year, as is said, continued to teach those doctrines, which, in spite of serious drawbacks, inculcate that manly energy and simplicity, fortitude under suffering, and reverence for moral worth, which made disciples of so many of the noblest characters among the Romans. As a man, Z. deserved and gained the highest respect. The Athenians honored him with a gold crown and a public burial, and his countrymen erected a monumental pillar to his honor. Of his numerous writings, scarcely anything remains save the titles.

ZENO'BIA, queen of Palmyra, succeeded (267 A.D.) her husband Odenatus, who had been acknowledged by Gallienus as his colleague in the Roman Empire. Nearly the whole of the eastern provinces submitted to her sway. When Aurelian assumed the purple, he marched against her with a large army, and after defeating her in several battles, besieged her in Palmyra. Her hopes of being relieved by the Persians and Arabians being disappointed, she attempted to escape by flight, but was captured, 273 A.D. Before the conqueror, her courage failed, and she saved her own life by imputing the blame of the war to her counselors, especially the celebrated Longinus, who was accordingly put to death. Z. was led in triumphal procession at Rome, decked with splendid jewels, and almost fainting under the weight of gold chains. She was presented by her conqueror with large possessions near Tivoli, where, in the society of her two sons, Heronnianus and Timolaus, she passed the rest of her life in comfort and even splendor. She was a woman of great courage, high spirit, and strikingly beautiful. With purity of morals in private life, she combined prudence, justice, and liberality in her administration. Her literary acquirements were considerable; she spoke Latin and Greek, as well as the oriental languages with fluency. The balance of authority is said to be in favor of the belief that she was attached to the Jewish faith.

ZE'NTA, or SZENTA, a town of Hungary, in the county of Bacs, on the right bank near the Theiss, 120 miles south-south-east of Pesth, in a beautiful plain. Cattle-breeding is carried on. Pop. (1880) 21,200. It is celebrated for the victory of Prince Eugene over the Turks in 1696.

ZE'OLITE (Gr. *zeo*, to boil), the common name of a large group of minerals, often called the Zeolitic family. They receive this name from their melting before the blowpipe. They are all soluble in acids, and most of them gelatinize in acids in consequence of silica being set free. They are hydrated silicates of alkalies or alkaline earths, most of them containing alumina. Magnesia is rarely present in them. Their composition, however, is very various. They are generally found in amygdaloidal cavities, or in fissures of trap and other Plutonic rocks, as granite and gneiss, apparently as deposits from water percolating through the rock. They sometimes, but rarely, occur in veins. They are found either in crystals or of crystalline structure, often in plates or fine scales, often in needles or fibrous. Among them are *Analcine*, *Natrolite* or *Mesotype*, *Scolezite*, or *Needlestone* (*Needle Zeolite*), *Stilbite*. *Heulandite*. *Brewsterite*, *Apophyllite*. *Chabasite*, *Harmotome*, or *Crosstone*, and *Laumonite*. The number of species and varieties which have been described and have received distinct names, is very large.

ZEPHANI'AH (the name probably signifies a 'watcher of the Lord'), a Hebrew prophet who flourished during the reign of Josiah, in the latter part of the 7th c. B.C. The subject-matter of his brief 'prophecy' is the temporary desolation of Judæa ('I will utterly consume all things from off the land,' i. 2), on account of the infidelity and worldliness of the inhabitants, Jerusalem being specially assailed by the author for her filth and pollution; the tyranny and the rapacity of her rulers, and the violence and treachery of her priests and prophets. At the same time the prophet predicts the destruction of the surrounding heathen nations, the Philistines, the Moabites, Ammonites, Ethiopia, and Assyria. The close, in which he declares that God will leave a righteous remnant in Israel, and for their sakes will ultimately bless the land with permanent peace, is couched in a strain of tender exultation.

ZERBST, capital of the former duchy of Anhalt-Zerbst (See ANHALT), a town of North Germany, in the duchy of Anhalt, 10 miles north-west of the town of Dessau, and 68 south-west of Berlin, is situated on a level sandy spot on the river Nuthe, a tributary of the Elbe. In place of the ancient walls, promenades now encircle the town. Close by is a beautiful large palace, the ducal residence. The town has four Protestant churches, a Roman Catholic one, and a synagogue. The church of St. Nicholas is a beautiful specimen of Gothic architecture. The town is the seat of a court of justice; has a high school, called the Francisceum; female, industrial, and other schools; a house of correction, and orphan asylum, hospitals, and a workhouse. Articles in gold and silver, silk, wax, soap, stoneware, carriages, are manufactured. There are many breweries, and the culture of hops is carried on. Handsome baths have been erected over a mineral spring. Pop. (1880) 14,201.

ZERMATT, an important center for tourists in Switzerland, is a small village of 500 inhabitants, near the upper end of the Visp valley in Valais. It stands more than 5300 feet above the sea, amidst some of the most magnificent scenery in Europe. Monte-Rosa and the Matterhorn are near. The Théodule Pass leads to Italy.

ZEULENRO'DA, a town of the German principality of Reuss-Greiz, 51 miles south-south-west of Leipzig, stands on a high plateau, in a wooded hilly district. Z. is regularly built, with four suburbs. It has a spacious market-place with a court-house, two churches, schools, and a hospital. There are bleach-works, a trade in cattle, and manufactures of woollen goods especially hosiery. Pop. (1880) 6770.

ZEUS (Sanse.) *div*, light, *djaus*, heaven, *devas*, god; Lat. *Ju-piter* and *Dies-piter*, i. e., Father Zeus; Ang.-Sax. *Tiu*, whence Tuesday) was the greatest of the national dieties of Greece. According to the most received mythology, he was the son of Cronos and Rhea, brother of Poseidon and Hera, the latter of whom was also his wife. He expelled his father and the older dynasty of the Titans; assumed the sovereignty of the world, and successfully resisted the attacks of the giants and the conspiracies of the

gods. In the allotment of the world, after the dethronement of Titans, Z. gained the rule of heaven and air, Hades of the infernal regions, and Poseidon of the sea; while the earth was left subject to the influence of all three, though Z. was regarded as having the supremacy throughout all departments. Crete, Dodona and Arcadia were the places where the worship of Z. was most cultivated; and although originally the inhabitants of these places may not have looked upon themselves as worshipers of the same god, yet, in process of time, all the local gods revered under the name of Z. were at last merged in one great Hellenic divinity, a process which was carried still further out when he was identified with the Jupiter of the Romans and the Ammon of Libya.

Besides the epithets of Z. from the seats of his worship, he had many titles applied to him from his various powers and functions, moral and physical. He was the father and king of gods and men; the protector of kings, of law and order; the avenger of broken oaths and of other offences; he watched over the state, the assembly, the family, over strangers and suppliants; his hand wielded the lightnings and guided the stars; he ordained the changes of the seasons, and, in short, regulated the whole course of nature. All prophecy, too, was supposed to originate in him, and it was from him the prophetic god Phœbus received his oracular gift. He dispensed, as it pleased him, both weal and woe to mortals; but whether he could control the Fates themselves, is a point about which the ancients disagreed, as men have done in all ages where the question of free-will and fate is concerned. Of the many epithets applied to Z., perhaps the best known is the Olympian, from that Olympus in Thessaly whose summit was believed to be his residence as well as that of the other gods. His most celebrated festival was the Olympic, held at Olympia, in Elis, after the end of every fourth year.

Combined with such exalted conceptions of the majesty and power of Z., we find many stories current respecting his amours with mortals and immortals; he is represented as acting with caprice, anger, deceit. Probably, in many cases, an ancient Greek of average position and capacity did not view such matters with any very strong feeling of disapprobation. Others, again, as Xenophanes (q. v.), protested against the transference to the gods of human passions and failings; or, as Pindar, maintained that they would believe nothing of the gods that was discreditable to them; or, as Euripides, argued that such tales were sufficient to disprove their divinity; or, as Euhemerus, held that the local worship of Z., like that of other deities, was owing to the fact, that divine honors were paid to deified men at the place of their burial, and that of course it was no wonder to find human actions assigned to gods who had once been human. In modern times, the various myths were at one time explained as symbolical of various celestial and terrestrial phenomena, such as the apparent motion of the sun, the alternation of day and night, the changes of the seasons, and so forth. The most rational explanation is as follows: In early times, men thought and spoke of natural objects as if they were personal agents, employing names for them which were literally, not symbolically significant. But from lapse of time, and the departure of various tribes from their original seats, in many countries the meaning of these words became obscured, and though men still used them, their real significance was forgotten, and terms which originally had expressed some process of nature, were conceived to narrate some incident in the history of a person. For example, the expression that the sun follows the dawn, was misunderstood, and gave rise to the myth of Phœbus pursuing the nymph Daphne, because the word Daphne was no longer understood. Such misconceptions were then, by successive ages, elaborated into myths, more or less fanciful, and even revolting. In this respect, Z. has fared no better, or rather much worse, than the other deites. In the same way as the Greek war-god Ares is a personage much inferior to the Latin Mars, so the serious and unimaginative Roman's conception of his majestic Jupiter Optimus Maximus (the best, the greatest), was more elevated than that conceived of Z. by the sensuous Greek. But this might be expected from the different character of the two peoples. Except in the grander attributes of omnipotence and fatherly care of the universe, we can trace little in common; for the Jupiter of the Latin poets, as portrayed in Virgil and Ovid, is drawn entirely from Greek sources, and is merely the Z. of Greek mythology with an altered name.

ZEU'XIS, the celebrated painter, was born at Heraclea, probably the city of that name in Lucania. He is also styled of Ephesus, which means that he belonged to the Ionian school of painters. He flourished in the latter part of the 5th c. B.C., and was at Athens about the beginning of the Peloponnesian war. He excelled in the treatment of light and shade, in accuracy of imitation of natural objects, and in expressing the perfection of human, and particularly female beauty. This last he effected by selecting the finest models he could find for each separate part. His most famous pictures were 'Zeus enthroned, with the gods standing round;' 'Helen;' 'The Infant Hercules strangling the Serpents;' 'The Female Hippocentaur.'

By the exercise of his art, he attained to great riches and fame, and like his rival Parrhasius was exceedingly conscious of his pre-eminence. He repeatedly presented rather than sold pictures to cities that were anxious to possess them, because he thought no money-price could pay for them. Greece was plundered of many of his masterpieces by her Roman conquerors; and one of the noblest, the 'Hippocentaur,' was lost on the passage to Rome. Designs on vases, sarcophagi, and other works of antiquity exist adorned with representations of the same subjects as Z. painted, and probably were imitated from his productions.

ZEYST, a large village in the Netherlands, province of Utrecht, is surrounded by beautiful well-wooded estates and country-seats, the summer residences of many of the first families of Amsterdam. The industries are making soap, candles, and vinegar, brass and zinc founding, &c. On a rising ground, and surrounded by fine old trees, stands the Dutch Reformed church, built in 1180. There is also a Roman Catholic church. In 1746, a society of Moravian Brethren settled at Z., where they have built a separate quarter, consisting of public and private buildings, erected along the sides of two large grassy squares, called the Easter Plain and the Wester. Besides the church, there is an excellent day and boarding-school, which is resorted to by children of parents belonging to various Protestant communions. The unmarried members live, the males in the Brothers' House, the females in the Sisters' House. Another building is set apart for widows. There are also family residences, workshops, and warehouses. In 1870, the pop. of Z. numbered 5440; in 1875, 5547.

ZIE'RIKZEE, an old and important town in the Netherlands, province of Zeeland, is situated in the south-east of the island of Schouwen. It was fortified before the beginning of the 11th c., and owed its rise and prosperity to the shipping-trade and fishing. The walls have been leveled, planted with trees, and formed into shady walks. Z. has two havens, the old and the new, two Dutch Reformed churches, a Lutheran, a Roman Catholic, a small dissenting church, and a Jewish synagogue. There are a grammar-school, a school of design, and other excellent public schools maintained by the town. The principal means of living are trade in agricultural produce, shipping, ship-building, fishing, weaving calicoes, beer-brewing, drying madder, sawing wood, grinding corn, &c.

Z. suffered severely in the contests between Flanders and Holland for the possession of Zeeland. In 1303, the Flemings besieged it with a large army, but were compelled, by Count William of Holland, to retire, on the 10th of August 1304. In the long war of independence, after an obstinate defence, the Spaniards took Z. on the 2d of July 1576. Pop. (1870) 7834; in 1875, 8043.

ZIGZAG, in Military Science, a trench of approach against a fortress; so constructed that the line of trench may not be enfiladed by the defenders. See SIEGE.

ZIGZAG, a decoration characteristic of the Norman style of architecture. It consists of one or more mouldings running in zigzag lines, and is used with great effect. The zigzags are employed in great profusion, and are sometimes undercut so as to be detached from the mouldings.

ZI'LLEH (ancient *Zela*), a town in Asiatic Turkey, in the pashalic of Sivas, about 30 miles west-south-west of Tokat. It is built on a height, with a small flat conical hill in the center of the town, which is evidently the mound or road, of which another portion is still seen at Thyana, the construction of which was attributed to Semiramis. Scarcely any remains of antiquity are to be found here; an ugly fortress of the middle ages having usurped the place of its beautiful temple. This was the field of Julius Cæsar's battle with Pharnaces, of which he wrote 'Veni, vidi vici.' There are several large khans, and manufactures of coarse cottons. Its annual fair, of 15 or 20 days, from the middle of November, is often frequented by 40,000 or 50,000 persons from the commercial towns of Asiatic Turkey. There are about 2000 houses, the population being almost entirely Turkish.

ZI'LLERTHAL, one of the principal valleys in the Tyrol, traversed by the Ziller, is about 50 miles long. Towards the south and south-west, it is bounded by lofty glaciers; but towards the north, where it opens into the valley of the Inn, it is tolerably fertile. Among the eight secondary valleys are the Duxerthal—famous for its precipitous glaciers, 1200 feet high—and the Zemthal, both remarkable for several great waterfalls. The inhabitants of the Z., who number about 15,000 are celebrated even in the Tyrol for their handsome, well-built figures; and their fine Alpine songs are well known and appreciated in London and Paris.

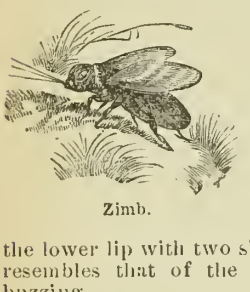
The chief wealth of the Z. is derived from the rearing of cattle. About 5000 head of cattle are exported yearly; but, notwithstanding, the valley is not able to support its numerous population.

Many of the men hire themselves out as servants for the summer, while others go about as pedlers, selling essences of herbs and gloves, of which 10,000 pair are made yearly. The principal towns are Zell and Mairhofen. For some years, the valley has been much visited by artists, chiefly from Munich.

In recent times, the inhabitants of Z. acquired considerable notoriety by a part of them leaving the Roman Catholic Church, and emigrating. For a considerable time, they had been in the habit of reading the Bible, and were on friendly terms with the Protestant Church, although still attending the Roman Catholic service; but when, in 1826, the Catholic clergy began to enforce auricular confession with greater strictness, a number of them thought seriously of going over to the Protestant Church. Ere long, they not only objected to the confessional, but to the worship of the saints, absolutions, masses for the soul, purgatory, &c. In 1830, they began to leave the church; and by 1832, the number of dissenters had amounted to 240. The Emperor Francis, to whom, on his visit to Innsbrück in 1832, they addressed a petition regarding their religion, promised them toleration; but after considerable delay they were told (1834) that they must either return to the Catholic faith or remove to Transylvania, where there were Protestant congregations. As the Zillerthalers could not agree to this, they formed the resolution as the Protestants of Salzburg had once done, of seeking a refuge in Prussia. This was granted; and the Zillerthalers, who had been allowed by the Austrian government to sell their property, set out, August 1837, for Prussia.

In all, 399 men, women, and children arrived, 2d October, at Schmiedeberg, in Silesia, where they were to stay until the arrangements for their reception in Ermannsdorf were completed. The king gave them 22,500 thalers (£3375) on their settlement, and (1839) made them a further grant of 12,500 thalers (£1875) for a church and school. The colony received the name of Z., and in 1871 numbered over 400 inhabitants.—See *Geschichte der Zillerthaler Protestanten* (Nürnb. 1838); Rheinwald, *Die Evangelischgesinnten in Zillerthal* (4 Aufl., Berl. 1838).

ZIMB, a dipterous insect, exceedingly destructive to cattle in Abyssinia, as the Tsetse (q. v.) is in the more southern parts of Africa. It probably belongs to the same family, but this has not yet been ascertained. It is supposed to be the *Zebub* of the Hebrew Scriptures (Is. vii. 18). Bruce describes it as very little larger than a bee, but thicker in proportion; the wings broader, and without color or spot; the head large; the upper lip sharp, having at the end of it a strong pointed hair, a quarter of an inch long; the lower lip with two similar bristles. The flight of the insect resembles that of the gadfly, and is attended with a peculiar buzzing.



Zimb.

The Z. is found only where the soil consists of a rich black loam; but all the inhabitants of the sea-coast, along the southern shores of the Red Sea, and southwards beyond Cape Guardafui, are compelled to remove their cattle in the rainy season to the nearest sands, in order to prevent their destruction by this pest, as well as those of more inland districts from the mountains of Abyssinia northwards to the confluence of the Astaboras and the Nile. 'As soon as this plague appears, and their buzzing is heard,' Bruce says, 'all the cattle forsake their food, and run wildly about the plain till they die, worn out with fatigue, fright, and hunger.' The camel, the elephant, and the rhinoceros are liable to the attacks of the Z., as well as the ox; but the elephant and rhinoceros protect themselves by rolling in mud, which, when dry, coats them as a kind of armor.

ZIMMERMAN, Johann Georg, a native of the town of Brugg, in the Swiss canton of Bern, in which his father was a senator, was born on the 8th December 1728. He was educated at home, in the first instance, and afterwards at Bern, preparatory to his going to the university of Göttingen to study medicine. This he did in the year 1747. By his countryman, the celebrated Haller, he was kindly welcomed; he became an inmate of his house, and had the advantage of his valuable aid in the prosecution of his studies. In these he displayed the utmost ardor, not content to confine himself to medicine, but aiming at a large and liberal culture. In his specialty, so great was the proficiency attained, that on his taking his degree of Doctor in 1751, he published a work entitled *Dissertatio Physiologica de Irritabilitate*, which not only at the time attracted attention by its originality of view, but even now is held to be not without value.

In 1752, he began to practise as a physician at Bern with every prospect of success; but shortly after, the post of public physician falling vacant in Brugg, his native place, he was induced to transfer himself thither. About this time, he was married to a relation of his friend and preceptor, Haller. Despite the extensive practice he speedily acquired, with such a reputation for skill as brought patients from a great distance to consult him, he continued to cultivate other pursuits; and in 1756, he published a miscellany of prose and verse, remarkable as containing the first sketch of his treatise *On Solitude*, which afterwards became so famous. In 1758 appeared his work on *National Pride*, an ingenious and able dissertation, which immediately became popular, and carried the name of the writer, by translation, into nearly every country in Europe. That he did not, however, neglect his special department of study was proved in 1763 by the appearance of an elaborate work on Experience in Medicine (*Von der Erfahrung in der Arzeneikunst;* Zürich, 2 vols. 8vo). Of this, the great value was instantly recognized, and it still continues to enjoy some portion of its first reputation. Z. was now a man of European note; and among other advantageous offers made to him was that of the post of Physician to the king of Britain at Hanover, with the title of Aulic Councilor attached to it. This he accepted; and to Hanover he accordingly went in 1768. His repute as a physician continued here to increase, and from all quarters came flocks of people to have the benefit of his advice. In 1770, he had the misfortune to lose his wife; and this distress was complicated by an attack of an internal malady, which soon after obliged him to go to Berlin to undergo a perilous operation. This was successfully performed, but did not preclude a return of the complaint some time after. His only daughter now died; and a son who survived sunk under the influence of disease into something like entire idiocy.

Z., who had almost from his very boyhood had to struggle against a constitutional melancholy, became now, as it almost seemed, a confirmed and hopeless hypochondriac. From this deplorable state he was rescued for a time by a second marriage, into which his friends persuaded him; and as fruit of his revived interest in life, he gave to the world, in 1784, his celebrated work On Solitude (*Ueber die Einsamkeit;* Leipzig, 4 vols. 8vo), a book which speedily became a popular favorite throughout Europe. In 1786, he was invited by Frederick the Great, then in his last illness, to attend him at Potsdam. On going thither, he found that the case of the king was beyond the reach of his art. He remained, however, for some time; and as the result of his sojourn, he published in 1788 and 1790, two works on Frederick the Great, the manifold indiscretions contained in which involved him in much painful and acrimonious controversy. In excuse of much in the books not easily to be defended, everything seems to show that they were merely the first indications of a return of his constitutional malady in an aggravated, and, as it proved, a finally intractable and hopeless form. His melancholy hallucinations continued to grow upon him, till he was at length little better than a mere maniac; and on the 7th of October 1795, he died at Hanover. During these last sad years, he had continued at intervals to write and publish; but in everything thus produced there was evident the wreck of his once brilliant faculties. As a physician, a philosopher, a man of general accomplishment, and a writer of singular power and felicity, Z. was unquestionably one of the most remarkable figures of his time. Of Zimmerman on *Solitude* every one must needs have heard: it no longer retains the immense popularity it once had; but along with his more expressly medical treatises, which are of interest—if not very much now otherwise—in relation to the history and development of his profession, it must still continue for a time to perpetuate the name of its writer.—See *Z.'s Eigene Lebensbeschreibung* (Autobiography, Han. 1791); Tissot, *Vie de Z.* (1797); Wichmann *Z.'s Krankengeschichte* (1786); Bodemann, *J. G. Z.* (1878).

ZINC (Zn, eq. 32·5—new system, 65—sp. gr. 6·8), or *Spelter*, as it is often called in commerce, is a hard bluish-white metal, lustrous externally, and when broken, exhibits a foliaceous crystalline fracture. At ordinary temperatures, it is somewhat brittle; but when heated to above 212°, it becomes perfectly ductile and malleable, and may be drawn out into wire or beaten into thin plates. At about 400°, it again becomes so brittle that it may be easily pulverized. It fuses at 773°, and at a white heat may be volatilized; and if the vapor be exposed to the air, it burns very brilliantly, and is converted into oxide of zinc, which is deposited in copious white flakes. The temperature of its boiling-point is estimated by Deville at 1904°. On exposure to the air, zinc soon loses its metallic lustre, and assumes a gray appearance, in consequence of its surface becoming oxidized, while the metal beneath is thus protected from further change—a property which renders this metal especially useful for many economical purposes. It has no action on water at ordinary temperatures, but if a mineral acid be present, it readily decomposes water, and is employed to decompose the water of dilute sulphuric acid, when hydrogen is required. Moreover, a hot solution of potash acts on zinc, hydrogen being liberated, while oxide of zinc is formed and dissolved in the alkaline solution. Zinc precipitates from their solutions most of the electro-positive or basylous metals less oxidizable than itself.

This metal is never found in the native state; the chief ores from which it is extracted are noticed below.

The commercial zinc obtained by the ordinary methods of extraction usually contains a small quantity of lead, iron, and carbon, with occasional traces of arsenic and copper. In order to obtain it in a chemically pure state, a stream of sulphuretted hydrogen is passed through a slightly acidulated solution of sulphate of zinc, and after the removal of any precipitate that may be found, the solution is boiled so as to expel the gas, after which the zinc is precipitated in the form of carbonate, by the addition of carbonate of soda. The carbonate is converted by ignition into oxide of zinc, which must be distilled in a porcelain retort with the purest available form of carbon, as, for example, charcoal prepared from loaf-sugar.

Zinc is commonly regarded as forming only one compound with oxygen—namely, the *protoxide of zinc* (ZnO), although it has been suggested that the film which is formed upon the surface of metallic zinc by exposure is a sub-oxide. Protoxide of zinc is obtained by heating the metal in the air, the white oxide thus obtained being formerly known as *Lana philosophica*, from its woolly appearance; while it was known as *Flores zinci*, or *Flowers of Zinc*, in pharmacy. The process of manufacturing this oxide, when it is required as a pigment, consists, as Professor Miller remarks, 'in distilling zinc from clay retorts into chambers through which a current of air is maintained. The volatilized metal burns at the high temperature to which it is exposed under these circumstances; and the oxide is deposited in a series of condensing chambers.'—*Inorganic Chemistry*, 3d ed. p. 545. The pigment thus obtained is known as *Zinc White*.

The impure oxide of zinc, commonly known as *Tutty*, is obtained from the flues of furnaces in which brass is melted. A hydrated oxide of zinc (Zn,HO) is precipitated in a white gelatinous mass from the solution of the salts of zinc by the addition of potash or soda, but redissolves in an excess of alkali. Oxide of zinc is readily soluble in acids and is capable of being reduced by charcoal, but not by hydrogen. The most important salts formed by oxide of zinc are the sulphate and carbonate. *Sulphate of Zinc*, or *White Vitriol* ($ZnO,SO_3 + 7Aq$), occurs in large transparent, glistening, four-sided prismatic crystals, resembling those of Epsom salts. At a temperature a little below 212°, the crystals lose six equivalents of their water of crystallization, and at a somewhat greater heat, they lose their last equivalent, and previously to losing their water of crystallization, they fuse in it. This salt is readily soluble in water, requiring 2½ parts of the latter for its solution at 60°. It is obtained in considerable quantity as a residue in the process of obtaining hydrogen from dilute sulphuric acid and zinc; and it is prepared on the large scale by roasting and lixiviating zinc-blende or sulphide of zinc, which, when heated in the presence of air, is oxidized into the sulphate. *Carbonate of Zinc* (ZnO,CO_2) constitutes one of the most important of the zinc-ores—viz., the common or rhomboidal variety of *calamine*, a name which is derived from the property which this substance possesses of adhering after fusion in the form of reeds to the base of the furnace. Carbonate of zinc may be artificially prepared by precipitating a salt of oxide of zinc with carbonate of soda, when the required salt falls as a white precipitate; this is, however, not simple neutral carbonate, but a basic carbonate, having the composition expressed by the formula $2(ZnO,CO_2), 3(ZnO.HO)$.

Of the haloid salts, the *Chloride of Zinc* (ZnCl), formerly known as *Butter of Zinc*, is the only one requiring notice. This salt is obtained in the anhydrous form by burning zinc in chlorine gas, and in the hydrated state by dissolving zinc in hydrochloric acid, and evaporating the solution, chloride of zinc being thus formed, while hydrogen escapes in the gaseous form. In the anhydrous state, it forms a whitish-gray, semi-transparent mass, which fuses readily, and sublimes at a high temperature. When exposed to the air it soon deliquesces, and is soluble in water in all proportions. The watery solution has a burning and nauseous taste, and in a concentrated state acts as a powerful caustic. It may be crystallized with 1 equivalent of water from its aqueous solution; and it is soluble in alcohol. It 'forms double salts with the chlorides of sodium, potassium, and ammonium; and a concentrated solution of the double chloride of zinc and ammonium ($H_4NCl + ZnCl$) is much used for the purpose of removing the film of oxide from the surface of metals, such as zinc, iron, or copper, which are to be united by the operation of soldering.'—Miller's *Inorganic Chemistry*, 3d ed. p. 546. With sulphur, zinc forms only one combination—viz., *sulphide of zinc*, or *blende* (ZnS), which is one of the most abundant of the zinc minerals. Blende, when pure, is of a pale brown color, but it is commonly blackish from admixture with sulphide of iron. It usually occurs crystallized in rhombic dodecahedra, or allied forms, but sometimes is found in the massive state.

Sulphide of zinc may be obtained artificially as a white precipitate, which, on drying becomes yellow, by the addition of sulphide of ammonium to a solution of a zinc-salt. Zinc forms several important alloys, amongst which *brass* (consisting of 2 parts of copper to 1 of zinc) and *German Silver* (q. v.) may be specially noticed. Professor Miller sums up the characters of the salts of zinc as follows: 'The salts of zinc are colorless; their solutions have an astringent, metallic taste, and act rapidly as emetics. They are distinguished by giving no precipitate in acid solutions with *sulphuretted hydrogen*, but they yield a white hydrated sulphide of zinc with sulphide of ammonium.'

Manufacture.—That the Romans were acquainted with the art of making brass—an alloy of copper and zinc—is proved by the analysis of some of their coins struck soon after the commencement of the Christian era. Yet zinc itself was not known in Europe as a distinct metal until Paracelsus described its distinctive properties in the 16th century. Probably the Roman brass was produced by smelting ores containing both zinc and copper, some of which are at the present day smelted in Sweden. Zinc, however, was brought from the East by the Portuguese long before it became an article of commerce in Europe, and is supposed to have been known and made into articles of use and ornament both in India and China from an early period.

There are several ores of zinc, but only two of much importance—viz., blende and calamine. Blende, black-jack, or sulphuret of zinc, contains, when pure, about 67 per cent. of zinc, but, like most ores, it is rarely found pure. The usual composition of English blende is zinc 61, iron 4, and sulphur 33. It occurs in all the older geological formations, and is often associated with the ores of copper and tin, but most frequently with lead ore—occurring, of course, like these in veins. Blende crystallizes in the form of the rhomboidal dodecahedron. The crystals have considerable brilliancy, but their lustre is waxy rather than metallic. In this country, it is usually of a dark color, from the sulphuret of iron which it contains—hence the miners' name of *black jack*. Sometimes it is sufficiently argentiferous to allow of the profitable extraction of the silver. Blende is found in Wales, Isle of Man, Cornwall, and Derbyshire. It is also found in a good many localities on the continent—Sweden, in particular, being rich in this ore.

Calamine, or carbonate of zinc, contains, when pure, 52 per cent. of zinc, but it varies much in the proportion of metal which it contains on account of impurities. Its primitive crystalline form is the rhombohedron, but calamine as well as blende occurs more frequently massive than in crystals. It is usually either of a dull yellow or reddish-brown color. Like some other useful substances, calamine was formerly exported from England as ballast, through ignorance of its value. It was at one time raised to a considerable extent in Somersetshire, Derbyshire, and Cumberland, but it is chiefly the last county which produces it now. Belgium, Silesia, and Carinthia are well-known continental localities; recently extensive deposits of it were discovered on the north coast of Spain, which are estimated to last for ages; and the island of Sardinia is an important source.

Red oxide of zinc is found in New Jersey, U. S., where it is smelted. This is an oxide of zinc with a small quantity of oxide of manganese, which gives it its red color. Silicate of zinc, or

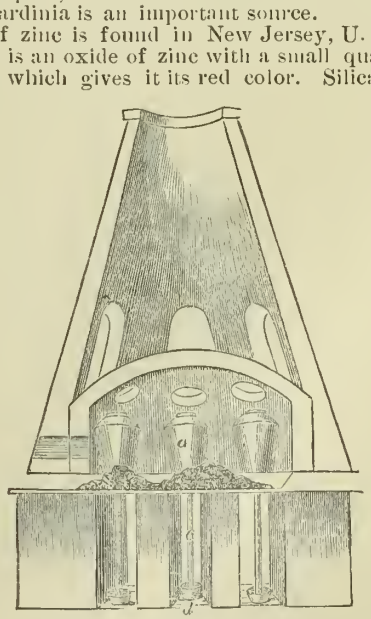


Fig. 1.

electric calamine, is another rare ore, generally associated when found with calamine. It is said to be smelted in the United States, and to yield very pure zinc.

There are several distinct processes for the extraction of zinc from its ores, and of these the English, the Belgian, and the Silesian are the most important. The English process is as follows: The zinc ore (blende or calamine) is crushed between rollers to the size of hazel-nuts, and then roasted for about twelve hours, with occasional stirring, in a calcining furnace. The furnace in

which the roasted ore is reduced very much resembles a glass-furnace. It is either circular or octagonal in form, and usually contains six pots or crucibles, made of Stourbridge fireclay, about 3 feet high by 2¼ feet in their widest diameter. In the bottom of each pot there is an opening, from which a sheet-iron tube, in two pieces, descends about 8 feet, and under its open end there is a sheet-iron vessel to receive the condensed zinc. Fig. 1 gives a sectional view of this furnace, and Fig. 2 a view of one of the pots with its appendages on a larger scale. Zinc being volatile at high temperatures, is smelted by distillation, and in the English process it is called distillation *per descensum*. An entire charge—that is, a charge for the whole six pots (*a*)—consists of one ton of calcined ore mixed with a proper quantity of ground coke. When the pots are charged, their covers are fixed and luted on, the conical portion of the descending pipe (*b*) being previously securely fixed and lined with fireclay. The hole in the bottom of the pot is plugged with wood, which becomes converted into charcoal by the heat, and is then sufficiently porous to allow the zinc vapor to pass down, while at the same time it stops the descent of the coke or ore. The heat of the furnace is gradually raised, and soon produces vapor of zinc in the pots, which condenses as it descends the pipes (*c*), and drops into trays (*d*) placed at the bottom of each pipe. Sometimes a tube becomes stopped by a lump of zinc, and when this happens, the furnace-man melts it with a bar of red-hot iron. It takes nearly three days to work off the above charge, which yields about 8 cwts. of zinc, and requires about 25 tons of coals for its distillation. It is necessary to watch the pots with great care while the process is going on, as any leakage usually causes much loss of zinc. The *rough zinc*, as it is called, is removed from the pans, where it accumulates in lamps, and melted in cast-iron pots. It is then well stirred and skimmed, and finally cast into ingots or cakes of the ordinary commercial size—the skimmings being worked over again with a new charge of ore.

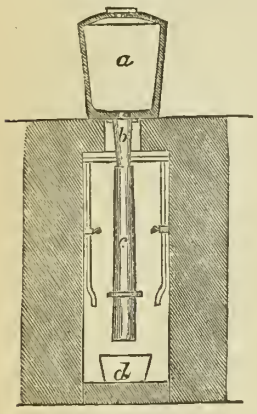


Fig. 2.

The Belgian furnace differs greatly in its construction from the English. It consists of from 60 to 80 small fireclay retorts, *a*, *a*, *a*, each about 3 feet 6 inches long, by 8 inches in diameter, and set in a series of rectangular compartments, filling up an arched chamber. Fig. 3 shows a transverse section of this furnace. There is a clay nozzle or condenser, *b*, *b*, *b*, attached to the front of each retort, and on the end of this nozzle there is a sheet-iron receiver, *c*, *c*, *c*, for the condensed zinc. The fireplace is shown at *d*, and *e* is the pit to collect the residue from the retorts. The retorts are charged with ground and roasted calamine, mixed with small-coal free from sulphur. As the upper retorts receive less heat than the lower ones, they are not so heavily charged, and they are, moreover, supplied with less pure ores. At the end of every six hours, the receivers are emptied of their melted zinc. In this process, a ton of ore can be smelted in 24 hours, and the yield from it is about 40 per cent. of metallic zinc.

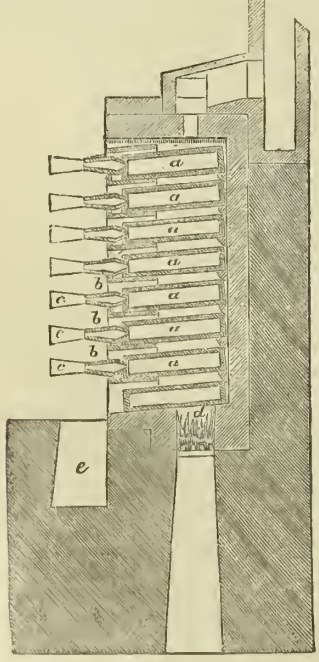


Fig. 3.

In the Silesian furnace, fireclay retorts, about 4 feet long by 1 foot 6 inches in diameter, are arranged in two rows, back to back, and placed horizontally on a flat furnace-bed, with a fireplace on a lower level running along between the backs of the retorts. A condensing apparatus comes away with a curve from the upper part of the front of each retort, and descends some 2 feet below it. From this, the zinc, on condensing, drops on the ground, or into a tray placed to receive it.

With regard to the comparative merits of these three processes of smelting zinc, no very decided opinion appears to be yet arrived at by those who have the best means of judging. The Belgian process consumes the least fuel, but requires the greatest amount of labor; the English, on the other hand, is worked with the least amount of labor, but requires the most fuel; whilst the Silesian holds a sort of middle position between those extremes. Each, however, has minor advantages and disadvantages which the others have not. All three processes are in use in England.

Zinc, at ordinary temperatures, is a comparatively brittle metal; but about the beginning of the present century, it was discovered that, if heated to between 200° and 300° F., its malleability and ductility were so increased that it could be rolled with facility into thin sheets, or drawn into fine wire. Since this was known, the uses of the metal, which formerly was only employed along with copper to make brass, have become greatly extended. In sheets, it is used for roofing, baths, water-tanks, spouting, and the like; also for covering ships' bottoms instead of copper. A considerable quantity is consumed for name-plates, for engraving upon, and for galvanic batteries. Perforated sheets with various ornamental patterns are manufactured for screens, blinds, light fences, and similar objects. As a material for casting artistic works, zinc possesses the desirable properties of having a low melting-point, and of taking a sharp impression from the mould, so as to require but little labor from the chaser; it has also considerable hardness. It has, in consequence, become a favorite material on the continent for making casts of statues, statuettes, and different kinds of ornaments.

Of late years, zinc has been applied with great success to the coating of sheet-iron for roofing and other purposes, and also for coating various kinds of iron wire, especially telegraphic wire. See GALVANIZED IRON.

We may remark here, that when zinc is exposed to a moist atmosphere, its surface becomes coated with a thin compact film of oxide or rust, which protects the metal beneath from further oxidation, whereas the rust of iron appears rather to penetrate the body of the metal with greater ease when it has once begun. Hence the value of zinc as a material for roofing, and also for protecting the surface of iron roofs.

The average annual produce of the zinc mines of the United Kingdom, for several years past, may be taken, in round numbers, at 15,000 tons of ore, yielding about 4000 tons of zinc, of the value of from £80,000 to £100,000, according to the market price of the metal, which has varied considerably. Our imports, in like manner, have amounted to about 15,000 tons annually of metallic zinc, the greater part of which came from Prussia, Belgium, and Holland.

Oxide of zinc is now employed to a large extent as a white pigment. It is of a purer color than white lead, does not tarnish and blacken like it with sulphuretted hydrogen, and is much healthier for operative painters, but unfortunately it is deficient in body. It is also used as an ingredient in pottery colors. An impure sulphate of zinc, known as *white vitriol*, is also employed in various arts.

Medical Uses.—In its purely metallic state, zinc produces no effect upon the animal economy, but several of its compounds are very active medicines. As a matter of convenience, we shall consider these compounds alphabetically, beginning with *acetate of zinc*, a salt not considered in the article on the chemistry of this metal. It is obtained by dissolving, with the aid of heat, carbonate of zinc in a mixture of acetic acid and distilled water, filtering the liquid while still hot, and setting it aside to crystallize. In this process, the carbonic acid of the carbonate of zinc is displaced by the acetic acid, and escapes with effervescence. The salt is obtained in thin, translucent, and colorless crystalline plates of a pearly lustre, with a sharp unpleasant taste, soluble in water, from which it may be precipitated pure white, by sulphuretted hydrogen, and evolves acetic acid when decomposed by sulphuric acid. The crystals contain 3 equivalents of water, and their composition is represented by the formula, $ZnO,C_4H_3O_3 + 3Aq$. Acetate of zinc is not much employed internally, but it is one of the most valuable local astringents, and is especially useful (in the

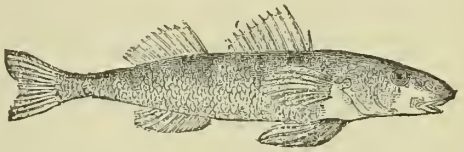
form of solution of from 3 to 5 grains in an ounce of water) in the treatment of skin-diseases attended with much discharge, such as eczema, impetigo, &c., when the first inflammatory symptoms have subsided; and it forms a useful astringent in the milder form of ophthalmia. It was the active ingredient in Sir Astley Cooper's celebrated injection for gonorrhœa in the third week—six grains of sulphate of zinc mixed with four fluid ounces of dilute solution of subacetate of lead, when sulphate of lead is precipitated, and acetate of zinc is held in solution. When employed as an ointment in skin diseases, from 4 to 10 grains finely powdered may be rubbed up with cold cream or simple ointment. *Carbonate of Zinc* is obtained for pharmaceutical purposes by the decomposition of sulphate of zinc in solution and carbonate of soda, when the carbonate of zinc is precipitated as a white, tasteless, inodorous powder, insoluble in water, but soluble with effervescence and without residue in dilute sulphuric acid. This preparation has been introduced as a substitute for *native calamine*, which formerly had a high reputation, but was so frequently adulterated as to render an officinal salt of known composition very desirable. Either in powder, or in the form of ointment, it forms an excellent astringent application for the treatment of intertrigo (or chafing of the skin), excoriations, and chronic skin diseases attended with much discharge. *Turner's Cerate*, although not in the Pharmacopœia, is in general use as a drying and healing ointment, and is one of the most popular remedies for superficial burns and sores. It is made by taking prepared calamine (or carbonate of zinc) and wax, 7½ ounces of each, and olive oil 1 pint. Melt the wax, and mix the oil with it, then remove them from the fire, and when the mixture begins to thicken, add the calamine, and stir constantly till they cool. *Chloride of Zinc*, in the form of colorless opaque rods, obtained by pouring the concentrated solution into proper moulds, is used in surgery as a powerful caustic in cases of cancer, fungous growths, &c. In toothache caused by caries, a minute portion of chloride of zinc introduced into the cavity of the tooth after the removal of the diseased parts, affords almost immediate relief. In consequence of its powerfully destructive properties, it should never be applied except by the surgeon. The solution of this salt, commonly known as *Burnett's Disinfectant Fluid*, is of much use in the sick-room or hospital ward as a deodorizing agent; as, however, it possesses strong caustic properties, great care must be taken that it is not administered internally in mistake for some other medicine. Few years pass without several fatal cases of this kind being recorded. *Oxide of Zinc* is characterized in the Pharmacopœia as 'a soft, white, tasteless, and inodorous powder, becoming pale yellow when heated, and forming with diluted sulphuric acid a solution which gives a white precipitate with hydrosulphide of ammonia.' It is employed internally with much success as a tonic in chorea and epilepsy, in which it must be given for a considerable period, and in gradually increasing doses till a scruple is taken daily. In doses of one or two grains combined with extract of henbane, it forms an admirable night-pill to check the perspiration in pulmonary consumption. Employed externally, either in the form of powder or ointment it forms a good astringent in cases of excoriation, sore nipples, intertrigo, slight ulcerations, &c. The officinal ointment containing 80 grains to an ounce of simple ointment, is too strong for ordinary cases, and is apt to *cake* upon the surface: these defects may, however, be removed by the addition of glycerine. *Sulphate of Zinc* is employed as an astringent, a caustic, an emetic, and a tonic. As an astringent, it is given internally in small doses (of from half a grain to two grains, made into a pill with conserve of roses), in cases of chronic diarrhœa, chronic bronchitis, and long-standing leucorrhœa; while it is used topically as a lotion in old ulcers (from 5 to 20 grains to an ounce of water), as a collyrium in chronic ophthalmia, and as an injection in the abortive treatment of gonorrhœa (i. e., when we wish to cut short the disease before inflammatory symptoms appear).

As a caustic, this salt, in its anhydrous state, and finely levigated, was strongly recommended by the late Sir James Simpson. He applied it in the form of powder; of a paste made with glycerine in the proportion of a drachm of the latter to an ounce of the powder; or of an ointment consisting of two drachms of prepared lard, rubbed up with an ounce of the powder. It has also been successfully used in the Dublin hospitals. Sulphate of zinc may be given in the same doses as the oxide as a tonic in cases of nervous palsy, and in the exhaustion dependent upon sexual excesses. In large doses, as from 15 to 30 grains, it operates as a safe and speedy emetic, and is preferable to all other emetics in cases of poisoning. In toxicological researches—as in Marsh's *Test for Arsenic*—great care must be taken to see that the zinc which is employed is perfectly free from arsenic, which is a not uncommon impurity.

ZINCO'GRAPHY is essentially the same art as Lithography (q. v.), zinc-plates being substituted for those of stone. One form of the art is described under the name of Anastatic Printing (see PRINTING). A style of it, called Paneiconography, brought forward by Gillot of Paris for the purpose of reproducing, by lithographic, autographic, or typographic proof, any drawing with crayon or stump, or any engraving from wood or copper, is thus described: A plate of zinc finely polished is prepared, and if an original drawing is to be copied, it is done by the artist in lithographic crayon on this plate; autographic writing done with the crayon, lithographis, and fresh proofs of wood or copper-plate engravings, must be transferred in the usual way to the surface of the plate; and whilst still wet, an ink-roller is passed over, so as to give a deeper impression.

Rosin very finely powdered is then sifted over, which adheres to the wet ink, and becomes consolidated, so that the superfluous powder is easily brushed off from the parts not covered with ink. The plate is next placed with its face upwards in a shallow trough containing dilute sulphuric or hydrochloric acid sufficient to slightly cover it; the trough is then gently rocked, so as to make the acid flow backwards and forwards over the plate, and if this be continued for some time—an hour or upwards—all the parts of the plate not covered with the ink and rosin are etched deep enough to be used as a relief-plate for printing from. In impressions where there are large interspaces, it is usual to saw them out; and in some cases, where it is found that the relief is not sufficiently high, the raised parts are re-inked, and again covered with the rosin, and submitted a second time to the action of the acid. Old engravings may be transferred by laying them to become damp on a board wetted with acidulated water, and then applying the ink-roller to the face of the engraving; the ink only acts upon the ink-lines of the engraving, and is repelled by the acid moisture which has been imbibed by the uncovered white spaces. A slight pressure will then easily produce a copy on the polished zinc-plate, which is perfected by the subsequent operations.

ZI'NGEL (*Aspro*), a genus of fishes of the perch family, remarkable for the elongated form of the body, and for having the mouth situated under the projecting and rounded snout, also for the roughness of their scales. The dorsal fins are widely separated, and the ventral fins are large. Only two species are known: of which one, the Z. of the Danube (*A. zingel*), inhabits that river and its tributaries, attains a length of fifteen inches, and a



Zingel (*Aspro vulgaris*).

weight of two or three pounds; the other (*A. vulgaris*) is found in the Rhone and its tributaries, and also in more eastern rivers, although unknown in those of the west of France, and is only six or seven inches long. Both are esteemed for the table.

ZINGIBERA'CEÆ. See SCITAMINEÆ.

ZINZENDORF. NICOLAUS LUDWIG, COUNT VON, the founder of the existing sect of the Moravian Brethren, or Herrnhuters, was born at Dresden, 26th May 1700. His father, a Saxon state minister, dying while Z. was a child, the latter was educated by his grandmother, a learned and pious lady, the Baroness von Gersdorf. Spener, the head of the Pietists, was a frequent visitor at her house, and his conversation, and the devotional exercises in which Z. took part, influenced his character while a mere child. In 1710, he went to Halle, where he spent six years, under the special care of Francke, the philanthropist. Z. founded among his fellow-pupils a religious society, to which he gave the name of the 'Order of the Grain of Mustard-seed.'

In 1716, he was sent by his relatives to Wittenberg, where Pietism was in less repute than at Halle; but he adhered to his early religious impressions. Two years afterwards, he traveled through Holland and France, everywhere endeavoring to convert the distinguished persons whom he met to his own religious views. On his return to Dresden, he was appointed a member of the Saxon state council, and married the sister of the Count Reuss von Ebersdorf. But political life was little to his mind, and he returned to his country seat in Upper Lusatia. While residing there, he accidentally met a wandering carpenter, named Christian David, a member of the old sect of Moravian Brethren, of whom some still remained in Moravia, professing the doctrines taught by John Huss. David described the persecutions to which the sect were exposed; and Z. invited him and his friends to settle on his estate. They accepted the proposal, and the colony received the name of 'Herrnhut.' Z. acted with great liberality to the settlers, and their success attracted much attention. In 1734, Z. went under a feigned name to Stralsund to pass an examination in theology, and was ordained a minister of the Lutheran Church. In 1736, he was banished from Saxony, on a charge of introducing dangerous novelties in religion. He repaired to Holland, where he

founded a Moravian colony, and afterwards to Esthonia and Livonia, where he also founded colonies. In 1737, at the request of King Frederick-William I. of Prussia, he was ordained Bishop of the Moravians. In the same year, he went to London, where he was received with much consideration by Wesley.

In 1741, he went to North America, accompanied by his daughter, and founded the celebrated Moravian colony at Bethlehem. The Herrnhuters, in the meanwhile, by their good conduct and industry, had won the respect of all classes in Saxony, and in 1747, Z. was allowed to return to Herrnhut. Having received authority by act of parliament to establish Moravian settlements in the English colonies of North America, he returned thither to do so. He finally settled at Herrnhut; and his first wife being dead, married Anne Nitschmann, one of the earliest colonists from Moravia. He died on 9th May 1760. Thirty-two preachers, from all parts of the globe, accompanied the coffin to the grave. Z. was the author of more than 100 works in verse and prose. His hymns, used in worship by the Moravians, are objectionable on account of their pious indecency. The same may be said of his sermons, especially of those which refer to the Holy Ghost as a spiritual mother. His writings are often incoherent or mystical, but they abound with passages in which deep and original thought is expressed with great clearness and beauty.—There are lives of Z. by Spangenberg (1775), Varnhagen von Ense (in his *Biographische Denkmale*, 1830), and Burkhardt (1876).

ZI'ON. Mount Z. is the name of the hill on which the south-west part of Jerusalem, the City of David, or Upper City, with the citadel of David, stood. At the present day, only the north half belongs to the city, the city wall running obliquely over the hill. On the west and still more on the south side, it descends steeply into the Vale of Hinnom to a depth of 300 feet. Mount Z. is 2537 feet above the level of the Mediterranean Sea. With the prophets and poets of the Old Testament, Z. often stands for the whole of Jerusalem (also called 'Daughter of Zion'), particularly in reference to the Temple. See JERUSALEM.

ZIRCO'NIUM (symb. Zr, equiv. 44·8—new sys. 89·6) is the metallic constituent of the earth *zirconia*, which is found in association with silica in the minerals *zircon* and *hyacinth*. The composition of zirconia is usually represented by the formula Zr_2O_3, but Swanberg regards zirconia not as a pure earth, but as a mixture of three; and to one of the metals, whose earths he thinks that he has isolated, he gives the name of *Norium*. The sources from which zirconium is derived are so few (it being found only in Ceylon, one district of the Ural, and Southern Norway), that it is unnecessary to enter into any details regarding it.

ZI'RKNITZ, or CZIRKNITZ, LAKE (Ger. *Czirknitzersee*, *Lacus Lugeus* of Strabo), a small lake of Austria, in Carniola, about 20 miles south-south-west of Laibach, and 30 miles east-north-east of Trieste, is situated in a deep valley to the south of Mount Javornik, and to the north-east of Mount Slivinza. The lake is about 5 miles long, and between 2 and 3 broad, is surrounded with numerous villages, chapels, and castles, contains four small islands —on the largest of which is built the hamlet of Ottok—and has no surface outlet. It is about 56 feet deep in the deepest part, and is very irregular in shape. It is worthy of notice only on account of the very remarkable phenomenon of the occasional disappearance of its waters for several weeks, and even months, during which the bottom is often covered with luxuriant herbage, which the peasants make into hay; sometimes also they manage even to sow and reap a small crop of buckwheat in its deserted bed. The waters, however, are not perfectly regular in their disappearance —indeed, sometimes for five or six years together they have not retired at all—but generally they drain off in the end of August, and return, if the season be wet, in five or six weeks. It takes between 20 and 25 days to empty the lake, but the return of the waters is sudden and unexpected, its basin being refilled sometimes in 24 hours. The phenomenon is accounted for by the nature of the bed of the lake. It is composed of limestone, and, like all the Carniolaic plateau, is full of deep fissures and caverns, through which the waters disappear at irregular intervals, returning when the rain sets in.

Some of these openings are 50 feet deep, and the chief ones are known to the peasantry by particular names. They communicate with subterranean reservoirs, penetrating the interior of the surrounding mountains, through which the waters are replenished or drawn off. There are 12 of these openings which discharge water into the lake as well as draw it off, and 28 which draw it off only. Through the former of these the water pours in after rainy weather as from a spout. When the surface of the lake reaches the caverns of Velka-Karlanza and Malka-Karlanza, the waters are discharged by these into the valley of St. Canzian, and, after disappearing several times, fall into the Unz, above Planina. Sometimes, however, the volume of water is so great that these caverns prove insufficient to carry it off, when the lake overflows and covers the neighboring country, sometimes submerging villages. In 1834, the lake was drained in January, and remained perfectly dry till the end of February 1835, a circumstance without parallel since the time that any records of its history have been kept. The lake is pretty well stocked with fish, and at certain times is the resort of great numbers of waterfowl, which afford both sport and profit.—There is a small village of the same name on a small stream that falls into the north side of the lake.

ZISKA,* or ZIZKA, JOHN, of Trocznov, the famous leader of the Hussites, was born at Trocznov, in the circle of Budweis, Bohemia, about 1360. His family being noble, he became a page to King Wenceslas of Bohemia, but his gloomy and thoughtful temperament unfitted him, while yet a mere boy, for the frivolous occupations about court; so, embracing the career of arms, he served as a volunteer in the English army in France, and afterwards joined King Ladislas of Poland with a body of Bohemian and Moravian auxiliaries, and greatly distinguished himself in the war against the Teutonic Knights, deciding the dreadful battle of Tannenberg (in which the Grand Master and 40,000 knights were left dead on the field) by desperate charges at the head of his contingent. High honors were heaped upon him by the king; but the war (in which Z. had lost his right eye) being now over, his restless spirit led him to join the Austrians against the Turks, and subsequently the English against the French; and returning to Bohemia soon after the murder of John Huss (q. v.), he became chamberlain to King Wenceslas. Z. was an adherent of the Hussite doctrine; and the tragical fate of its apostles, and the tyrannical cruelties exercised by the imperial and papal officers on its adherents, excited in his mind the liveliest indignation and resentment.

A widespread sentiment of a similar kind, originating as much from patriotic as from religious feelings, existed in the kingdom; and a powerful party was soon formed, which urged upon the king a policy of resistance to the decisions of the Council of Constance. Z. soon became prominent among the leaders of this party, and his personal influence with the king gained for it the latter's sanction to offer resistance, though the king's vacillating disposition incapacitated him from giving effect to his own honest convictions, and taking open part with his subjects against their oppressors. After the outbreak at Prague (30th July 1419), in which the violent behavior of the Catholics was avenged by the precipitation of 13 magistrates from the council windows, Z. was unanimously chosen leader of the Hussites, and the first great religious conflict of Germany was commenced in earnest. The shock produced by news of this outbreak was fatal to Wenceslas, and his death gave more of a political character to the contest as when his brother, the Emperor Sigismund (the same who had allowed his safe-conduct to Huss to be violated), attempted, by advancing an army of 40,000 men into the country, to obtain the throne, his project was frustrated for a time by the Hussites, who insisted on their religious and political liberties being secured, and totally defeated his army with a hastily levied force of not more than 4000.

On the retirement of the imperialists, Z. completed his conquest of Bohemia by the capture of the castle of Prague in 1421 (the town had been taken in the spring of 1420), and secured his hold of the country by the erection of fortresses, chief of which was that of Tabor, whence his party derived its name of *Taborites* (q. v.). The varied experience acquired by Z. in foreign warfare was now of immense service to his party; his followers were armed with small firearms (then little known); and his almost total deficiency in cavalry was compensated for by the introduction of the *Wagenburg* (or 'cart fort,' constructed of the baggage-wagons), to protect his little army from the charges of the mail-clad knights. Numerous other inventions and ingenious contrivances mark Z.'s brief career as leader of the Hussites, and show his eminent qualities as an engineer and a general. In 1421, he lost his remaining eye at the siege of the castle of Rabi; but though now totally blind, he continued to lead on his troops to a succession of victories almost unexampled in history—the list of 13 pitched battles fought by him, always with much inferior force, including only one defeat, and that so much resembling a drawn battle, that his opponents dared not molest his retreat. His greatest achievements were the rout (18th January 1422) of Sigismund's second invading army, which was driven into Moravia, and 2000 men of it drowned in attempting to escape across the frozen Iglau; and his great victory at Aussig, over the German crusading army, commanded by Frederick the Warlike of Saxony, and the Elector of Brandenburg.

In the latter conflict, the furious onset of Z.'s troops was steadily sustained by the Saxons, who were choice troops, and the fanatic Hussites recoiled in astonishment at a successful resistance which they had never before encountered. Z., apprised

* It is often stated that John of Trocznov was called Z. on account of his being 'one-eyed,' but this is erroneous; Z. was the name of the family for generations before his time, nor does it signify 'one-eyed' in either the Bohemian or the Polish language.

of the circumstances, approached on his cart, thanked his men for their past services, adding, 'and if you have now done your utmost, let us retire.' Thus stimulated, they made a second charge still more furious than before, broke the Saxon array, and left 9000 of it dead on the field. Sigismund was now convinced that the conquest of Bohemia was impossible, and after a time proposed an arrangement with the Hussites, by which full religious liberty was allowed; and Z., who had an interview with the emperor on the footing of an independent chief, was to be appointed governor of Bohemia and her dependencies. But the war-worn old chief did not live long enough to complete the treaty, for, while besieging the castle of Przibislav, he was seized with the plague, and died, 12th October 1424. He was buried in a church at Czaslav, and his iron war-club was hung up over his tomb. A foolish story was long current that, in accordance with Z.'s express injunctions, his skin was flayed off, tanned, and used as a cover for a drum which was afterwards employed in the Hussite army; in order that even when dead he might be a terror to his enemies.

The only accusation which can with justice be made against Z. is on the ground of excessive cruelty, the victims being the monks and priests who fell into his hands. But atrocious cruelties were practised on the Hussites, and it was not to be expected that the weaker party should set an example of moderation.

ZITHER, the cithern, the modern representative of the ancient *cithara*, is a popular and common instrument in Tyrol, and of late years has become more widely known. It is a flat stringed instrument, having a wooden frame and flat sounding-board, with brass strings. When to be used it is placed on a table or on the knees, and the strings are played by the right hand, the thumb being armed with a metallic *plectrum* to bring out the melody more prominently. Latterly a good deal of music has been composed expressly for the Z., the tone of which is clear, keen, but melodious.

ZI'TTAU, a town of Saxony, 48 miles east-south-east of Dresden, and 69 by railway, is situated near the Bohemian frontier. The town has many churches, the most notable of which is the Byzantine Church of St. John, finished in 1836; a splendid court-house, one of the finest in Saxony, erected 1844; a good library of 12,000 vols.; a gymnasium, a normal, a free, an industrial, a Catholic, an infant, and other schools; several charitable institutions—as a workhouse, infirmary, asylum for orphans, &c. Z. is the center of the linen and damask manufacture of Saxony. There are also woollen manufactures, bleachfields, dye-works, paper, oil, and saw-mills, and iron-foundries. Its position on the railway into Bohemia led the Prussians to make it a center of operations during the war of 1866. Pop. (1880) 22,473.

ZLATOU'ST, or KLIUCHI (Golden Mouth), a town of Russia, in the government of Ufa, among the Ural Mountains, about 150 miles north-east of Ufa, on the river Ufa. It consists chiefly of wooden houses, and the inhabitants are mostly miners. It is the center of the iron and gold mines of the district. There is an extensive manufactory of sword-blades, which are considered the best in the empire; other articles of inlaid and embossed steel are also manufactured. Pop. 17,000.

ZMEINOGO'RSK, or ZMIEF, a town of Siberia, in a mountainous district of the government of Tomsk, upwards of 350 miles south-west of the town of Tomsk, on the river Smievka. The town is situated in the vicinity of one of the most productive silver-mines in Siberia, which was discovered in 1726, and belonged to the Demidoff family till 1745, when it became crown property. Since its discovery it has yielded nearly a half of all the silver produced by the Siberian mines. Pop. 5990.

ZNAIM, or ZNAYM, a town of the Austrian Empire, in Moravia, on a rising ground close to the left bank of the Taja, 48 miles north-by-west from Vienna. It is celebrated for the conflict which took place here between the French and Austrians, on June 14, 1809, in which the French were victorious (see WAGRAM). A castle on a height, the ancient residence of the princes of Moravia, is now a military hospital. Near it is a circular church, supposed to be as old as the 12th c. Pop. (1869) 10,600.

ZOAR, a village in Ohio, U. S., on the Ohio Canal, 90 miles E.N.E. of Columbus, settled in 1817, by a German community, 'The Society of Separatists of Z.,' who hold in common 9000 acres of land; they have a woollen factory, mills, a store, church, school, and other social and industrial establishments, all managed by trustees, elected by popular vote. Pop. in 1870, 326.

ZO'BO, a hybrid between the Yak (q. v.) and the common ox of India. It is not very unlike an English ox. It is common in the western parts of the Himalaya, and is valued as a beast of burden, as well as for its milk and its flesh.

ZO'CLE, or SOCLE, a square plain plinth under the base of a column.

ZO'DIAC (Gr. *zodiakos*, commonly derived from *zoön*, an animal), the name given by the ancients to an imaginary band extending round the celestial sphere, having as its mesial line the ecliptic or apparent path of the sun. It was fixed at about 16° in width, for the purpose of comprehending the paths of the sun and of the five planets (Mercury, Venus, Mars, Jupiter, and Saturn) which were then known; and as, of these planets, Mercury has by far the greatest inclination of orbit to the ecliptic, and the value of that element in his case is only 7° 0′ 9″, the width given to the zodiac was amply sufficient for the required purpose. But when the career of planetary discovery commenced in the beginning of the 19th c., the first three which were discovered (Ceres, Pallas, and Juno) at once destroyed the idea which had been long seated in men's minds, that no planets existed beyond the limits of the zodiac, by exhibiting orbits inclined to the ecliptic at no less angles than 10° 36½′, 34° 42⅝′, and 13° 3½′; and a large number since observed have been found to wander from 0° to 18° beyond the zodiac, from which circumstance they have, along with the three above mentioned, been denominated *ultra-zodiacal* planets. The stars in the zodiac were grouped into 12 constellations, to each of which 30° or $\frac{1}{12}$th of the whole circle, was assigned, though it often did not fill up that space, but was only situated in it; and this equable division into *signs* was of great advantage in defining the positions of the sun and planets at any epoch.

The constellations, with the appropriate symbols of the corresponding signs, are as follow:

Aries (*Ram*) ♈	Libra (*Balance*) ♎
Taurus (*Bull*) ♉	Scorpio (*Scorpion*) ♏
Gemini (*Twins*) ♊	Sagittarius (*Archer*) ♐
Cancer (*Crab*) ♋	Capricornus (*Goat*) ♑
Leo (*Lion*) ♌	Aquarius (*Water-bearer*) ♒
Virgo (*Virgin*) ♍	Pisces (*Fishes*) ♓

As one half of the ecliptic is to the north, and the other to the south of the equator, the line of intersection of their planes is a diameter of each, and the two points in which this line meets the celestial sphere are known as the equinoctial points. The comparative immobility, with respect to the ecliptic, of these points, suggested at once the employment of one or other of them as a point from which to reckon, and accordingly that point at which the sun crosses the equinoctial from south to north was fixed upon and called the first point (or commencement) of Aries. After the sun had advanced eastward through this sign—i. e., 30° along the ecliptic—he entered the sign of Taurus, continuing his course onward through the others in the order in which they are given above, again crossing the equinoctial southwards at the point where he emerged from Virgo, and entered Libra. This was the case with the sun during the time of Hipparchus (q. v.), but though the equinoctial points move very slowly, yet they do so with great uniformity, and the westerly motion of 50″ annually which they describe along the ecliptic, has at the present time separated the sign Aries, from the constellation Aries, and caused the former to correspond almost to the constellation Pisces. This gradual retrogression of the signs through the constellations of the zodiac will continue till they accomplish, in about 25,868 years, a complete circuit; after which period the sign and constellation of Aries will coincide, as they did in the time of Hipparchus. Neither the zodiac nor its constellations are of much use now in astronomy, except as, like the other constellations, affording an easy though somewhat fantastic nomenclature for the stars, and a rude, but sometimes convenient mode of reference to their positions.

The porticoes of the temples of Denderah and Esne in Egypt, have representations of the zodiacal constellations, which are of great antiquity, and have formed a fruitful theme of discussion. M. Dupuis, in his *Origine des Cultes*, has, from a careful investigation of the position of these signs, and calculating precession at its usual rate, arrived at the conclusion that the earliest of them dates from 4000 B.C. This conclusion is controverted by M. Fourier, in his *Recherches sur les Sciences, &c. de l'Egypte*, who makes the representations at Esne 1800 years older than the other; but his hypothesis has been in turn overthrown by MM. Ideler and Biot. The truth seems to be that nothing is as yet definitely known respecting these ancient representations; for the manner in which the investigations have been mixed up with the Biblical question of the antiquity of man, has prevented any truly scientific research. The Greeks would seem to have borrowed their constellations from the Egyptians and Babylonians, and this is corroborated, to some extent, by occasional remarks in Greek writers as to the positions of various constellations at certain times, which positions are inconsistent with the supposition of the observer being in Greece. The zodiacal figures of the Hindus, ancient Persians, Chinese, and Japanese have such a remarkable resemblance to those of the Egyptians, that there can be little doubt as to their common origin.

ZO'DIACAL LIGHT is the name given to a singular appearance seen after sunset or before sunrise, at all seasons of the year in low latitudes, but rarely in this country, except in March, April, and May in the evenings, and six months later in the mornings. It is obviously due to illuminated (partly, perhaps, self-luminous) matter surrounding the sun in a very flat, lenticular form, nearly coinciding with the plane of the ecliptic, or rather with the sun's equator, and extending to a distance from the sun greater than that of the earth, since its apex is often seen more than 90° from the sun. It seems to have been first distinctly pointed out by Cassini, and was long regarded as the sun's *atmosphere*. This idea, however, is totally irreconcilable with mechanical principles; since, to assume so flat a form, in spite of the enormous attraction of the sun, and its own elasticity, an atmosphere would have to revolve with a velocity so great as to dissipate it into space. The only conceivable explanation of the phenomenon is, therefore, to be found in supposing it to consist (like the rings of Saturn) of an immense assemblage of small cosmical masses, rocks, stones, and pieces of metal, such as are continually encountering the earth in the form of aërolites or meteorites. For the dynamical stability of such a system, it is only necessary that each fragment should separately describe its elliptic orbit about the sun. The mutual perturbations of the system, on account of the enormous mass of the sun, will be exceedingly small, except in the case of actual collision; but some of the planets will have a considerable effect upon it. That this is the true explanation of the phenomenon, is now generally believed.

Some very curious recent observations on the August and November meteorites of 1866 (see METEORS) have shown that these bodies move in orbits almost exactly the same as those of two known comets. The comet, then, is merely that portion of the ring of small masses, revolving all nearly in the same orbit, where the greatest number are, for the time, collected: and it is possible that to the collisions, which must most frequently occur where the separate particles are most numerously grouped, are due the spectral phenomena of incandescent gases which have been observed in the heads of comets by Huggins and others. Such speculations, were this the place to pursue them, might easily be extended to the sudden production, and changes of form, of the tails of comets which occur near perihelion, for there the separate masses must necessarily be much more crowded together, and their impacts must be increased both in number and violence.

ZO'ETROPE, or WHEEL OF LIFE, an optical instrument, so named from its exhibiting pictures of objects as if endowed with life and activity. Although only of late years introduced from America, under this name, the instrument itself, which is simply a cylindrical thaumatrope, was invented and made the subject of a patent so long ago as the year 1860. Mr. Peter Hubert Desvignes, the inventor, in his published specification, has very fully described various modifications of the cylindrical thaumatrope; and the instruments which, under the name of Mimoscope, he contributed to the London Exhibition of 1862, being furnished with pictures of exquisite artistic finish and beauty, were deservedly rewarded with 'honorable mention.' Mr. Desvignes also proposed a stereoscopic form of the instrument, in anticipation of the one already described under Stereoscope (q. v.), and has employed models, insects, and other objects, instead of pictures, with perfect success. The truly marvelous results shown in this instrument depend, primarily, on the well-known fact, that vision 'persists' for a certain short interval of time after the occlusion of the visual ray. It follows from this principle, that, if a series of pictures, representing the different attitudes successively assumed by an object in completing a given movement, be presented to the eye so quickly that the visual impression of each picture shall continue until the incidence of the one next following, the object will remain constantly in view, and its various parts will appear to execute the movement delineated by the pictures.

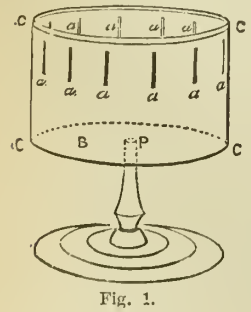


Fig. 1.

The mechanical means for affecting this result will be understood from fig. 1, which represents the zoetrope in its most popular, but by no means most excellent, form. C, a cylinder of strong card-board, 12 inches in diameter, and 7¼ inches in depth, with a metal rim at the top, and fastened to a circular piece of wood, B. The latter is screwed at its center to a pivot, P, which moves freely within the upright of the stand S, and forms a vertical axis, round which the cylinder may be made to revolve with any desired rapidity; *a*, thirteen equidistant apertures, each $\frac{3}{16}$ inch in width, and 3 inches long. Each series of pictures is printed on a strip of thick paper, 3½ inches in breadth, and 36 inches in length. In using the instrument, illuminate it well from above, and having placed the picture-strip within the cylinder, immediately beneath the apertures, *a*, rotate the cylinder with the requisite velocity (which will vary according to the nature of the subject), and look through the apertures at the pictures upon the opposite side of the cylinder.

To avoid the grotesqueness of a number of groups all seen performing the same movement at the same time, Mr. Desvignes devised the thaumatrope, shown in a somewhat modified form by fig. 2, in which the cylinder, C, turns upon a horizontal axis, P; and by means of an aperture at the bottom of the hood, H, the sight is limited to the space occupied by a single group on the opposite side of the cylinder, and, both eyes being brought into consentaneous aetivity, the clearness and pleasantness of the illusion are greatly enhanced. In this arrangement, the groups are arranged, on the strips, one above another, and not side by side, as in the former; and they are perforated with apertures to correspond with those on the cylinder. As has been pointed out by Mr. Desvignes, the width of the apertures should never exceed one-sixteenth of an inch; and the exterior of the instrument should be painted mat black.

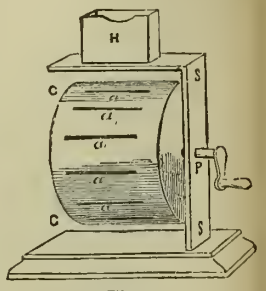


Fig. 2.

We will now speak of the principles which determine the character and distinctness of the illusion, and first of all, will endeavor to explain why it is that the pictures, looked at through the apertures, are plainly visible; whereas, viewed over the top of the revolving cylinder, they run into an indistinguishable mass.

The effect of the apertures, in this regard, is two-fold; they limit the *time* during which each group is pictured upon the retina; and they limit, or should be made to limit, the *quantity* of each group at any one instant so depicted. Obviously, if the view be *instantaneous* only, the group in that minute interval of time will not have moved to a *perceptible* degree, and will therefore appear stationary. It is for this reason that the apertures should be made very narrow (not exceeding one-sixteenth of an inch, as above stated), and then, the eye being placed close to them, the retinal images will not be slurred—as with wider apertures, and consequent increased motion of the pictures while under view, they would be—and the maximum of *definition* is thus attained. But, in this case, both the quantity of light reaching the eye, and the time of its operation, are insufficient, which defects can only be compensated by setting the instrument in violent motion, thus occasioning an inconveniently rapid recurrence of the retinal impressions. Instead, therefore, of letting the whole picture be seen for a *single* instant, let us increase the total time of visibility by arranging that successive small portions of the pictures shall be seen in *successive* instants. This is effected by withdrawing the eye a few inches from the aperture; for the eye being at the apex of the visual angle, the further it is removed from the aperture, the greater is the distance *within the visual angle* through which the aperture must travel; and prolonged in a like degree will be the *total time of visibility* for each picture. But here another difficulty is evoked, manifesting itself in one of the most puzzling phenomena of this curious instrument.

The pictures are seen as *sensibly diminished in breadth*, the explanation of which is as follows: The longer the time of visibility, the greater will be the onward movement of the picture while under view; therefore, if the left-hand side of the picture come first into view, by the time the advance of the aperture permits of the right-hand side being seen, the latter will have progressed *towards* the left, and it will accordingly be seen relatively nearer to the left side than is its natural position. And this compression, of course, takes effect over the whole of the picture. In the exquisitely elaborate drawings prepared by Mr. Desvignes, this compression was allowed for, to the great enhancement of the effect.

Lastly, of the effects due to the pictures themselves. If the pictures on the strip be the same in number as the apertures, the pictures will either coincide with the apertures, in point of position, or will be equidistant, each from its adjacent aperture; in which case there will be no apparent shifting of the pictures either to right or left. But if there be 12 pictures and 13 apertures, the picture-interval will be greater than the aperture-interval, and only one picture on the strip can be coincident with an aperture; the rest will be situated in advance of the apertures, each succeeding one slightly more than its predecessor; and, as a consequence, seen through the apertures of the revolving cylinder, they will appear continuously to advance. The contrary will be the case, if the number of the pictures exceed that of the apertures. These curious properties, which make it possible to exhibit figures moving either backwards or forwards, as well as

with movements proper to themselves, were fully investigated by the late Professor Faraday; and we would recommend those interested in the subject to refer to his Memoir on Optical Deceptions, contained in his *Experimental Researches in Chemistry and Physics*, pp. 291, *et seq.*

ZO'ILUS, a grammarian, born at Amphipolis. Authorities vary respecting the age in which he lived, and the manner of his death. The usual account is that he lived in the time of Ptolemy Philadelphus, and that he solicited, but without success, the patronage of that monarch. He gained notoriety for the bitterness with which he attacked Homer, whence he was surnamed *Homeromastix*, Homer's Scourge. His name is used proverbially for an austere and malignant critic, as Aristarchus is for one candid and intelligent. All his works are lost.

ZO'LLVEREIN (Ger., meaning 'customs-union'), a union of different independent German states, under the leadership of Prussia, so as to enable them, in their commercial relations with other countries, to act as one state. When, after the war of liberation in 1815, the political union, destroyed by the downfall of 'the holy Roman Empire,' had been restored to a certain degree in the German 'Bund' (see GERMANY), internal commerce was felt to be trammeled and depressed by the collection of revenue at the frontiers of every petty state; nor was it possible, without united action, to carry out the policy in regard to foreign commerce which might be thought best for protecting and developing the native trade and manufactures. The first suggestion of such a union came from Prussia; but it took many years before an actual beginning was made, and still longer before it reached its ultimate extent, as the plan was opposed for a long time by the jealousies and special interests of many of the states.

From 1819 to 1828, only some of the minor principalities enclosed within the Prussian territories had been got to conform to the Prussian commercial system; but in 1828, Hesse-Darmstadt, and in 1831, Hesse-Cassel, gave in. This was followed, in 1833, by the accession of Bavaria, Würtemberg, the kingdom of Saxony, the principality of the same name, Schwarzburg, and Reuss; and in 1835—1836, by that of Baden, Nassau, and Frankfürt-on-the-Main. The adhesion of Hanover did not take place till 1851, of Oldenburg till 1852. When in 1868 Lübeck and the two duchies of Mecklenburg had joined the Z., its territory extended over the whole of what subsequently became the German empire, with the exception of Hamburg, Bremen, and a small part of Baden near Schaffhausen. The Reichsland of Alsace-Lorraine was incorporated in 1871. The imperial constitution of April 16, 1871, recognizes and ratifies the privilege of the free ports so to remain until 'they themselves demand admittance within the common customs-boundary.'

The principle of the Z.'s action was this: The whole territory embraced by the Union formed commercially (in regard, at least, to countries beyond its limits) one state. The duties on exports, imports, and through-transports were collected at all the frontiers of the Union according to a uniform tariff (subject to some concessions, made on special grounds, to individual states); and the proceeds, after paying the expenses of collection, were divided among the members of the Union in proportion to their several populations. In regard to the internal trade of the Union, as the duties on articles manufactured for home consumption were different in the different states, a complicated system of drawbacks came into play, in order to put the commerce of all on an equal footing.

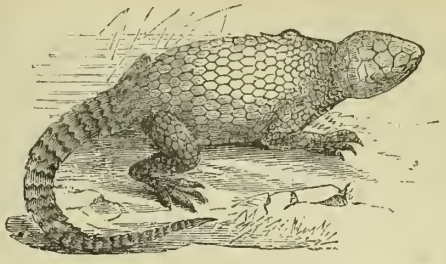
The treaty of union was agreed upon for a definite period of years, and was renewed from time to time; as in 1842, 1853, 1865, 1867. In the latter year, much was done to simplify the relations of the various states to one another in respect of internal trade; and the administration of the Z. was so modified as to give to the various members of the Union votes in its council and parliament proportionate to the number of inhabitants in each state.

Since the establishment of the German empire, the Z. has no longer a separate constitution of its own. Its council (representing governments) is merged in the Federal Council of the empire; its parliament (representing populations) in the Reichstag. Affairs are managed on the principles adopted by the Z. in 1867, by permanent committees of the Federal Council—viz., those for customs and taxes, for trade and commerce, and for finance.

The net income of the Z., which in 1834 amounted only to 12,178,761 thalers, had risen in 1871, the last year in which the Z. had separate accounts, to 28,000,002 thalers (above £4,000,000).

ZO'MBOR, a royal free town of Hungary, on a plain about 120 miles south of Pesth, capital of the district of Bacs, near the Francis Canal. It has handsome county buildings, Greek and R. C. churches, gymnasium, barracks, town-house, &c. There is a brisk trade in grain and cattle. Pop. (1880) 24,693.

ZONU'RIDÆ, a family of saurian reptiles, having the head covered with regular polygonal shields, the body and tail with large scales; the sides furnished with a longitudinal fold of the skin, covered with small scales; the tongue flat, nicked at the tip, the eyes with two valvular lids. The species are numerous, natives of warm climates. The form of some is rather short and thick, others are long and serpent-like. In some also, the limbs



Zonurus.

are well developed, in others they are merely rudimental, and in some the very rudiments of them are entirely concealed under the skin.

ZOO'LOGY (Gr. *zoon*, an animal, and *logos*, a discourse), the science which has for its subject the Animal Kingdom (q. v.). This science, itself a branch of Natural History (q. v.) or Biology, is divided into a number of branches, which are often pursued as distinct sciences, the subject being too large to be thoroughly studied except in this manner; although it is also necessary that the results of investigation in particular departments should be brought together, so that the animal kingdom may be viewed as a whole, and the relations of the most widely different groups of animals to each other determined.

The branches of Z. relating to the inferior classes of *Vertebrata* are thus named: that which has *Birds* for its subject is universally known as *Ornithology* (q. v.); that which relates to *Reptiles* is *Herpetology* (q. v.), and the subordinate branch relating to serpents is sometimes called *Ophiology;* that which relates to *Fishes* is *Ichthyology* (q. v.). Among *Invertebrate animals*, the group of *Mollusca* is the subject of the science of *Malacology* (q. v.), although this term is seldom used; and when shells rather than the animals which bear them are considered, the term *Conchology* (q. v.) is employed. No particular term is commonly applied to the branches of Z. which treat of the *Crustacea*, *Arachnida*, &c.: but that which relates to *Insects* is universally known as *Entomology* (q. v.), and the term *Helminthology* (q. v.) is employed to designate that which has *Worms* for its subject. No similar terms are used for the branches of this science which relate to other groups of *Invertebrata*.

The Science of Z., however, divides itself into distinct sciences, not so much in accordance with the divisions of the animal kingdom, as with regard to particular aspects of the subject which may be studied either in relation to animals generally, or to any particular species. Thus, *Anatomy* (q. v.) may be regarded as a branch of Z., when the term Z. is taken in its largest sense, as including man along with the inferior animals, and *Ethnology* (q. v.) must in like manner be considered as belonging to it. The anatomy of the inferior animals is sometimes called *Zootomy*, and the term *Comparative Anatomy* is employed when their structure is studied in relation to that of man, and the structure of one division of the animal kingdom in relation to that of the others. *Physiology* (q. v.) is one of the most important branches of Z.; and with it that branch of chemistry which treats of animal substances is closely connected. A very interesting branch of Z. is that which relates to the habits and instincts of animals. It can hardly be said to have been constituted into a separate science, but has received much attention from those naturalists who have devoted themselves to the study of particular groups of animals. See ANIMAL KINGDOM.

We have no evidence that the study of Z. was prosecuted to any considerable extent before the time of Aristotle. In his hands it became at once a science, and the foundations of a system of classification were laid. No artificial system of classification has ever been produced in Z., like the sexual system of Linnæus in botany; but from the very first to the present day, a natural grouping of animals has always been attempted. To this the widely marked distinctions between the principal groups almost unavoidably led. Aristotle brought to bear upon the subject the highest powers both of observation and of generalization, and some of the groups established by him still retain their place in the most modern systems. Ælian and Pliny show no capacity for the scientific treatment of the subject; and in their writings, facts are largely mingled with fables. During the middle ages, Z., like other kindred sciences, was almost completely neglected. For many centuries, the only name worth mentioning, in connection with the history of the science, is that of Albertus Magnus; whose knowledge, however, was entirely derived from Aristotle and other ancient authors. From his time, in the first half of the 13th c., to the beginning of the 16th, Z. was again almost com-

pletely neglected; but the new activity of mind which then displayed itself soon sought this as well as other directions, and an impulse was more especially given to Z. by the progress of geographical discovery.

The names of Belon (q. v.) and Rondelet, are the two greatest in this department at this period, and by them Z. was enriched with many new facts, while attempts were also made at a more perfect classification. Aldrovandi and Gesner (q. v.) soon followed them, besides others who began to direct their attention more specially to particular branches of Z. It was not till after the middle of the 17th c., however, that any real progress was made in classification, founded upon a philosophical study and comparison of animals. The works of Ray (q. v) are described by Cuvier as 'the foundation of modern zoology.' The materials, however, were in great part prepared, and the first outline of a system sketched by Willughby. From the days of Aristotle, Z. had never been prosecuted with such acuteness of observation, accuracy of description, and breadth of philosophical generalization as it was by Willughby and Ray. The progress of the science now became very rapid. Buffon won for it, by his interesting descriptions and brilliant style, the general attention of the educated portion of society, not only in his own but in other countries. He was almost immediately followed by Linnæus, who, extending his studies from botany to Z., not only enlarged the science by his own observations and discoveries, but rendered it far greater service by gathering together the facts ascertained by others, and by the improvement which he effected in classification.

Some of the larger groups established by Linnæus have been retained by all subseqent naturalists without essential modification of their characters, and even his smallest groups—genera—have been very generally retained, although now regarded as constituting tribes or families. According to the Linnæan system, the animal kingdom is divided into six great classes, which are further brought together in groups of two each as follows:

Heart bilocular, with two auricles, blood warm, red,	Viviparous.	1. Mammalia.
	Oviparous.	2. Birds.
Heart unilocular, with one auricle, blood cold, red,	With lungs	3. Amphibia.
	With gills.	4. Fishes.
Heart unilocular, with one auricle, circulating fluid (*sanies*) cold, white,	With antennæ.	5. Insects.
	With tentacula.	6. Vermes.

It was, however, in constituting and defining the genera that Linnæus showed in the highest degree his powers both of observation and arrangement. His labors in the lower departments of the animal kingdom were much less perfect than in the higher; but others speedily entered upon the field, and whilst new species of animals, and their habits continued to be described, the study of comparative anatomy was also diligently prosecuted. The names of Pallas, Hunter, and Blumenbach are particularly worthy to be noticed; but more than any other, the name of Cuvier, who, like Linnæus, took a comprehensive view of the whole subject of Z., and carried forward the work of minute observation, as well as of generalization. His system of classification is so vast an improvement of that of Linnæus as to be almost fundamentally new, and has formed a new starting-point for all further progress.

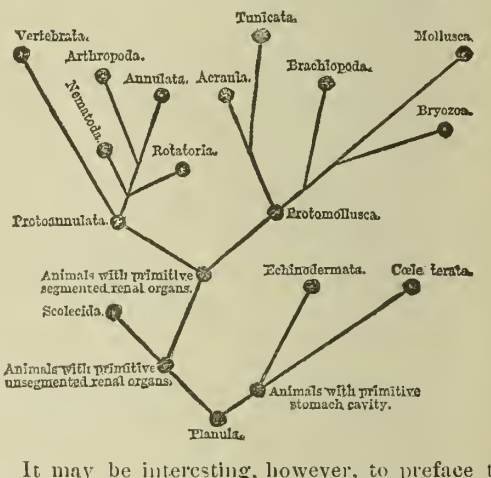
The divisions, the classes, and many of the orders of Cuvier's system have already been noticed under their proper heads, so that it may be enough here to give the most general outline of the system.

Div. I. Vertebrata.	Class 1. Mammalia.
	" 2. Aves (Birds).
	" 3. Reptilia (Reptiles).
	" 4. Pisces (Fishes).
Div. II. Mollusca.	Class 1. Cephalopoda.
	" 2. Pteropoda.
	" 3. Gasteropoda.
	" 4. Acephala.
	" 5. Brachiopoda.
	" 6. Cirrhopoda.
Div. III. Articulata.	Class 1. Insecta (Insects).
	" 2. Crustacea.
	" 3. Arachnida.
	" 4. Annelida.
Div. IV. Radiata.	Class 1. Echinodermata.
	" 2. Entozoa.
	" 3. Acalephæ.
	" 4. Polypi.
	" 5. Infusoria.

The system of Cuvier has been extensively modified by many subsequent anatomists; notably Lamarck, De Blainville, Ehrenberg, Owen, Milne-Edwards, Von Siebold and Stannius, Leuckart, Agassiz, Huxley, Hæckel, and others. The accompanying outline, while serving to give an idea of the present state of classification, must not be regarded as authoritative or final, since the rapid progress of knowledge is introducing incessant change in our conceptions of the relation of the greater groups. The reverse error must, however, be guarded against—that of supposing one classification as good as another, for each really marks a stage of progress. The taxonomy of the various groups, too, has reached a considerably greater degree of permanence.

The most remarkable waves of progress in Z. since Cuvier, have been due at first to the splendid morphological impulse of Geoffrey St. Hilaire (q. v.); to the prosecution, in the light of the cell-theory, of the study of the simplest forms of life, and of the minute structure of the higher animals; to the pursuit of embryology under Von Baer (q. v.) and his successors; and finally, in the highest degree to Darwin's labors, both in the regions of observation and of theory. Influenced by the theory of evolution (see Darwinian Theory and Descent of Man; Species, Origin of; Geographical Distribution; &c.), and aided by embryology, the zoologist now seeks to arrange his forms in series which should represent not merely resemblance of adult structure, but also should indicate as nearly as possible the lines of descent by which he believes these forms to have originated.

Thus various recent authors, notably Hæckel and Semper, have constructed 'phylogenetic' classifications of the animal kingdom in the form of genealogical trees; but these speculations, however ingenious and suggestive, cannot supersede the existing classifications, at least while our knowledge of embryology, and more especially of palæontology, remains so imperfect; for the line of descent has been made out with apparent certainty only in the case of a few genera, such as the horse (see Mammalia) and



crocodile. It may be interesting, however, to preface the ordinary classification by an example of a genealogical tree, borrowed from Semper.

I. PROTOZOA.

Section A. Monera.—Class 1. Monera.
Section B. Endoplastica.—Class 2. Rhizopoda; 3. Foraminifera; 4. Heliozoa; 5. Radiolaria; 6. Infusoria; 7. Gregarinida.

II. PORIFERA.

Class 1. Myxospongiæ; 2. Fibrospongiæ; 3. Calcispongiæ.

III. CŒLENTERATA.

Class I. Hydrozoa—
Sub-class i. Hydroida.—Order 1. Hydridæ; 2. Corynidæ; 3. Sertularidæ; 4. Campanularidæ.
Sub-class ii. Siphonophora.—Order 5. Calycophoridæ; 6. Physophoridæ.
Sub-class iii. Discophora.—Order 7. Medusidæ; 8. Lucernaridæ.
Sub-class iv. Graptolitida (extinct).—Order 9. Graptolitidæ.
Class II. Actinozoa—
Sub-class i. Coralligena.—Order 1. Zoantharia; (*a*) Malacodermata, (*b*) Sclerodermata, (*c*) Sclerobasica; 2. Alcyonaria; 3. Rugosa (extinct).
Sub-class ii. Ctenophora.—Order 4. Ctenophora.

IV. VERMES.

Class I. Platyelmia.—Order 1. Turbellaria; 2. Nemertea; 3. Trematoda; 4. Cestoidea.
Class II. Nematelmia.—Order 1. Nematoda; 2. Gordiacea.
Class III. Acanthocephala (*Echinorhynchus*).
Class IV. Chætognatha (*Sagitta*).
Class V. Rotatoria.
Class VI. Enteropneusta (*Balanoglossus*).
Class VII. Gephyrea.

Class VIII. ANNELIDA—
Sub-class i. Discophora.
Sub-class ii. Chœtopoda.—Order 1. Achœta; 2. Oligochœta; 3. Polychœta (Tubicola, Errantia).
Class IX. POLYZOA.
Class X. BRACHIOPODA.

V. ARTHROPODA.

Class I. PROTOTRACHEATA (*Peripatus*).
Class II. MYRIAPODA.—Order 1. Chilognatha; 2. Chilopoda.
Class III. INSECTA—
Section A. Ametabola.—Order 1. Anoplura; 2. Mallophaga; 3. Thysanura.
Section B. Hemimetabola.—Order 4. Neuroptera; 5. Hemiptera; 6. Orthoptera.
Section C. Holometabola.—Order 7. Aphaniptera; 8. Diptera; 9. Hymenoptera; 10. Lepidoptera; 11. Strepsiptera; 12. Coleoptera.
Class IV. CRUSTACEA.—Order 1. Trilobita (extinct); 2. Phyllopoda, (*a*) Branchiopoda, (*b*) Cladocera; 3. Cumacea; 4. Edriophthalmia, (*a*) Amphipoda, (*b*) Isopoda; 5. Stomatopoda; 6. Copepoda; 7. Ostracoda; 8. Cirripedia; 9. Schizopoda; 10. Decapoda, (*a*) Macrura, (*b*) Brachyura.
Class V. ARACHNIDA.—Order 1. Merostomata, (*a*) Xiphosura, (*b*) Eurypterida (extinct); 2. Arthrogastra; 3. Araneina; 4. Acarina; 5. Linguatulina.

VI. ECHINODERMATA.

Class 1. Echinoidea; 2. Asteroidea; 3. Ophiuroidea; 4. Crinoidea; 5. Holothuroidea; 6. Blastoidea (extinct); 7. Cystoidea (extinct).

VII. MOLLUSCA.

Class I. LAMELLIBRANCHIATA—
Section A. Dimya.—Order 1. Asiphonida; 2. Siphonida.
Section B. Monomya.
Class II. POLYPLACOPHORA.
Class III. SCAPHOPODA.
Class IV. GASTEROPODA—
Section A. Prosobranchiata.
Section B. Opisthobranchiata.
Section C. Pulmonata.
Section D. Heteropoda.
Class V. PTEROPODA—
Order 1. Thecosomata; 2. Gymnosomata.
Class VI. CEPHALOPODA—
Section A. Tetrabranchiata.
Section B. Dibranchiata.—Order 1. Decapoda; 2. Octopoda.

VIII. TUNICATA.

Class I. PERENNICHODATA (*Appendicularia*).
Class II. CADUCICHORDATA—
Section A. Simplicia.
Section B. Composita.
Section C. Conserta.

IX. VERTEBRATA.

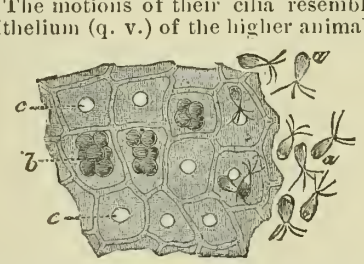
α ACRANIATA (*Amphioxus*).
β CRANIATA.
Class I. ICHTHYOPSIDA—
SECTION A. Cyclostomata.
Section B. Pisces.—Order 1. Elasmobranchii; 2. Holocephala; 3. Ganoidei; 4. Teleostei, (*a*) Physostomi, (*b*) Anacanthini, (*c*) Acanthopteri, (*d*) Pharyngognathi, (*e*) Lophobranchii, (*f*) Plectognathi; 5. Dipnoi.
Section C. Amphibia.—Order 1. Urodela; 2. Anura; 3. Gymnophiona; 4. Labyrinthodonta (extinct).
Class II. SAUROPSIDA—
Section D. Reptilia.—Order 1. Lacertilia; 2. Chelonia; 3. Ophidia; 4. Crocodilia; 5. Plesiosauria; 6. Ichthyosauria; 7. Dinosauria; 8. Pterosauria (the last five extinct.)
Section E. Aves—
i. Saururae (*Archæopteryx*).
ii. Ratitæ (*Cursores*).
iii. Carinatæ.—Order 1. Natatores; 2. Grallatores; 3. Rasores; (*a*) Gallinacei, (*b*) Columbacei; 4. Scansores; 5. Insessores or Passeres, (*a*) Dentirostres, (*b*) Conirostres, (*c*) Tenuirostres, (*d*) Fissirostres; 6. Raptores.
Class III. MAMMALIA—
Section i. Ornithodelphia.—Order 1. Monotremata.
Section ii. Didelphia.—Order 2. Marsupialia.
Section iii. Monodelphia (or Placentalia).—Order 3. Edentata; 4. Ungulata, (*a*) Perissodactyla, (*b*) Artiodactyla; 5. Sirenia; 6. Toxodontia (extinct); 7. Dinocerata (extinct); 8. Tillodontia (extinct); 9. Hyracoidea; 10. Proboscidea; 11. Carnivora; 12. Cetacea; 13. Insectivora; 14. Rodentia; 15. Cheiroptera; 16. Primates, (*a*) Lemuridæ, (*b*) Simiadæ, (*c*) Anthropidæ.

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See also articles on ANIMAL KINGDOM, VERTEBRATA, MAMMALIA, BIRDS, FISHES, REPTILES, and those on the several animals.

ZO'OPHYTE (derived from the Greek *zoon*, an animal, and *phyton*, a plant, and signifying an animal-plant) is a term which was employed by Cuvier, in his earlier attempts at classification, in the same sense as he afterwards employed *Radiata*—viz., to designate the lowest primary division of the animal kingdom, which includes many animal organisms that are fixed to a definite spot of rock, shell, &c., and have more or less superficial resemblance to plants, such as corals, sea-anemones, &c. See above, ZOOLOGY. The term is now disused by scientific naturalists.

ZO'OSPORE (Gr. *zoos*, living, and *spora*, a seed), in Botany, the name given to those Spores (q. v.) of many lower algæ and fungi, which, being furnished with cilia, move spontaneously for a short time after being discharged from the spore-case of the parent plant. The motions of their cilia resemble those of the cilia on the Epithelium (q. v.) of the higher animals. The purpose



Portion of Thallus of a green Sea-weed (*Ulva*):
a, free zoospores, each with four cilia; *b*, young zoospores forming from protoplasm of cell; *c*, opening in cell-wall by which zoospores have escaped.

served by the ciliary motion in zoospores, is evidently the wider diffusion of the species; and the cessation of the motion after a certain time permits the spore to become fixed, in order to germination, which is frequently preceded by conjugation. They are apt to be mistaken by observers with the microscope for Infusoria (q. v.).

ZOO'TOMY, a term sometimes employed to denote the anatomy of the lower animals, as distinguished from human anatomy. See ZOOLOGY.

ZO'RNDORF, a village four English miles north of Küstrin, was the scene of the bloodiest of the many desperate conflicts of the *Seven Years' War* (q. v.). The Russians having for the second time been ordered by the Czarina Elizabeth to invade Prussia, advanced towards Berlin, committing frightful devastations, while Frederick the Great, with the bulk of his forces, was engaged with the Austrians in Silesia and Saxony. The Russians, under Fermor, were 50,000 strong, and easily drove before them Dohna's little Prussian army of 15,000; but Frederick being speedily apprized of this new invasion, hastened northwards with such a reinforcement as raised the army to 30,000; and after taking care, by the breaking down of bridges, &c. to cut off their retreat, engaged the invaders. The battle, which commenced at eight in the morning of August 25, 1758, and lasted till evening, consisted mainly in a succession of furious charges, accompanied with a tremendous artillery-fire, and was not decided till Seidlitz, by an able movement, turned the Russian flank. The Russians, now discovering that they were nearly surrounded, fought with the utmost desperation, and ultimately both armies bivouacked on the field of battle. In the morning, however, Fermor drew off his forces, diminished by 20,000 men, 103 cannon, and 27 standards; having inflicted on the Prussians a loss of 13,000 men, 26 cannon, and a few standards. Generals Soltikof, Czernitchef, and Prince Sulkowski were made prisoners by the Prussians on this occasion; and, oddly enough, the first named was the conqueror of Frederick II. in the next great battle between the two northern powers, at Kunersdorf (q. v.).

ZOROASTER, or rather ZARATHUSTRA (which in Greek and Latin was corrupted into ZARASTRADES and ZOROASTRES; while the Persians and Parsees altered it into ZERDUSHT), is the name of the founder of what is now known as the Parsee religion. The original meaning of the word is uncertain, and though there

have been many conjectures formed about it, yet not one of them seems to be borne out by recent investigations. Most probably, it only indicates the notion of 'Chief,' 'Senior,' 'High-priest,' and was a common designation of a spiritual guide and head of a district or province. Indeed, the founder of Zoroastrianism is hardly ever mentioned without his family name—viz., Spitama. He seems to have been born in Bactria. The terms he applied to himself are either Manthran, i. e., a reciter of Manthras; a messenger sent by Ahuramazda; a speaker; one who listens to the voice of oracles given by the spirit of nature; one who receives sacred words from Ahuramazda through the flames. His life is completely shrouded in darkness. Both the Greek and Roman, and most of the Zend accounts about his life and works are legendary and utterly unhistorical. In the latter, he is to a great extent represented, not as a historical, but as a dogmatical personality, vested with superhuman, or rather divine powers, standing next to God, above the archangels themselves. His temptations by the devil, whose empire is threatened by him, form the subject of many traditional reports and legends.

He is represented as the abyss of all wisdom and truth, and the master of the whole living creation. 'We worship'—so runs one of the prayers in the Fravardin Yasht—'the rule and the guardian angel of Zarathustra Spitama, who first thought good thoughts, who first spoke good words, who first performed good actions, who was the first priest, the first warrior, the first cultivator of soil, the first prophet, the first who was inspired, the first who has given to mankind nature, and reality, and word, and hearing of word, and wealth, and all good things created by Mazda, which embellish reality; who first caused the wheel to turn among gods and men, who first praised the purity of the living creation and destroyed idolatry, who confessed the Zarathustrian belief in Ahuramazda, the religion of the living God against the devils. . . . . Through whom the whole true and revealed word was heard, which is the life and guidance of the world. . . . . Through his knowledge and speech, the waters and trees become desirous of growing; through his knowledge and speech, all beings created by the Holy Spirit are uttering words of happiness.'

In the old Yazna (see ZEND-AVESTA) alone, he appears like a living reality, a man acting a great and prominent part both in the history of his country and that of mankind. His father's name seems to have been Pourushâspa, and that of his daughter, the only one mentioned of his children, Pournchista. Very obscure, however, remains, even by this account, the time when he lived. The dates generally given are as follows. Xanthos of Lydia places him about 600 years before the Trojan war; Aristotle and Eudoxus place him 6000 years before Plato; others, again, 5000 years before the Trojan war. Berosos, a Babylonian historian, makes him a Babylonian king, and the founder of a dynasty which reigned between 2200 and 2000 B.C. over Babylon. The Parsees place him at the time of Hystaspes, Darius's father, whom they identify with a king mentioned in the Shâh-Nâmeh (q. v.), from whom, however, Hystaspes is totally distinct. This account would place him at about 550 B.C. Yet there is scarcely a doubt that he must be considered to belong to a much earlier age, not later than 1000 B.C.; possibly he was a contemporary of Moses. It is almost certain that Z. was one of the Soshyantôs, or fire-priests, with whom the religious reform, which he carried out boldly, first arose. These were probably at first identical with the Vedic Atharvans (fire-priests), as indeed Zoroastrianism is merely an advanced stage of Brahmanism. The former creed, that of Ahura, by way of eminence, transformed, after the outbreak of the schism, the good beings of the latter into devils or devas; e. g., the purely Brahmanic Indra, Sharva, Nâsatya, &c.—unless it promoted them into saints and angels (yagatas).

The conflict that led to this schism between the Iranians and those Aryan tribes which immigrated into Hindustan Proper, and whose leaders became afterwards founders of Brahmanism, sprung from many social, political, and religious causes. The Aryans seem to have originally led a nomad life, until some of them, reaching, in the course of their migrations, lands fit for permanent settlements, settled down into agriculturists. Bactria and the parts between the Oxus and Jaxartes seem to have attracted them most. The Iranians became gradually estranged from their brother tribes, who adhered to their ancient nomad life; and by degrees, the whilom affection having turned into hatred, considered those peaceful settlements a fit prey for their depredations and inroads. The hatred thus nourished, by further degrees included all and everything belonging to these devastators; even their religion, originally identical with that of the settlers. The 'Deva religion' became, in their eyes, the source of all evil. Moulded into a new form, styled the 'Ahura' religion, the old elements were much more changed than was the case when Judaism became Christianity. Generation after generation further added and took away, until Zarathustra, with the energy and the clear eye that belongs to exalted leaders and founders of religions, gave to that which had originally been a mere reaction and spite against the primitive 'Brahmanic' faith, a new and independent life, and for ever fixed its dogmas, not a few of which have sprung from his own brains.

It is, as we said in the article on the ZEND-AVESTA, chiefly from the Gâthas that Zarathustra's real theology, unmutilated by later ages, can be learned. His leading idea was monotheism. Whatever may have caused the establishment of the dualism of gods; the good and the evil in the Persian religion—a dualism so clearly marked at the time of Isaiah, that he found it necessary to protest emphatically against it—it was not Z. who proclaimed it. His dualism is of a totally different nature. It was merely the principle of his speculative philosophy—a supposition of two primeval causes of the real and the intellectual world. His moral philosophy, on the other hand, moved in a triad—thought, word, and deed. There is no complete system of Zoroastrian philosophy to be found in the Zend-Avesta, any more than there is a developed Platonic system laid down explicitly in the Platonic writings; but from what is to be gathered in the documents referred to, it cannot be doubted that Z. was a deep and great thinker, far above his contemporaries, and even many of the most enlightened men of subsequent ages. If proof were needed for the high appreciation in which he was held in antiquity, it might be found in the circumstance, that even the Greeks and Romans, not particularly given to overrating foreign learning and wisdom, held him in the very highest estimation, as may be seen by their reiterated praises of the wisdom of him whose name they scarcely knew how to pronounce.

With regard, then, to the first point, his monotheism, it suffices to mention, that while the fire-priests before him, the Soshyantôs, worshiped a plurality of good spirits called Ahuras, as opposed to the Indian devas, he reduced this plurality to a unity. This one supreme being he called Ahurô Mazdaô (that Ahura which is Mazdao), or the creator of the universe—the Auramazda of the cuneiform inscriptions of the Achemenidian kings, the Ahurmazd of Sassanian times, and the Hormazd or Ormazd of modern Parsees. This supreme god is by Z. conceived to be 'the creator of the earthly and spiritual life, the lord of the whole universe, at whose hands are all the creatures.' The following extract from the Gâtha (Ustavaiti) will leave no doubt on that much-contested point: 'Blessed is he, blessed are all men to whom the living wise God of his own command should grant those two everlasting powers (viz., immortality and wholesomeness). . . . . I believe Thee, O God, to be the best thing of all, the source of light for the world. Everybody shall choose Thee as the source of light, Thee, Thee, holiest spirit Mazda! Thou createst all good things by means of the power of Thy good mind at any time, and promisest us, who believe in Thee, a long life. I believe Thee to be the powerful holy god Mazda! for Thou givest with Thy hand, filled with helps, good to the pious man, as well as to the impious, by means of the warmth of the fire strengthening the good things. From this reason, the vigor of the good mind has fallen to my lot. . . . . Who was in the beginning the father and the creator of truth? Who showed to the sun and the stars their way? Who causes the moon to increase and wane, if not Thou? . . . . Who is holding the earth and the skies above it? Who made the waters and the trees of the field? Who is in the winds and in the storms that they so quickly run? Who is the creator of the good minded beings, Thou wise? Who made the lights of good effect and the darkness? Who made the sleep of good effect and the activity? Who made morning, noon, and night?' Ahuramazda is thus to Z. the light and the source of light. He is wisdom and intellect; he possesses all good things, temporal and spiritual, among them the good mind, immortality, wholesomeness, the best truth, devotion, piety, and abundance of all earthly good. All these gifts he grants to the pious man who is pure in thought, word, and deed. He rewards the good, and punishes the wicked; and all that is created, good or evil, fortune or misfortune, is his work alone.

We spoke of Z.'s philosophical dualism, and of its having often been confounded with theological dualism, which it is certainly very far from being. Nothing was further from Z.'s mind than to assume anything but one supreme being, one and indivisible. But that everlasting problem of all thinking minds—viz., the origin of evil, and its incompatability with God's goodness, holiness, and justice—he attempted to solve by assuming two primeval causes, which, though different, were united, and produced the world of the material things as well as that of the spirit.

The one who produced the *reality* (gaya) is called Vohu Mano, the good mind; the other, through whom the non-reality (ajyâiti) originated, is the Akem Manô, the naught mind. To the first belong all good, true, and perfect things; to the second, all that is delusive, bad, wicked. These two aboriginal moving causes of the universe are called twins. They are spread everywhere, in God as in men. When united in Ahuramazda, they are called Cpentô Mainyus, and Angrô Mainyus—i. e., white or holy; and dark spirit. It is only in later writings that these two are supposed to be opposed to each other, not within Ahuramazda, but without—to stand, in fact, in the relation of God and Devil to

each other. The inscriptions of Darius know but one god, without any adversary whatsoever. But while the one side within him produced all that was bright and shining, all that is good and useful in nature, the other side produced all that is dark and apparently noxious. Both are as inseparable as day and night, and though opposed to each other, are indispensable for the preservation of creation. The bright spirit appears in the blazing flame, the presence of the dark is marked by the wood converted into charcoal. The one has created the light of the day, the other the darkness of night; the former awakens men to their duty, the other lulls them to sleep. Life is produced by the one, and extinguished by the other, who also, by releasing the soul from the fetters of the body, enables her to go up to immortality and everlasting life.

We have said already that the original monotheism of Z. did not last long. False interpretations, misunderstandings, changes, and corruptions crept in, and dualism was established in theology. The two principles then for the first time became two powers, hostile to each other, each ruling over a realm of his own, and constantly endeavoring to overthrow the other. This doctrine, which appears first fully developed in the Vendidad, once accepted by some of the most influential leaders, it soon followed that, like terrestrial rulers, each of the two powers must have a council and a court of his own. The number of councilors was six, each having to rule over some special province of creation; but Ahuramazda, who at first merely presided over this council, came gradually to be included in their number, and we then read of seven instead of the usual six Ameshaspentas, or Immortal Saints. These six supreme councilors, who have also found their way into the Jewish tradition embodied in the Talmud, are both by etymology and the sense of the passages in which they figure, distinctly seen to be but abstract nouns or ideas, representing the gifts which God grants to all those who worship with a pure heart, who speak the truth and perform good actions. The first of these angels or principles (Vohu Mano) is the vital faculty in all living beings of the good creation. He is the *son* of Ahuramazda, and penetrates the whole living good creation. By him are wrought all good deeds and words of men.

The second (Ardibehesht) represents the blazing flame of fire, the light in luminaries, and brightness and splendor of any and every kind. He represents, as the light, the all-pervading, all-penetrating Ahuramazda's omnipresence. He is the preserver of the vitality of all life and all that is good. He thus represents Providence. The third presides over metals, and is the giver of wealth. His name is Sharavar, which means possession, wealth. The fourth (Issandarm. t = Devotion) represents the earth. It is a symbol of the pious and obedient heart of the true Ahuramazda worshiper, who serves God with his body and soul. The two last (Khordâd and Amerdât) preside over vegetation, and produce all kinds of fruit. But apart from the celestial council stands Sraosha (Serost) the archangel, vested with very high powers. He alone seems to have been considered a personality. He stands between God and man, the great teacher of the prophet himself. He shows the way to heaven, and pronounces judgment upon human action after death. He is, in the Yazna, styled the Sincere, the Beautiful, the Victorious, who protects our territories, the True, the Master of Truth. 'For his splendor and beauty, for his power and victory,' he is to be worshiped and invoked. 'He first sang the five Gâthas of Zarathustra Spitama;' that is, he is the bearer and representative of the sacred tradition, including the sacrificial rites and the prayers. He is the protector of all creation, for 'he slays the demon of Destruction, who prevents the growth of nature, and murders its life. He never slumbers, but is always awake. He guards with his drawn sword the whole world against the attacks of the demons, endowed with bodies after sunset. He has a palace of 1000 pillars, erected on the highest summit of the mountain Alborj. It has its own light from inside, and from outside it is decorated with stars. . . . . He walks teaching religion round about the world.' In men who do not honor him by prayer, the bad mind becomes powerful, and impregnates them with sin and crime, and they shall become utterly distressed both in this life and in the life to come.

In the same manner as Ahuramazda, his counterpart, Angrômainyus, was in later times endowed with a council, imitated from the one just mentioned, and consisting of six devas, or devils, headed by Angrômainyus himself, who is then styled Devânam Devo = arch-devil. The first after him is called Ako Mano, or Naught Mind, the original 'non-reality,' or evil principle of Zoroaster. He produces all bad thoughts, makes man utter bad words, and commit sin. The second place is taken by the Indian god Indra; the third, by Shiva or Shaurva; the fourth, by Naonhaitya—the collective name of the Indian Ashuras or Dioscuri; the fifth and sixth, by the two personifications of 'Darkness' and 'Poison.' There are many devas, or devils, besides to be found in the Zend-Avesta, mostly allegorical or symbolical names of evils of all kinds. While the heavenly council is always taking measures for promoting life, the infernal council is always endeavoring to destroy it. They endeavor to spread lies and falsehoods, and altogether coincide together with their great chief, with the devil and the infernal hierarchy of the New Testament.

Thus Monotheism was in later times broken up and superseded by Dualism. But a small party, represented by the Magi, remained steadfast to the old doctrine, as opposed to that of the followers of the false interpretation or Zend, the Zendiks. In order to prove their own interpretation of Zoroaster's doctrines, they had recourse to a false and ungrammatical explanation of the term Zervana Akarana, which, merely meaning time without bounds, was by them pressed into an identity with the Supreme Being; whilst the passages on which the present Desturs, or Parsee priests, still rest their faulty interpretation, simply indicate that God created in the boundless time, i. e., that He is from eternity, self-existing, neither born nor created. Two intellects and two lives are further mentioned in the Zend-Avesta. By the former are to be understood the heavenly, spiritual wisdom, and the earthly wisdom, i. e., that which is learned by ordinary teaching and experience.

The two lives are in the same manner distinguished as the bodily and the mental, i. e., body and soul. From these two lives, however, are to be distinguished the 'first' and 'last' lives, terms which refer to this life and the life to come. The belief in the latter, and in immortality, was one of the principal dogmas of Z., and it is held by many that it was not through Persian influence that it became a Jewish and a Christian dogma. Heaven is called the 'House of Hymns,' a place where angels praise God incessantly in song. It is also called the 'Best Life,' or Paradise. 'Hell' is called the House of Destruction. It is the abode chiefly of the priests of the bad (deva) religion. The modern Persians call the former Behesht; the latter, Duzak. Between heaven and hell, there is the bridge of the gatherer or Judge, over which the soul of the pious passes unharmed, while the wicked is precipitated from it into hell. The resurrection of the body is clearly and emphatically indicated in the Zend-Avesta; and it belongs, in all probability, to Z.'s original doctrine—not, as has been held by some, to later times, when it was imported into his religion by other religions. A detailed description of the resurrection and last judgment is contained in the Bundehesh. The same argument—the almightiness of the Creator—which is now employed to show the possibility of the elements, dissolved and scattered as they may be, being all brought back again, and made once more to form the body to which they once belonged, is made use of there to prove the Resurrection.

There is still an important element to be noticed—viz., the Messiah, or Sosiosh, from whom the Jewish and Christian notions of a Messiah are held, by many, to have been derived. He is to awaken the dead bodies, to restore all life destroyed by death, and to hold the last judgment. Here, again, a later period introduced a plurality, notably a Trinity. Three great prophets are also to appear when the end of the world draws nigh, respectively bearing the names of Moon of Happy Rule, Aurora of Happy Rule, and Sosiosh, who is supposed to be the son of Zarathustra, begotten in a supernatural way; and he will bring with him a new portion of Zend-Avesta, hitherto hidden from man. Even a superficial glance at this sketch will show our readers what very close parallels between Jewish and Christian notions on the one hand, and the Zoroastrian on the other, are to be drawn; but, as we have noticed under PARSEES (q. v.), an attentive reading of the Zend-Avesta reveals new and striking points of contact almost on every page.

We have in the foregoing sketch mainly followed Haug, the *facile princeps* of Zend studies in these days; but we have also taken into account the views of Windischmann, Spiegel, and other prominent investigators, and principally by quoting the words of the sacred sources themselves, when feasible, put our readers in a position to judge on the main points for themselves. We cannot, however, do better than thus briefly summarize, in conclusion, the principal doctrines of Z., as drawn from a certain speech (contained in the Gâthas), which, in all probability, emanates from Z. himself.

'1. Everywhere in the world, a duality is to be perceived, such as the Good and the Evil, light and darkness; this life and that life, human wisdom and divine wisdom. 2. Only this life becomes a prey of death, but not that hereafter, over which the destructive spirit has no power. 3. In the universe, there are from the beginning two spirits at work, the one making life, the other destroying it. 4. Both these spirits are accompanied by intellectual powers, representing the ideas of the Platonic system on which the whole moral world rests. They cause the struggle between good and evil, and all the conflicts in the world, which end in the final victory of the good principle. 5. The principal duty of man in this life is to obey the word and commandments of God. 6. Disobedience is punished with the death of the sinner. 7. Ahuramazda created the idea of the good, but is not identical

with it. This idea produced the good mind, the Divine Spirit, working in man and nature, and devotion—the obedient heart. 8. The Divine Spirit cannot be resisted. 9. Those who obey the word of God will be free from all defects, and immortal. 10. God exercises his rule in the world through the works prompted by the Divine Spirit, who is working in man and nature. 11. Men should pray to God and worship him. He hears the prayers of the good. 12. All men live solely through the bounty of God. 13. The soul of the pure will hereafter enjoy everlasting life; that of the wicked will have to undergo everlasting punishment—i. e., as modern Parsee theologians explain, to the day of the resurrection. 14. All creatures are Ahuramazda's. 15. He is the reality of the good mind, word, and deed.' See PARSEES, GUEBRES, ZEND, ZEND-AVESTA, &c.

ZOSIMUS, of Constantinople, a Greek historian, who lived in the 5th c. A.D. He wrote the History of the Roman Emperors, in six books, from Augustus to 410 A.D. His style is concise, clear, and interesting. He seeks to unfold the causes of the decline of the empire, and being himself a pagan, he adduces as the chief, the neglect of the pagan religion which attended the progress of Christianity. The unsparing severity with which he assails various Christian emperors, especially Constantine, has been considered by some (e. g. Bentley) to detract from his credibility as a historian. From his own point of view, he shows a considerable degree of acuteness in his remarks. Nothing is known of his personal history.

ZOSIMUS, POPE, and successor of Innocent I., requires a brief notice on account of his connection with the history of the heresiarch Pelagius (q. v.). Z. was a Greek by birth, and was elected Bishop of Rome, March 1, 417. The African bishops had condemned the opinions of Pelagius, and this judgment has been ratified by Pope Innocent. In the interval, however, Pelagius appealed to the pope; and his disciple, Celestius, came in person to Rome, where he presented a confession of faith in his own justification. Z., having convened a council of bishops and submitted this to them, was induced by the specious explanations of Celestius to suspend the judgment, and even to write to the African bishops, recommending a reconsideration of the case. This apparent conflict of Z. with his predecessor, although it has been used by the Gallican as well as Protestant controversialists as an argument against papal infallibility, was nevertheless only temporary. On further examination of Celestius, Z. became sensible that he had been deceived; and even before the reply of the African bishops, confirmed and renewed their original condemnation of the Pelagian doctrine. He died December 26, 418. His Letters, which are curious and interesting, are found in Constant's *Epistolæ Romanorum Pontificum*.

ZOUAVES (Arab. *Zwawa*), a body of troops in the French army, which derives its name from a tribe of Kabyles, inhabiting the mountains of Jurjura, in the Algerian province of Constantine. Long previous to the invasion of Algiers by the French, these Kabyles had been employed as hired mercenaries in the service of the rulers of Tripoli, Tunis, and Algiers; and after the conquest of the last-named country in 1830, the French, in the hope of establishing a friendly feeling between the natives and their conquerors, took the late Dey's mercenaries into their service, giving them a new organization. Accordingly, General Clausel created, in 1830, two battalions of Z., in which each company consisted of French and Kabyles in certain proportions, officers, subalterns, and soldiers being selected from either race; the Z., though retaining their Moorish dress, were armed and disciplined after the European fashion; and the battalions were recruited by voluntary enlistment. As it was soon found, however, that the system of commingling the two races did not effect the object intended, the French and Kabyles were formed into separate companies; and in 1837, they were divided into three battalions, and put under the command of a colonel. Their first colonel was Lamoricière, who mainly effected their reorganization, and under whom, as well as his successor, Cavaignac (q. v.), they distinguished themselves in many a bloody conflict with the Arabs of the south.

Gradually, however, the native element was eliminated, and since 1840, they may be considered as French troops in a Moorish dress. In 1852—1855, their numbers were greatly augmented, and they now amount to upwards of 10,000 men, divided into four regiments of four battalions each. They are recruited from the veterans of the ordinary infantry regiments who are distinguished for their fine 'physique' and tried courage and hardihood; clad in a loose jacket and waistcoat of dark-blue cloth ornamented with yellow braid, loose madder-colored trousers, brown cloak, madder-colored Fez cap with a yellow tassel, surrounded by a green turban, a light blue sash of wool, yellow leather leggings, and white gaiters; and armed with a carbine and sword-bayonet. The uniform of the officers and subalterns is the same as that of the hussars.

When the French and the African elements of the original Zouave battalions were separated, the Africans were constituted into a separate body, under the name of Algerian Tirailleurs, a force still recruited in Algiers to form a part (three regiments) of the regular French army. They are better known as *Turcos*.

ZSCHOKKE, JOHANN HEINRICH DANIEL, one of the most eminent German authors of this century, was born at Magdeburg on March 22, 1771. On leaving school at the age of 17, he joined a company of players in the capacity of a dramatic author. He traveled with them for some time, after which he returned to his family, and entered the university of Frankfurt. There he seems to have studied all subjects from divinity to administration (*Kameral-wissenschaften*). He at the same time acted as a private teacher, and published plays which brought him some reputation, but no pay. In 1795, he was disappointed in obtaining the post of Ordinary Professor, for which he applied, and set out on a tour through Germany and France. He settled finally at Reichenau, in the Grisons, where he opened a boarding-school. So much pleased were the governing bodies of the canton with his establishment, that they presented him with the citizenship. In return for this favor he wrote a history of the Grisons, published at Zürich in 1798 (*Geschichte des Freistaats der drei Bünde in Rhätien*). In the same year, however, Z. became unpopular in the canton by advocating its annexation to the Helvetic Republic established by the French, and his school was in consequence closed. He removed to Aarau, then the seat of government, where he was employed as a commissioner to settle the affairs of Unterwalden, Uri, Schwyz, and Zug, a trust which he discharged with the utmost ability and good temper.

The benevolent interest, indeed, which he manifested in the sufferings of the population has made his name memorable as a national benefactor. It would be tedious to enumerate the political and administrative affairs in which Z. was actively engaged after this period; we find him at one time protesting against the arbitrary proceedings of the French, and at another pointing out the prudence of concession, but always taking a course marked by practical sagacity and wisdom. In 1804, he was presented with the citizenship of Aargau and appointed Inspector of Woods and Mines. In the same year, he founded the Swiss Messenger (*Schweizerboten*), a publication which rapidly became popular. It was followed by the Miscellany of the Latest News (*Miscellen für die neueste Weltkunde*), which was continued down to 1813. In 1811, he added a monthly periodical, the *Erheiterungen*, to these publications. He died at Aarau, June 27, 1848. Z.'s works are very numerous, and are always characterized by sound information, good sense, and a vigorous and effective eloquence. The most important of his historical works, not mentioned above, are *History of the Forest Cantons*, a *History of Bavaria*, a *Popular History of Switzerland*. His novels or tales are more numerous and better known; among the best are *The Creole, Alamontade, Jonathan Frock, Clementine, Oswald*, and *Meister Jordan*. As a poet and play-writer, Z. has less merit. The most popular of all his writings was the *Hours of Devotion*, a Sunday periodical: it supplied a complete exposition of modern rationalism, and yet displayed such zeal and eloquence in the cause of sound morality, that it met with approbation from persons of all creeds. It has gone through 40 German editions, and, with many other works of Z., has been translated into English. A collected edition of works of Z. (Aarau, 1825). See *Life of Zschokke*, by Munch (Haag, 1831); and *Autobiography*, Eng. trans. (1845).

ZSCHOPPAU, a town of Saxony, in the circle of Zwickau, and about 26 miles east of the town of that name, on the river Zschoppau. It has a castle and two churches; manufactures of hosiery, cloth, lace, &c.; weaving, wool-spinning, dyeworks, bleach-fields. Pop. (1880) 7991.

ZUG, the smallest of the Swiss cantons, is about 14 miles in length by 10 in width. Pop. (1870) 20,993; (1880) 22,994. The south-eastern part of the canton borders on the Alpine region, and is hilly and pastoral; the north-western part, sloping to the plain of Switzerland, and enclosing a great part of the Lake of Zug, is a rich and beautiful country of corn-fields and orchards. The chief exports of Z. are dried fruit, cattle, and the products of the dairy. Z. is a representative democracy, all citizens above 19 enjoying the franchise. There are two councils, one consisting of 67 members, which discharges legislative functions, and another consisting of 11 members, which conducts the administration. The inhabitants speak Swiss-German, and are Roman Catholic. The battle of Morgarten, which founded the independence of Switzerland, was fought on the frontier of this canton in 1315; but it was not till 1352 that Z. joined the Swiss Confederation.—Zug, the capital of the canton, has a pop. of about 4300.

ZUIDER ZEE, a large gulf penetrating deep into the Netherlands, between 52° 26′—53° 20′ N. lat., is about 60 miles in length, and 210 miles in circumference. The islands Texel, Vlieland, Ter Schelling, Ameland, and Schiermonnikoog, reaching in a chain from the most northern point of Holland, are the remains of the former line of coast, which form a breakwater against the

North Sea. From Dunkirk in French Flanders to the north of Holland, the interior is defended from the sea by sand-hills or downs. Here, as at the mouth of the Scheldt, the sand-barrier was broken, and the waters overflowing the low lands, separated the province of Friesland from the peninsula of North Holland, and, having united with the small inner lake Flevo, formed the present Zuider Zee. The decisive inundation occurred in 1282.

In the Z. Z., lie the islands Wieringen, Urk, Schokland, and Marken, with a pop. of about 5000 souls. Fishing is the principal industry. The light-tower, on the east point of Marken, stands in 52° 27′ 37″ N. lat.; and the inhabitants are a hardy, industrious, and independent people, who live by fishing and exporting meadow-hay. They cling tenaciously to their old customs, and never marry except among themselves. The houses are built on artificial mounds, or 'hills of refuge;' and the island being liable to frequent and heavy floods, few cows or sheep are kept, no gardens or trees planted, the necessaries of life being almost all brought from the mainland.

From the south-east of the Z. Z., a long narrow arm, called the Y (pronounced *I*), formerly ran nearly due west, through the peninsula of Holland. A strong sea-dyke and locks have been constructed to cut off the Z. Z. from the Y, through which a broad ship-canal has been made between Amsterdam and the North Sea, on which a new harbor is approaching completion. On both sides of the new canal, the Y. has been drained and turned into about 12,000 acres of rich land. The new waterway was formally opened by the king in 1876. It is proposed to make a dyke from the mouth of the Yssel to Enkhuisen, and drain the central part of the Z. Z., making room for 200,000 inhabitants, and adding nearly 500,000 acres to the arable land of the Netherlands.

ZU'LU, or AMAZULU, is the name of that portion of the Kaffir race who inhabit Natal and the region north-east of it, until they gradually merge into the mere negro of the east coast, north of the Zambesi. The Kaffir organization appears to hold an intermediate place between that of the negro and a higher type; and as we go south and west, from the swamps and malaria of Delagoa Bay and Sofala to the more healthy and bracing regions of Natal and Independent Kaffraria, the Kaffir features appear, as it were, to grow more refined—the mouth protrudes less, the lips are less thick, and the nose assimilates more to that of the European, although the distinguishing type of woolly hair may still continue.

The Z. Kaffir is a far more amiable savage than his brother the Amakosa of the Cape frontier districts. He is less warlike and predatory, more industrious, and far more willing to act in the capacity of a farm-laborer or domestic servant. In language, customs, habits, &c., although certain tribal and local differences occur, yet they may be called common to all the nation, as a Z. Kaffir has no difficulty in understanding a native of British Kaffraria; and his views of a future state, purchase of wives, &c., are pretty similar. The Z. is by nature social, light of heart, and cheerful; his affections are gentle, steady, and enduring; his passions are, however, strong, and called out when in a state of war. He is comparatively chaste; crimes which stain European or Eastern civilization are unknown to him. He is hospitable and honest, yet greedy and stingy; he is kind to his own family, yet cruel to dumb animals; and whatever the better nature of his impulses may be, yet when his great chief commands war, he is converted into a demon. He is proud, and very easily can distinguish between an English gentleman and the loafing tribe with which too many of our colonies are afflicted. The writer of this article, by the exercise of a little kindness and firmness, has experienced the most utter devotion from individuals of the Kaffir race generally. Their reasoning powers are good, and with an improved education, a Z. rationalist might not disgrace a chair in the Sorbonne.

It is from the Z. country, however, that those terrible tyrants who so long devastated South-eastern Africa, the chiefs Chaka, Dingaan, Moselikatze, &c. issued. The training of their subjects to a peculiar mode of warfare spread desolation and havoc for many years amongst the Betjuana and other tribes of the interior, until eventually these mighty chiefs with their thousands of followers, fighting, like Homer's heroes, hand to hand, armed with stabbing assagais and shields of ox-hide, the colors of which distinguished the different regiments they were formed into, melted away with broken power into comparative insignificance before the terrible rifles of a few hundred emigrant Dutch Boers, who, in their turn, gave way to the energetic action of the British authorities (see NATAL). The Zulus, although they have very often serious intestine wars amongst themselves, have generally lived on friendly terms with the Natal colonists. That their warlike qualities have not decayed was sufficiently shown in the war that broke out in 1879 between England and Ketchwayo (Cetewayo), the Zulu king. Within a week or two after the British forces crossed the Natal frontier, the Zulus inflicted a severe blow on the invaders by surrounding a camp at Isandhlwana and annihilating the defenders. They repulsed several attacks on their strongholds; but after the British had received reinforcements, were defeated at Ginghilovo, and completely broken by Lord Chelmsford at Ulundi on the 3d July. The king was captured shortly afterwards, and deported to Cape Town.

The Zulu country was divided amongst twelve chiefs (having four British residents). But in 1883, Ketchwayo was reinstated in the central portion of his kingdom, under certain restrictions, with an English resident. The north-east part of his former domains is under a chief independent of the Zulu king; and on the south, adjoining the Natal border, another strip of territory is reserved for the chiefs unwilling to come again under Ketchwayo's authority (one of whom, John Dunn, is of English blood).

A number of missionary societies of the Wesleyan, American, Norwegian, and Episcopal churches labor amongst these tribes. Considerable interest was some time ago provoked with regard to Bishop Colenso's peculiar views for evangelizing these heathens; and Colenso's Zulu was for a while almost as famous as Macaulay's New Zealander.

The Amafengu tribe, now settled along the Cape frontier, are a broken tribe of Zulus, driven far to the south-west by Chaka or Dingaan, then reduced to slavery by the Amakosa Kaffirs, and freed by Sir B. Durban in the Kaffir war of 1834—1835. The principal Z. tribes are the Amazulu, the Amahnte, Amazwazi, and Amatabele. The last emigrated far northwards to the mountains which separate the basins of the Limpopo and Zambesi.

ZU'LULAND. The country lying north-east of the colony of Natal, between its east boundary, the Tugela and Umzimyati rivers, and Delagoa Bay, is generally known under the name of Z., or the Zulu country, inhabited by tribes of Zulu Kaffirs. The great coast chain of mountains, which form in the Cape Colony the Stormbergen, and further to the north-east the Kahlamba and Drachenbergen, still continue well defined to the north-east, running parallel to the coast, but 120 miles distant from it, separating the coast region of Z. from the higher plateaux of the Transvaal, and rising to an average height of 6000 or 7000 feet. East of the Tugela River, the country spreads out into large undulating, grassy plains, but sparsely wooded; while towards the foot of the mountains the kloofs afford some excellent timber. The principal rivers are the Umvoluzi or St. Lucia River, which enters the sea about 80 miles north-east of the Natal frontier; and the Mapoota and its branches, which drain the north part of the region, and fall into Delagoa Bay. The country along the coast between the St. Lucia River and Delagoa Bay is very flat, marshy, and unhealthy. A considerable range of mountains, called the Lebombo, run from the Umvoluzi River almost in a northerly direction to beyond Delagoa Bay, about half way between the coast and the first range we have mentioned, forming a supporting buttress to a plateau of high level, similar to those so common in the Cape Colony and Natal.

This is generally a fertile region, and, as far as the coast-line, is healthy. Sugar, cotton, and other tropical products can be grown as advantageously as in the Natal colony, to which it forms, as it were, an intermediary link between the fever-regions of the east coast and the more healthy climate of Natal and the Cape Colony. The St. Lucia River marks the boundary-line beyond which, to the north-east, Europeans cannot live. Up till the outbreak of the war in 1879, no good map of the Zulu country existed, and even yet, of course, we know very little of its geology or mineral productions. None of the rivers are available for inland navigation, although a large lagoon inside the mouth of the St. Lucia River can be ascended for a few miles. The rivers which flow into Delagoa Bay from the north are sluggish streams, often with no perceptible current, and can be ascended a considerable distance. A large quantity of ivory, rhinoceros' horns, hides, &c. are collected in this region by traders from Natal; and cattle, Indian corn, &c. thrive well in the country before the swampy region commences. The principal tribes are all of the Zulu race—the Amazulu inhabiting the region bordering on Natal; the Amahnte, Amazwazi, &c. the country in the neighborhood of Delagoa Bay. The Portuguese have a very decayed fort and settlement on Delagoa Bay, garrisoned by a few mulatto soldiers, and carrying on some trade with the natives and Dutch Boers in gunpowder, muskets, calico, &c., in exchange for ivory, horns, and other native produce; and a contraband one in slaves is also, we fear, winked at by the authorities, as captures are often made along the coast by our cruisers.

The Dutch emigrant Boers, who very much required a port on the sea-board of South-east Africa, would long since have seized on Delagoa Bay, if it were not from a wholesome dread of the very unhealthy climate, which appears to affect those stalwart sons of the highlands of South-east Africa more even than it does Europeans or North Americans.

ZUMALA-CARREGUY DON TOMAS, the most distinguished of the generals who supported the cause of Don Carlos during the

Spanish Civil War of 1833—1840, was born in 1789 at Ormaiztegua, in the Biscayan province of Guipuzcoa. Of an aristocratic, though not wealthy family, he was deeply imbued from infancy with royalist sentiments, which gathered strength with increasing years, till they led him, like the Vendean leaders, to sacrifice fortune and life for a prince wholly unworthy of such devotion. At the time of the invasion of the Peninsula by Napoleon, Z. was a student of law at Pampeluna, and like many of the Spanish youth, he deserted his studies to take up arms against the invader, serving in Mina's corps till the close of the war. He afterwards served under Quesada in the 'Army of the Faith;' and on the re-establishment of absolutism, was raised to the rank of colonel, and appointed governor of Ferrol. He displayed excellent administrative qualities; but his decided leaning to the party of the Carlists (though he repelled indignantly all proposals to proclaim Don Carlos king during the life of Ferdinand VII.) becoming known, he was tried by a council of war, and acquitted.

In 1832, when the army was purged of all officers suspected of Carlism, Z. was dismissed, and retired to Pampeluna, where he lived in retirement till the death of Ferdinand and the rising of the Basque population called him to head the Carlist insurrection (October 11, 1833). His motley army was without uniform, ill fed, and ill paid; yet the profound esteem in which 'El Tio Tomas' was held by his followers enabled him to maintain an effective discipline. The overwhelming superiority in number of the Christinos, however, forced him to adopt a defensive system of tactics; so, holding the command of Biscay and Navarre, and the strongholds of Fuenterrabia and Irun, to assure his retreat into France, if necessary, he kept his opponents at bay, defeated Rodil in the valley of Amescoas (August 1, 1834), routed another force of Christinos at Viana (September 7), gained a second victory in the Amescoas Valley in the following spring, completely defeating Valdez, after a battle of four days, and routed Iriarte near Guernica. These brilliant successes of his skillful and devoted partisan flattered the too sanguine and somewhat weak-minded Don Carlos with the hope of speedily seating himself on the throne, rendered him less willing than formerly to be guided by the counsels of Z., and led him to interfere with the latter's schemes, to his own detriment. Accordingly, after another year's successful fighting with the Christinos, Z. was ordered to lay siege to Bilbao; but on June 15, 1835, he received a gun-shot wound so severe that he died ten days afterwards. With Z.'s death, all hope of success for the Carlists was extinguished; and though the war dragged on desultorily for some years longer, the result was never doubtful.

Z. was as distinguished for generosity and disinterestedness as for fidelity; and so much had he impoverished himself by liberality to his soldiers, that neither his wardrobe nor his treasury supplied the means for his decent interment.—See Hemingsen's *Twelve Months' Campaign with Zumala-Carregny in Navarre and the Basque Provinces* (2 vols., Lond. 1836).

ZÜ'RICH, a canton on the north-eastern frontier of Switzerland, is drained by the Rhine and its tributaries. Pop. (1870) 284,786; (1880) 317,576. It is traversed by ridges of lofty hills, running north-west and south-east, between which lie three valleys, forming almost its whole surface—those of the Toss, the Glatt, and the Limmat. The Lake of Zürich penetrates Z. for a distance of 26 miles, and connects it with the cantons of Schwyz and St. Gall. Z. has not a fertile soil, but it is carefully cultivated. A considerable quantity of corn is raised in the canton, though not enough to supply the wants of the population. Vineyards and orchards are numerous; but the pasture-lands are of much greater importance, and cattle form the chief wealth of the agricultural population.

Z. was one of the earliest seats of the cotton manufacture in Europe, and the spinning and weaving of cotton are still prosecuted with great success. The silk manufactures are nearly as important; and more recently, the progress made in the manufacture of railway locomotives and other machinery, has been a cause of some alarm to English engineers. The mechanics of Z. divide their attention between agriculture and manufacturing industry, and are among the most prosperous and best educated working-men in Europe. The government of the canton is a representative democracy—all adult citizens of 20 enjoying the franchise. The great council of Z. is elected chiefly by the citizens, but partly also by its own members. It appoints for four years an executive council of nine members. A desire to give a yet more thoroughly democratic character to the constitution led to the appointment in 1868 of a committee to consider its revision; and now the real decision as to laws, taxes, &c., lies with the people. Z. returns 14 members to the national council. The pop. of the canton (663 sq. m.) is German-speaking and Protestant.

ZÜRICH, the capital of the canton of the same name, is situated at the point where the Limmat issues from the Lake of Zürich, and unites with its tributary, the Sihl. Its pop. in 1880 was 25,102. It is one of the most prosperous manufacturing and commercial towns of Switzerland; yet the narrow streets and lofty houses of its older quarters, on the high ground east of the river, give it the quaint appearance of a medieval city. There are many interesting old buildings—the most remarkable being the cathedral erected in the 11th century. The university, the gymnasium, and the school of industry have long enjoyed a high reputation. The town library is extensive; and numerous museums of natural history, &c., indicate the intelligence and cultivated tastes of the population.

ZU'RUMA, or ZARUMA, a town of Ecuador, South America, on the west slope of the Andes, about 30 miles from the west coast, and 90 south of Guayaquil. It is situated in a mining district—its gold and silver mines having rendered it formerly very populous, but its importance has greatly declined. Pop. about 6000.

ZU'TPHEN, a fortified town in the Netherlands, province of Gelderland, is beautifully situated on the right bank of the Yssel, where that river is joined by the Berkel, in a picturesque district of country, chiefly under cultivation, and variegated with abundance of wood. It is one of the oldest towns in the kingdom, but has many elegant modern buildings. The fortifications are promenades, from many points of which lovely prospects are obtained.

Z. is a station of the State Railway from Arnhem to Friesland, and has an extensive trade in wood, bark, and grain. There are factories for weaving and spinning, grain, wool, oil, and paper mills, many tanneries, a soap-boiling establishment, and a large carpet-manufactory. The principal building is the Great Church, supposed to have been founded in 1103; it and the Broederenkerk (Church of the Brethren) belong to the Reformed Communion; the Roman Catholics, Lutherans, and Baptists have each a church, and the Jews a synagogue. Besides good schools for the ordinary branches of education, there are a grammar-school, school of design, a theater, and a concert-hall. The town has several charitable institutions for the sick, orphans, and old people; also the provincial lunatic asylum, which can receive 220 patients. Pop. (Jan. 1, 1880) 14,822.

At Rysselt, a village near Z., is a reformatory, called the Netherlands Mettray, in which about 150 boys are educated, and taught farm-labor, and various handicrafts. It was founded in 1851, and has done much good. Nearly one-half of the boys have been withdrawn by their parents. The others obtain situations through the directors. The largest number have taken to farm-labor and gardening, for which the reformatory specially prepares them. Many have become soldiers and sailors; others smiths, house-painters, shoemakers, tailors, bakers, bricklayers, house-servants, &c. The institution is maintained by annual contributions, legacies, and a small charge for each boy. The receipts are about £3500 annually, of which, on an average, a half is from legacies and contributions. The expenditure is about the same.

ZVENIGORO'DKA, an old town of Russia, government of Kiev, on the Tikritch, a tributary of the Bug, about 98 miles south of the town of Kiev. Pop. 11,200. The trade and manufactures are not worthy of notice.

ZVO'RNIK, a town of Bosnia, which the Austrians, now administrating Bosnia, occupied in 1878 only after severe fighting, is on the Drina, about 60 miles N.E. of Bosna-Serai. The town is strongly fortified, standing on the face of a steep hill, at the summit of which is a strong fortress commanding the valley of the Drina. It has several mosques, Greek and Roman Catholic churches, lead mines, and a considerable trade in timber. Pop. about 12,000.

ZWEI'BRÜCKEN. See DEUX-PONTS.

ZWI'CKAU, a picturesque, irregularly-built, ancient-looking town of Saxony, in a pleasant valley on the left bank of the Mulde, 60 miles south-west of Dresden. The river is crossed here by three bridges. The town is the capital of the circle of Zwickau, and is the seat of a district court, court of appeal, and other public offices. Of its churches, the most noteworthy is that of St. Mary, the finest Gothic edifice in the Erzgebirge, dating from 1453, distinguished by its tall tower, from which an extensive view can be obtained; it contains a very fine altar-piece by the old German master Wohlgemuth, and other interesting works of art. There are also a splendid court-house and exchange; a cloth hall, a district infirmary; a gymnasium, with a library of 20,000 vols.; a burgher, Catholic, trade, and other schools; an old castle, which has been converted into a workhouse. The town is prosperous, and the population increasing. There are cloth manufactories, breweries, dye-works, chemical works, tanneries, oil and saw mills. The chief source of its wealth, however, and that of the neighboring villages, are the rich beds of coal in the surrounding district. There are also large iron-works in the neighborhood. The town is connected by railway with Leipzig, Dresden, and other important places, and has a considerable transit trade. Pop. (1880) 35,005.

ZWINGLI, ULRICH, one of the most important of the reformers, was born 1st January 1484, at Wildhaus, in the canton of St. Gall, Switzerland, and was one of eight sons of the amtmann of that place. He studied first at Bern; then at the university of Vienna, where he devoted himself to philosophy; and afterwards at Basel, where, under Wyttenbach, he directed his attention to theology. He became pastor in 1506 in Glarus. At this time, his studies were chiefly directed to the Latin classics and the church Fathers; but having begun to learn Greek in 1513, he from that time devoted himself to the New Testament. He wrote out the Epistles of Paul in the original language, and learned them by heart, which was of great service to him afterwards in his disputations. In the capacity of army chaplain, he attended the campaigns in Lombardy of the inhabitants of Glarus for the pope against the French, in 1512, 1513, and 1515, for which service he received a pension from the pope till 1517. In 1516, the liberal-minded administrator, Geroldseck, invited him to be preacher in the convent of Maria-Einsiedeln, famous for its pilgrimages. Here Z. began to preach against many abuses prevailing in the church; he also called on the bishops of Sitten and Constance to bestir themselves for the improvement of the church under the guidance of the Word of God. So little was he then suspected, that the papal legate, Antonio Pulci, conferred on him, in 1518, the diploma of chaplain to the Holy See. He was soon afterwards called to Zürich; and he entered on his office as pastor in the great cathedral there, 1st January 1519, with a discourse, in which he declared himself for the pure gospel unfettered by glosses. In this office, to which was joined in 1521 that of canon in the cathedral, he laid the foundation of his subsequent work as reformer. The same cause that had stirred Luther into activity gave the impulse to Zwingli. In 1518, Bernardin Samson, a Franciscan from Milan, came to Switzerland for the purpose of selling indulgences for the benefit of the papal court. Z., who was still in Einsiedeln on Samson's first appearance, opposed him both there and afterwards in Zürich with the whole force of his pulpit eloquence, and succeeded so well that Samson was not allowed to enter the town of Zürich. From this time, Z., although attacked by the monks and many of his brother canons, advanced with rapid steps in his reforming career; for the magistracy of Zürich supported his measures to such a degree that, as early as 1520, they issued an order throughout their jurisdiction that the Word of God should be taught without human additions. In 1522, the Reformation was formally established in Zürich. At this time Z. wrote his first book against the fasts of the Roman Church; he also began to study the Hebrew language. The offers of high promotion made to him by Adrian VI. could not make him waver. In January 1523, the government of Zürich invited all theologians disposed to enter the lists with Z. to a conference at Zürich, which was attended by 600 clergy and laity.

Z. had arranged the articles of faith, to the number of 67, which were to be the subject of the conference, and defended them so ably against the attacks of the celebrated Joh. Faber, afterwards Bishop of Vienna, that the council of Zürich declared in favor of Z.'s doctrines, and upheld him and his assistants in adhering to them. The second disputation, October 1523, at which Z., before more than 900 people, spoke against the worship of images and the mass, was the cause of the removal of all pictures and statues from the churches of the city of Zürich and its jurisdiction; and this was followed, in 1524, by the abolition of the mass. In the same year, Z. entered into the married state with Anna Rheinhard, aged 43, the widow of a nobleman of the name of Meyer von Knonow. In the following year, he published his creed, *Von der wahren und falschen Religion* (Of the True and False Religion). He had thus, in a few years, placed the work reformation in his native land on a solid footing. He now pressed zealously forward in the same course; while the magistracy of Zürich, who all along actively supported him, abolished the begging friars, brought matters relating to marriage before the secular courts, and instituted a better management of church property. On a great many points Z. was at one with Luther and the other German reformers; only, in regard to liturgical matters, he carried out his reform more radically according to the Bible, and rejected the dogma of the presence of Christ in the Lord's Supper.

In order to heal the breach that had, as early as 1524, broken out between the two parties of the new religion on the latter point, a meeting between the Saxon and Swiss reformers was brought about by Philip, Landgrave of Hesse, at Marburg in 1529. The conference lasted for three days, but little progress was made towards unity of opinion. See SACRAMENTARIAN. In 1531, open war broke out between Zürich on the one side, and the Catholic cantons of Lucerne, Schwyz, Uri, Unterwalden, and Zug on the other; and Z., by command of the council of Zürich, had to take the field with the banner of the canton, which had always been borne by a priest. On the 11th October came the conflict; and as their opponents were more than double in number, and also better led, the Zürichers were beaten, and Z. was among the fallen. His collected works were published in Zürich in 1545, in 4 vols.; a selection, in two vols., appeared in 1819—1821, edited by Usteri and Vögelin.—See the lives by Rotermund (1818), Hottinger (1820), Christoffel (1857), and Mörikofer (1869).

Of all the reformers, there is none more fitted to excite our love and respect than Zwingli. Fearlessly honest in purpose; with a clear head and eye for the truth; less violent, if less eloquent than Luther; more candid and open-minded, if less systematic and penetrating in spiritual insight than Calvin; he stands before us quite as original, if not as prominent as these reformers. His work was not so great as theirs, his influence not so extended; but his character was quite as genuine, and his labor, in some respects, quite as enduring.

ZWO'LLE, the capital of the Netherlands province of Overyssel, is situated on the Zwarte Water, and by the canal called the Willemsvaart has connection with the Yssel. It is one of the finest towns in the kingdom, having many beautiful private and public buildings. Both within and without the gates are pleasant promenades and drives, shaded by large trees. The surrounding country consists of rich meadows and cultivated fields, adorned by pretty country-seats. Z. has three extensive suburbs—Diezenpoorten, Kamperpoorten, and Sassenpoorten. It is most favorably situated for commerce, having, by navigable waters and railways, communication with the provinces around the Zuider Zee, Hanover, England, and other maritime nations. The trade in farm-produce and stock is very great. Principal industries are shipbuilding, tanning leather, rope-spinning, beer-brewing, soap-boiling, weaving calicoes and stockings, book and plate printing, making salt, cooperage, and refining sugar. The most important buildings are the Town House, Palace of Justice, and Great Church. There are many excellent charitable institutions; and besides those for the ordinary branches of education, a flourishing grammar-school, in which Pope Adrian VI. was partly educated, and a school of design. Z. has a cabinet of natural history, a literary and a musical society. Here the poet Rhynvis Feith (1753—1824) was born, and Thomas à Kempis lived during 71 years. Between 1815 and 1880, the pop. increased from 12,870 to to 22,760.

ZYGOPHYLLA'CEÆ, a natural order of exogenous plants, allied to *Rubiaceæ*, and containing about one hundred known species, herbaceous plants, shrubs, and trees, chiefly natives of subtropical countries. They have opposite, generally pinnated leaves, without stipules. The flowers are solitary, or two or three together; the calyx 4—5-parted; the petals alternate with the calycine segments, and clawed; the stamens twice as many as the petals, generally rising from the back of small hypogynous scales; the ovary simple, 2—5-celled, with two or more ovules in each cell. The fruit is capsular, rarely somewhat fleshy, with four or five angles or wings. The most important genus is *Guaiacum* (q. v.). The abundance of species of *Zygophyllum* and some other genera constitutes one of the most striking features of North African and Arabian deserts. The flowers of *Z. fabago* are employed as a substitute for capers, under the name of *Bean-capers*. Those of *Melianthus major*, in the Cape of Good Hope, abound in honey. The Turks use the seeds of *Peganum harmala* both as a spice and for dyeing red.

ZYMO'TIC DISEASES have been already referred to, and the most important of them are mentioned in the article NOSOLOGY. The word zymotic, now commonly used as a term to express a class of diseases which are preventable by the removal of known causes, should not be regarded as meaning more than this, or as embracing any scientific group of diseases. It is employed to class together all the diseases characterized by the property, which they have in common, of suddenly attacking large numbers of people. The diseases thus associated together, as Dr. Farr observes, 'distinguish one country from another—one year from another; they have formed epochs in chronology; and, as Niebuhr has shown, have influenced not only the fall of cities, such as Athens and Florence, but of empires; they decimate armies, disable fleets; they take the lives of criminals that justice has not condemned; they redouble the dangers of crowded hospitals; they infest the habitations of the poor, and strike the artisan in his strength down from comfort into helpless poverty; they carry away the infant from the mother's breast, and the old man at the end of life; but their direst eruptions are excessively fatal to men in the prime and vigor of age. They are emphatically called the *morbi populares*.' It must not be assumed, as the origin of the word (*zyme*, the Gr. for a ferment) might lead the reader to infer, that all the so-called zymotic diseases are true fermentations, for the class is intended to comprehend all the principal diseases which have prevailed as *epidemics:* they may be subdivided according to their causes, whether due to *Malaria*—in which case the diseases are endemic—to *specific disease poisons* which are communicable either by direct contact or by the indirect channels of air, water, &c; to *parasites;* or to *scarcity* or *inferior quality* of

food. The diseases of the group, therefore, fall into the four orders of *Miasmatic*, *Enthetic*, *Parasitic*, and *Dietic* disorders.

The causation of the two latter orders is easily grasped, and can in every case be traced. But in the two former it is not always so clear. According to the Germ-Theory (q. v.) of infections diseases, the origin *de novo* of a fever poison is as impossible as the production of a man or a dog without parents. Day by day we observe the discovery of one after another of the septic organisms causing disease, and it is but natural to conclude that within a short time all the specific causes of the diseases referred to will have been traced. It is urged by those who oppose the germ-theory that there must have been at some time a spontaneous origin of the poisons, and that there still may be. This argument, however, has no weight. The question of the origin of the first contagium is to pathology what the 'origin of species' is to physiology. The pathologist who is investigating the causation of specific diseases is no more to be troubled with the former problem, than the biologist who is studying the phases of embryonic development should be with the latter. It has long been known that infections diseases differ greatly in infectiveness. Few of the highly infectious diseases have at any time been supposed to arise *de novo*, but some of the less infectious—such as, for instance, typhoid fever—are still in certain quarters said to be of spontaneous origin, and due to the decomposition of excrementitious matters. But those who hold such a view must show in what way the decomposing matter acts.

Common septic bacteria, we know, cause diarrhœa, but they do not cause typhoid fever. A case of this fever, let us suppose, occurs in a small community. To all appearance the conditions of the place are unchanged, and the house affected does not differ from its neighbors. How is it to be explained according to the spontaneous origin theory? In such cases it seems to be forgotten by what subtle channels contagium may be carried; further, the fact is overlooked that the stage of incubation in such diseases is indefinite, and that a chance visitor may have left the poison behind, while apparently in good health. Every case of a specific fever can be traced by patient search to infection.

The prevalence of certain infectious maladies, more especially of those fevers which are common in childhood, is, according to Dr. Wilson, 'in great measure attributable to the culpable neglect arising from the popular belief, amounting almost to fatalism, that children must contract them some time, and that there is therefore little use in endeavoring to take any protective steps where the disease is epidemic. The consequence is that the epidemic continues to spread so long as susceptible victims are to be found in the community, and only dies out for a time when almost all these have been attacked.'

And it has been stated by Mr. Simon, 'that the deaths which occur in this country are fully a third more numerous than they would be if our existing knowledge of the chief causes of disease were reasonably well applied throughout the country; that of deaths, which in this sense may be called preventable, the average yearly number in England and Wales is about 120,000; and that of the 120,000 cases of preventable suffering which thus in every year attain their final place in the death-register, each unit represents a larger or smaller group of other cases in which preventable disease, not ending in death, though often of far-reaching ill effects on life, has been suffered. And while these vast quantities of needless animal suffering, if regarded merely as such, would be matter for indignant human protest, it further has to be remembered, as of legislative concern, that the physical strength of a people is an essential and main factor of national prosperity; that disease, so far as it affects the workers of the population, is in direct antagonism to industry; and that disease which affects the growing and reproductive parts of a population must also in part be regarded as tending to the deterioration of the race.' The most important of the laws by which zymotic poisons are governed, are noticed under VIRUS.

END OF CHAMBERS'S ENCYCLOPÆDIA.

AMERICAN SUPPLEMENT

CONTAINING OVER FIVE THOUSAND ARTICLES TREATING OF SCIENCE, ART, LITERATURE, HISTORY, BIOGRAPHY, THEOLOGY, PHILOSOPHY, Etc., Etc.

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BY

HENRY A. POWELL, LL.B.

TOGETHER WITH A COPIOUS INDEX.

PREFACE TO AMERICAN SUPPLEMENT.

It has been the aim of the Editors of this Supplement to compress a valuable fund of information into a comparatively small space. Only such matter has been selected as will prove of interest to the general reading public. It has not been assumed that an Encyclopædia should be a national directory, and great eare has been exercised in the selection of subjects, in order that the purchasers of this work might not be compelled to pay for valueless matter.

It is our belief that this Supplement will be found to thoroughly cover all matters of interest to the Americen reader not already treated of in Chambers's Encyclopædia. Great attention has been paid to American Biography and History, and it has been the endeavor of the Editors to make this part of the work complete. In order to insure aceuracy as to facts and dates, the most reliable authorities have, in all instanees, been examined ; and where there have been differences of opinion, that of the *best* has been aceepted.

As a rule, matters treated of in Chambers's Encyclopædia have not been introducod into the Supplement ; but in a few instances, where events of importanee have subsequently occurred, exeeptions have been made.

Believing that the reader of an Encyclopædia desires *facts* and not an exhibition of redundant rhetoric, we have sought in each instance to give these *facts*, stated as coneisely as possible, thus enabling the reader to immediately find what he may want, without waste of time and patience. *Multum in parvo* has been our ideal, and we are confident that the purchasers of this work will find the Supplement an invaluable addition to Chambers's Encyclopædia, which is itself unexcelled by any similar work ever placed before the public. We may add that the Supplement has been executed upon the same general plan as the original to which it is appended.

New York, *June* 1, 1885.

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AMERICAN SUPPLEMENT.

A, Gerard Van Der. This individual, and his two sons, Philip and Adolphus, have acquired honorable historical notice in, the annals of the United Provinces, from the strenuous efforts they made to resist Philip II. of Spain in his endeavors to tyrannize over their country, as well as from the distinguished part they took in its liberation, 1571.

AA, Peter Van Der, an eminent lawyer known as Petrus Vanderanus, who, in 1574, became president of the High Court of Justice of Luxembourg. Born at Louvain, 1530; died at Luxembourg, 1594.

AALEN, a district in the circle of Jaxt, kingdom of Würtemberg. Extent 108 square miles. or 69,120 acres. It is watered by the river Kocher, abundantly wooded, and mountainous in the south. Produces cattle, and a little corn. The manufactures are medicine, spun woollen and cotton; and some iron mines are worked. Contains one city, one market-town, and 109 smaller towns and villages. Pop. 22,000.—The capital is of the same name. Inhabitants, 2,800. Lat. 48° 4′ 20″ N., long. 18° 7′ 27″ E.

AALI PASHA, Mehemit, an eminent Turkish statesman, ambassador to England, 1841–44. Five times Grand Vizier. Born 1815; died 1871.

AA'RAU, the principal city in the canton of Aargau, on the right bank of the river Aar, at the south base of the Jura. It is well built, paved, and lighted. Manfactures: cottons, silk, and leather. Pop. 5,500, chiefly Protestant. Lat. 47° 23′ 35″ N., long. 6° 2′ 55″ E.

AARD'-WOLF, (Du., earth-wolf), a genus of digitigrade carnivorous mammals forming the link which connects the civets with the dogs and hyænas. It is a rare and singular animal, having externally the appearance and bone-structure of the hyæna united to the head and feet of the fox, with the intestines of the civet. Its size is about that of a full-grown fox; its habits are nocturnal, and it constructs a subterraneous abode.

AARIFI PASHA was born at Constantinople in 1830, being the son of Shekib Pasha, a distinguished diplomatist. In 1847 he accompanied his father on a mission to Rome, and afterwards to the embassy at Vienna. On his return to Constantinople he was employed in various capacities in the Ministry of Foreign Affairs. After acting as First Secretary to the legation at Vienna, he served at Paris till 1872 as First Translator and later as Interpreter to the Sublime Porte. He subsequently occupied several important posts in Turkey, and then resumed his diplomatic career as ambassador at Vienna. In 1874 he was nominated Minister of Public Instruction; three months later Minister of Justice, and then resumed his post at Vienna. On the establishment of the new Ottoman Constitution he was appointed President of the Senate, and soon afterwards received the Portfolio of Foreign Affairs. In 1877 he succeeded Khalil Sheriff Pasha as ambassador to Paris, and in 1879 was appointed Prime Minister by the Sultan. The new ministry, however, had but a very brief tenure of office.

AAR'SENS, Francis Van, Lord of Someldyck and Spyck, and one of the greatest negotiators of the United Netherland Provinces. In 1641 he was deputed one of the three ambassadors extraordinary to England, to settle the marriage between the Princess Mary and Prince William, the Stadtholder's son. Born at the Hague, 1572; died 1641.

AASEN, Ivar Andreas, a Norwegian philologist. Born of very poor parents, he raised himself to a very eminent literary position. Born at Œrsten, 1813.

AB, in Hebrew chronology the fifth month of the ecclesiastical and the eleventh of the civil year. It contained thirty days, and corresponded to the latter part of our July and beginning of August. The ninth of the month is one of the principal Jewish fast-days, commemorating the destruction of the Temple by Nebuchadnezzar and also by Titus.

ABAB'DEH, a tract of country in Upper Egypt, inhabited by a pastoral people, supposed to be aborigines. A marble, called *breccia verde*, with gold and emeralds, is found in it, and it abounds with ancient and Roman remains. Near the village now called Abadeh are the ruins of Antinœ, a splendid city built by the Roman emperor Adrian.

ABACO, or LUCAYA, (Great and Little), two islands of the Bahamas, the largest being 80 miles long and 15 miles broad. About 2,000 inhabitants are employed chiefly in fishing and shipbuilding. Lat. of lighthouse, 25° 51′ 30″ N., long. 77° 10′ 45″ W.

ABAKA'-KHAN', eighth emperor of the Moguls, of the race of Zingis. He defeated the king of Bokharia and the Egyptians, who had invaded his dominions. He died 1282.

ABAKANSK, a fortified town of Siberia, in the government of Yeneseisk. In the neighborhood are some remarkable figures covered with hieroglyphics. Lat. 54° N., long. 91° 14′ E.

ABANA and PHARPAR, 'rivers of Damascus' (2 Kings v. 12), are now generally identified with the Barade and the Awaj respectively. The former flows through the city of Damascus; the Awaj, a smaller stream, passes eight miles to the south. Both run from west to east across the plain of Damascus, which owes to them much of its fertility, and lose themselves in marshes, or lakes, as they are called, on the borders of the great Arabian desert.

A'BANCAY, a town of Peru, on the river Cuszo, important for its sugar-refineries. Pop. 20,000.

ABA'NO, a town in Italy, 5 miles south-west of Padua, celebrated for its warm baths, in one of which, as a method of cure, the patient is covered with warm mud. Pop. 3,000.

ABA'NO, Pietro di, a learned Italian, who first studied at Padua, and afterwards at Paris. He traveled in Turkey, France, England, and Scotland, whence he was recalled to take the professorship of medicine at Padua, on its becoming vacant. He was not only an astronomer, but an astrologist, and was regarded as a magician. In 1315, for the second time, he was brought before the Inquisition, on account of his doctrines, but died before the inquiry was completed. The judges found that he was guilty, and ordered his body to be burned, but it was secretly taken away by a friend, and he was therefore burned in effigy. Born at Abano, 1250; died 1316.

AB'ARAIM, or ABARIM, mountains of great height and steep ascent, which separated the territories of the Moabites and Ammonites from Canaan. One of these was named Nebo, and another Pisgah, on which Moses died.

AB'ARIS, the Hyperborean, a famous priest of Apollo, of whose learning and accomplishments several writers speak highly, but from what country he came is an undecided question. Some say he was of Scythia, and others of the country about the Caucasus. The Greeks say that he rode through the air on a sacred arrow, which he gave to Pythagoras, in return for the instructions he received from that philosopher. The time of his appearance is variously stated as the 6th and the 8th century B.C.

ABA'TI, Niccolo, a noted fresco painter of Modena, who assisted in decorating the palace of Fontainebleau. His finest easel-piece in oil is in the Dresden Gallery, representing the martyrdom of St. Peter and St. Paul. His brother, son, grandson, and great-grandson, were all painters of considerable ability. Born at Modena, 1512; died at Paris, 1571.

ABAU'JVAR, a district of Upper Hungary. The soil is fertile, and among the products are the grapes from which the famous Tokay wine is made. The district also yields metals, precious stones, salt, and mineral waters. Pop. 124,000.

ABB'ADIE, James, an eminent French divine, who took the degree of D.D. at Sedan, and was afterwards made minister of the French church at Berlin. In 1688 he accompanied Marshal Schomberg to England with the Prince of Orange, and was with that great man when he fell at the battle of the Boyne. On his return to London, he was appointed minister of the French church in the Savoy; and not long after promoted to the deanery of Killalo, in Ireland. Born at Nay, in Basse-Pyrenees, 1658; died at London, 1727.

ABBAS I., surnamed the Great, one of the most celebrated of the sovereigns of Persia, was the youngest son of Shah Mohammed Khodabendeh. After heading a successful rebellion against his father, and causing one of his brothers (or, as some say, both) to be assassinated, he obtained possession of the throne at the early

age of eighteen (1585). Determined to raise the fallen fortunes of his country, he first directed his efforts against the predatory Uzbeks, who occupied and harassed Khorasan. After a long and severe struggle, he defeated them in a great battle near Herat (1597), and drove them out of his dominions. In the wars he carried on with the Turks during nearly the whole of his reign, his successes were numerous, and he acquired or regained a large extent of territory. By the victory he gained at Bassorah (1605), he extended his empire beyond the Euphrates; Achmed I. was forced to cede Shirwan and Kurdistan in 1611; the united armies of the Turks and Tatars were completely defeated near Sultanieh in 1618, and Abbas made peace on very favorable terms; and on the Turks renewing the war, Baghdad fell into his hands after a year's siege (1623). In the same year he took the island of Ormuz from the Portuguese, by the assistance of the British. When he died in 1628, his dominions reached from the Tigris to the Indus. Abbas distinguished himself, not only by his successes in arms, and by the magnificence of his court, but also by his reforms in the administration of his kingdom. He encouraged commerce, and, by constructing highways and building bridges, did much to facilitate it. To foreigners, especially Christians, he showed a spirit of tolerance; two Englishmen, Sir Anthony and Sir Robert Shirley, were admitted to his confidence, and seem to have had much influence over him. His fame is tarnished, however, by numerous deeds of tyranny and cruelty. His own family, especially, suffered from his fits of jealousy; his eldest son was slain, and the eyes of his other children were put out, by his orders.

ABBASSIDES, the caliphs of Baghdad, the most famous dynasty of the sovereigns of the Mahometan or Saracen empire. They derived their name and descent from Abbas (*b.* 566, *d.* 652 A.D.), the uncle and adviser of Mahomet, and succeeded the dynasty of the Ommiads, the caliphs of Damascus. Early in the 8th century the family of Abbas had acquired great influence from their near relationship to the Prophet; and Ibrahim, the fourth in descent from Abbas, supported by the province of Khorasan, obtained several successes over the Ommiad armies, but was captured and put to death by the Caliph Merwan (747). Ibrahim's brother, Abul-Abbas, whom he had named his heir, assumed the title of caliph and, by a decisive victory near the river Zeb (750), effected the overthrow of the Ommiad dynasty. Merwan fled to Egypt, but was pursued and put to death, and the vanquished family was treated with a severity which gained for Abul-Abbas the surname of Al-Saffah, the Blood-shedder. From this time the house of Abbas was fully established in the government, but the Spanish provinces were lost to the empire by the erection of an independent caliphate of Cordova, under Abderrahman

On the death of Abul-Abbas, Almansur succeeded to the throne, and founded Baghdad as the seat of the empire. He and his son Mohdi waged war successfully against the Turkomans and Greeks of Asia Minor; but from this time the rule of the Abbassides is marked rather by the development of the liberal arts than by extension of territory. The strictness of the Mohammedan religion was relaxed, and the faithful yielded to the seductions of luxury. The caliphs Harun Al-Rashid (786—809) and Al-Mamun (813—833) attained a world-wide celebrity by their gorgeous palaces, their vast treasures, and their brilliant and numerous equipages, in all which their splendor contrasted strikingly with the poverty of European sovereigns. The former is known as one of the heroes of the *Arabian Nights;* the latter more worthily still as a liberal patron of literature, and science. It is a mistake, however, to look in the rule of these caliphs for the lenity of modern civilization. 'No Christian government,' says Hallan, 'except perhaps that of Constantinople, exhibits such a series of tyrants as the caliphs of Baghdad, if deeds of blood, wrought through unbridled passion or jealous policy, may challenge the name of tyranny.'

The territory of the Abbassides soon suffered dismemberment, and their power began to decay. Rival sovereignties (Ashlabites, Edrisites, &c.) arose in Africa, and an independent government was constituted in Khorasan (820), under the Taherites. In the West, again, the Greeks encroached upon the possessions of the Saracens in Asia Minor. Ruin, however, came from a less civilized race. The caliphs had continually been waging war with the Tatar hordes of Turkestan, and many captives taken in these wars were dispersed throughout the empire. Attracted by their bravery and fearing rebellion among his subjects, Motassem (833—842), the founder of Samarah, and successful opponent of the Grecian forces under Theophilus, formed body-guards of the Turkish prisoners, who became from that time the real governors of the Saracen empire. Motawakkel, son of Motassem, was assassinated by them in the palace (861); and succeeding caliphs became mere puppets in their hands. Radhi (934—941) was compelled by the disorganized condition of his kingdom to delegate to Mohammed ben Rayek (936 A.D.), under the title of *Emir-al-Omara*, commander of the commanders, the government of the army and the other functions of the caliphate. Province after province proclaimed itself independent; the caliph's rule became narrowed to Baghdad and its vicinity; and the house of Abbes lost its power in the East for ever, when Hulagu, prince of the Mongols, set Baghdad on fire, and slew Motassem, the reigning caliph (20th Feb. 1258). The Abbassides continued to hold a semblance of power in the merely nominal caliphate of Egypt, and feebly attempted to recover their ancient seat. The last of them, Motawakkel III., was taken by Sultan Selim I., the conqueror of Egypt, to Constantinople, and detained there for some time as a prisoner. He afterwards returned to Egypt, and died at Cairo a pensionary of the Ottoman government, in 1538.

ABBEY, EDWIN A., an American artist, born at Philadelphia, 1852. He was a pupil of the Philadelphia Academy of Fine Arts. In 1871 he was employed by Harper & Brothers, and since that time he has almost exclusively devoted himself to drawing for illustrated publications. His professional life has been spent in New York and London. He was elected a member of the Water-Color Society in 1876, of the New York Etching Club in 1877, and of the Tile Club in 1878. Among his water-color pictures are, *The Stage Office*, (1876), *The Evil Eye*, (1877), *Lady in a Garden*, and *A Rose in October*. His *Stage Office* was at the Paris Exposition of 1878. In 1882 the Harpers published his exquisite designs suggested by Herrick's poems, which first appeared in *Harper's Magazine*.

ABBEY, HENRY E., theatrical manager, was born at Akron, O., in 1846. After learning the jewelry business, he opened a store at Buffalo, N. Y. In 1870 he began his theatrical career by becoming advance agent for Edwin Adams, and in 1871 he leased the Akron Opera House. After that he became manager for John T. Raymond, and later for "Lotta." In 1876 he became manager of the Park Theater, New York. In 1878 he leased the Park Theater of Boston, and afterwards opened the Park Theater in Philadelphia. In 1881 he took Sarah Bernhardt on a starring tour throughout the United States, and afterwards entered into a similar engagement with Adelina Patti and Mrs. Langtry; he also leased the Grand Opera House, New York, and became manager of Edwin Booth In 1883 he leased the Lyceum Theater of London, where he starred Mary Anderson, Lawrence Barrett, and other American actors. During the same season he opened the new Metropolitan Opera House of New York with Christine Nilsson and other great artists; and managed the tour in this country of Henry Irving and his Lyceum company.

ABBON, a Norman monk, who at the end of the 9th c., wrote an account of the siege of Paris by the Normans.

ABBON, DE FLEURY, a learned French abbot of the Monastery of Fleury. King Robert sent him to Rome to avert the wrath of Gregory V., who threatened to lay the kingdom under an interdict, and Abbon obtained all that he asked. Killed in a quarrel between the French and the Gascons, 1004.

ABBOT, BENJAMIN, LL. D., successful educator, born at Andover, Sept. 17, 1762; and died at Exeter, N. H., Oct. 25, 1849. He was for fifty years principal of Phillips (Exeter) Academy; a position for which he possessed peculiar qualifications, and under his charge, the institution was exceedingly popular. Among his pupils were Daniel Webster, Edward Everett, Jared Sparks, George Bancroft, and many others who became distinguished. He stood at the head of his profession in New England.

ABBOT, GORHEM DUMMER. LL.D., the youngest of three brothers, Jacob, John S. C., and Gorham D., all American authors. He was born in Hallowell, Maine, Sept. 3, 1807, studied theology, and in 1837 became pastor of a Presbyterian Church at New Rochelle, New York. In 1843 he opened a large female school in New York, called the 'Abbot Collegiate Institute,' and subsequently the 'Spingler Institute.' He retired from teaching in 1866. He has published *Pleasure and Pulpit, Prayerbook for the Young, Mexico and the United States*, and has edited several educational works. He wrote his name Abbot, according to the original American spelling. He died Aug. 3, 1874.

ABBOT, SAMUEL, founder of the Andover Theological Seminary, born Andover, Ms.; died there April 30, 1812. aged 80. Having a feeble constitution, he adopted the mercantile profession in Boston, and, acquiring wealth by integrity and methodical habits, devoted it to religious and charitable objects. Upon the establishment of the seminary at Andover, Aug. 31, 1807, he gave to it $20,000, and in his will left it $100,000 more.

ABBOT OF FOOLS, OR MISRULE (in Scotland, the Abbot of Unreason). A mock abbot appointed by the monks of the middle ages to preside over the Christmas festivities.

ABBOTT, EMMA, was born in Chicago in 1849, where her father was a local musician. At an early age she manifested a taste for singing, and when quite young started east alone. According to her own account she carried her shoes in her hand, and went barefooted to save them. At Toledo, Ohio, she applied for work, and also at Cincinnati. In this manner she worked her way to New York, where she sang in halls, etc., until she came under the notice of her benefactor, who sent her abroad to be educated for the

operatic stage. In 1876 Miss Abbott made her *début* in London, as Maria in *La Figlia del Reggimento*, and was criticised somewhat unfavorably by the English critics. In the mean time some over-zealous friends had been inserting rather injudicious accounts of her marvelous voice in the American papers. Public curiosity was widely awakened, and a desire was felt on all sides to know whether she was really all that her friends had claimed for her, and whether she would prove to be the representative American prima donna to succeed Miss Kellogg. But on her appearance in 1877 at the New York Academy of Music in *La Figlia del Reggimento*, she was severely handled by the critics. They universally agreed that she merely possessed a light and flexible soprano voice, not by any means a phenomenal one either in point of quality or volume or range. She had the perseverance, however, to organize an opera company, supported by William Castle and others, and in spite of adverse criticism, she has become a favorite with her audiences in Western towns.

ABBOTT, Benjamin V., born Boston, June 4, 1830; Austin, born Dec. 18, 1831. The Abbott brothers, sons of Rev. Jacob, practise law in N. Y. City; and have jointly published *Admiralty Reports*, 1857, *N. Y. Practise Reports; Forms of Pleading; Digest of N. Y.; C. P. Reports*, 8 vols; *Digest of U. S. Statutes and Reports* 1789—1867, 4. vols.; *Clerks' and Conveyancers' Assist.; Digest of the Law of Corporations*, 2 vols., 1869; *Treatises on the Practice and Jurisdiction of the U. S. Courts;* many articles in law magazines; and *Conecut Corners*, a novel in support of prohibitory temperance laws.

ABBOTT, Edwin, D.D., born in London in 1838, was educated at St. John's College, Cambridge, of which he became a Fellow. He was Assistant Master in King Edward's School, Birmingham, from 1862 to 1865, when he was appointed Head Master of the City of London School. He was twice Select Preacher at Cambridge, also Select Preacher of the University of Oxford, 1877. The Archbishop of Canterbury conferred on him the degree of D D. in 1872. Dr. Abbott has published the following theological works:—*Bible Lessons*, 1872; *Cambridge Sermons*, 1875; *Through Nature to Christ*, 1877. His other works are, a Shakspearian *Grammar*, 1870; an edition of Bacon's *Essays*, 1876; *Bacon and Essex*, 1877; and an *English Grammar*. Dr. Abbott is also the author of two religious romances, published anonymously:—*Philochristus: Memoirs of a Disciple of our Lord*, 1878; and *Onesimus: Memoirs of a Disciple of St. Paul*, 1882.

ABBOTT, John Stephens Cabot, brother of Jacob, was born in Hallowell, Maine, Sept. 18, 1805. He was educated at Bowdoin College, and at Andover Theological Seminary, where he graduated in 1829. He was ordained to the Congregational ministry, and was pastor in several places. In 1844 he relinquished the pastoral office in order to devote himself to literary pursuits, although he has at intervals resumed the charge of several churches. His earlier works, *The Mother at Home*, *The Child at Home*, and *Practical Christianity*, were of a religious character; but the remainder of his writings are historical. Among these are 10 volumes of small histories prepared in conjunction with his brother Jacob: *Kings and Queens, or Life in the Palace; A History of the Civil War in America; Romance of Spanish History;* and *The History of Frederick the Second, called Frederick the Great*, compiled almost wholly from Carlyle. His most notable works relate to Napoleon I., of whom he is an enthusiatic admirer. His *History of Napoleon Bonaparte*, originally published serially in *Harper's Magazine*, and afterwards in two large volumes, is an indiscriminate eulogy, with little claim to historical value. This was followed by *Napoleon at St. Helena*, *The French Revolution of* 1789, and *History of Napoleon III*, 1868. His style, though often turgid and overstrained, is animated and picturesque; but in the higher qualities of an historian, accuracy in the examination of data and appreciation of the value of facts, he is utterly deficient. He died June 17, 1877.

ABBOTT, Lyman, D.D., son of the late Jacob Abbott, born at Roxbury, Massachusetts, Dec. 18, 1835. He graduated at the University of New York in 1853, was ordained a Congregational minister in 1860, and was pastor of various churches until 1865, when he became Secretary of the Freedmen's Commission until 1868. Subsequently he devoted himself mainly to literary pursuits. He had previously, in conjunction with his brothers, written two novels, *Conecut Corners*, and *Matthew Carnaby*, under the *nom de guerre* of 'Benauly,' formed from the initial syllables of their respective names (Benjamin, Austin, and Lyman). Besides several smaller works he has published *Jesus of Nazareth; His Life and Teachings*, 1869; *Old Testament Shadows of New Testament Truths*, 1870; *A Layman's Story*, 1873; *Commentary on the New Testament*, 1875–77; edited two volumns of *Henry Ward Beecher's Sermons*, 1868; a volume of his *Morning Exercises*, 1870; and, with T. C. Conant, a *Dictionary of Religious Knowledge*. Later he was one of the editors of *Harper's Monthly Magazine*, and principal editor of the *Illustrated Christian Weekly*. Afterwards he became editor of the *Christian Union*. He is a brother of Benjamin V. (born in 1830), and Austin (born in 1831), prominent lawyers in New York, who have prepared several legal works, which have been cited above.

ABBREVIATIONS. There are many abbreviations used in America which are not known in other countries. The following is a supplementary list to that given in the article Abbreviations in another part of this volume; it includes the principal Geographical and other American abbreviations in common use.

A. B. Artium Baccalaureus. Bachelor of Arts.
A. C. Ante Christum, before Christ.
Acct. Account.
Adjt. Adjutant.
Ad lib. Ad libitum, at pleasure.
Adm. Admiral.
Admr. Administrator.
Admx. Administratrix.
Æt. or Ætat. Ætatis, of age.
A. G. Adjutant General.
Ala. Alabama.
Ark. Arkansas.
A. U. C. Anno urbis conditæ, or Ab urbe condita, in the year from the building of the city (Rome).
Bbl. Barrel.
B. I. British India.
B. L. Bachelor of Law.
Brig. Gen. Brigadier General.
Bush. Bushel.
B. V. Blessed Virgin.
B. V. M. Blessed Virgin Mary.
C. Centigrade (thermometer).
Cal. California.
Cap. Capitulum, chapter.
Capt. Captain.
Chap. Chapter.
Chron. Chronicles.
C. J. Chief Justice.
C. O. D. Collect (or cash) on delivery.
C. G. H. Cape of Good Hope.
Col. Colonel; Colossians; Colorado.
Colo. Colorado.
Conn. or Ct. Connecticut.
Cor. Corinthians.
Cor. Sec. Corresponding Secretary.
Coss. Consules, consuls.
C. R. Civis Romanus, a Roman citizen.
D. (*d.*). Denarius, denarii, a penny, pence.
D. C. District of Columbia.
Del. Delaware; delineavit, drew it.
Deut. Deuteronomy.
D. F. Defensor fidei, defender of the faith.
D. T. Dakota Territory.
Dwt. Pennyweight.
E. East.
Eccl. or Eccles. Ecclesiastes.
Ecclus. Ecclesiasticus.
E. E. Errors excepted.
E. I. East India, or East Indies.
Eph. Ephesians.
Esd. Esdras.
Esq. Esquire.
Et al. Et alii, or alios, and others.
Et seq. Et sequentes, or sequentia, and the succeeding.
Ex. or Exod. Exodus.
Exr. Executor.
Ezek. Ezekiel.
F., or Fahr. Fahrenheit.
F. and A. M. Free and Accepted Masons.
F. A. S. Fellow of the Antiquarian Society.
Fla. or Flor. Florida.
F. R. A. S. Fellow of the Royal Astronomical Society.
Ga. Georgia.
Gal. Galatians.
Gen. General; Genesis.
G. M. Grand Master.
Gov. Governor.
Hab. Habakkuk.
Hag. Haggai.
H. B. M. His or Her Brittanic Majesty.
Heb. Hebrews.
Hhd. Hogshead.
H. I. H. His or Her Imperial Highness.
Hon. Honorable.
Hos. Hosea.
H. R. House of Representatives.
Ia. Iowa. (It is incorrect to use this A. for Indiana.)
Id. T. Idaho Territory.
Ill. Illinois.
Ind. Indiana.
Ind. T. Indian Territory.
I. O. O. F. Independent Order of Odd Fellows.
I. O. U. I owe you.
Isa. Isaiah.
I. T. Idaho Territory; Indian Territory. (Id. T. and Ind. T. are preferable.)
Jam. Jamaica.
Jer. Jeremiah.
JJ. Justices.
Josh. Joshua.
J. U. D. Juris utriusque doctor, doctor of both canon and civil law.
Jud. Judith.
Judg. Judges.
Kan. Kansas.
K. G. C. Knight Grand Cross.
K. G. C. B. Knight of the Grand Cross of the Bath.
Ks. Kansas.
Ky. Kentucky.
L. (*l.*, £). Libra, a pound (money).
La. Louisiana.
L. C. Lower Canada.
Lev. Leviticus.
L. I. Long Island.
Lib. Liber, book.
Lieut. or Lt. Lieutenant.
L. S. Locus sigilli, place of the seal.
M. Monsieur.
Macc. Maccabees.
Maj. Gen. Major General.
Mal. Malachi.
Mass. Massachusetts.
Matt. Matthew.
M. C. Member of Congress.
Md. Maryland.
M. E. Methodist Episcopal.
Me. Maine.
Messrs. Messieurs, gentlemen, sirs.
Mic. Micah.
Mich. Michigan.
Minn. Minnesota.
Miss. Mississippi.
Mlle. Mademoiselle.
MM. Messieurs.
Mme. Madame.
Mo. Missouri.
Mons. Monsieur.
M. T. Montana Territory.
Mt. Mount.
N. North.
N. A. National Academician; North America.

N. B. New Brunswick; North Britain.
N. C. North Carolina.
N. E. Northeast; New England.
Neb. Nebraska.
Neh. Nehemiah.
Nev. Nevada.
N. F. Newfoundland.
N. G. New Granada.
N. H. New Hampshire.
N. J. New Jersey.
N. M. New Mexico.
N. O. New Orleans.
No. Numero, number.
N. P. New Providence.
N. S. Nova Scotia.
N. T. New Testament.
Num. Numbers.
N. W. Northwest.
N. Y. New York.
N. Z. New Zealand.
O. Ohio.
Ob. Obiit, died.
Obad. Obadiah.
Or. Oregon.
O. T. Old Testament.
Oz. Ounce.
Pa. Pennsylvania.
P. E. Protestant Episcopal.
P. I. E. Prince Edward Island.
Penn. Pennsylvania.
Per cent. or per ct. Per centum, by the hundred.
Phil. Philippians.
Phila. Philadelphia.
P. M. Postmaster.
P. O. Post office.
P. P. C. Pour prendre congé, to take leave.
P. R. Porto Rico.
Prof. Professor.
Prov. Proverbs.
P. S. Postscript.
Ps. Psalm.
Pxt. Pinxit, painted it.
Q. Quadrans, farthing.
Q. d. Quasi dicat, as if he should say.
Q. M. Quartermaster.
Qr. Quarter; farthing.
Rec. Sec. Recording Secretary.
Ref. Ch. Reformed Church.
Rev. Revelation; Reverend.
R. I. Rhode Island.
R. M. S. Royal mail steamer.
Rom. Romans.
R. S. D. Royal Society of Dublin.
R. S. E. Royal Society of Edinburgh.
R. S. V. P. Repondez s'il vous plaît, Answer if you please.
Rt. Hon. Right Honorable.
Rt. Rev. Right Reverend.
S. (*s*,). Solidus, shilling.
S. A. South America.
Sam. Samuel.
S. C. South Carolina.
Sc. or Sculp. Sculpsit, engraved it.
Scan. Mag. Scandalum magnatum, defamation of the great, or of officials.
Sec. Secretary.
S. J. Society of Jesus, Jesuit.
St. Saint.
S. T. D. Sacræ Theologiæ Doctor, Doctor of Sacred Theology.
Tenn. Tennessee.
Thess. Thessalonians.
Tit. Titus.
T. T. L. To take leave.
U. C. Upper Canada; Urbis conditæ, year of Rome.
U. S. United States; United Service.
U. S. A. United States of America; United States Army.
U. S. N. United States Navy.
U. T. Utah Territory.
V. or vs. Versus, against.
V. A. Vicar Apostolic.
Va. Virginia.
Ven. Venerable.
V. G. Vicar General.
V. P. Vice President.
Vs. Versus, against.
Vt. Vermont.
W. West.
W. I. West Indies.
Wis. Wisconsin.
W. T. Washington Territory.
W. Va. West Virginia.
Wy. T. Wyoming Territory.
X. Xplotos, Christ.
Zech. Zechariah.
Zeph. Zephaniah.
&c. Et cetera, and so forth.

ABBT, THOMAS, a German writer, whose precocity of talent enabled him to produce, at the age of 13, a work deemed of great ability, and entitled *Historia Vitæ Magistra*. He subsequently attracted the notice of Prince Schaumberg-Lippe, by whom he was held in high estimation, and liberally patronized. Born at Ulm, in Suabia, 1738; died 1766.

ABDAL'LAH-EBN-ZOBIER, an Arabian chief, who seized the caliphate in 680, notwithstanding the claim of Yezid, and enjoyed the dignity nine years. Fell fighting in the defence of Mecca, in his 72d year.

ABDERA, a Greek town on the south coast of Thrace. Founded B.C. 656, and grew to be a place of considerable importance. The exact site is now unknown. Birthplace of Democritus, Protagoras, and Anaxarchus.

ABDUL-AZIZ KHAN, Sultan of Turkey, was born Feb. 9, 1830, being the second son of the Sultan Mahmoud Khan, who died in 1839, and brother of the late Sultan Abdul Medjid, on whose death, June 25, 1861, he ascended the throne of the Ottoman empire, according to the custom which prefers a brother to a son as heir. He had much stronger military tastes than his predecessor. His government succeeded in raising several loans in the London money market, for the avowed object of reforming the finances of the empire; but whether these reforms are real or illusory time alone can prove. One of the most troublesome questions that for some time affected the interests of the Porte arose out of the scheme of M. de Lesseps, for the formation of the Suez canal, as the Emperor of the French gave a decision in favor of the Company against the Viceroy of Egypt, by which the suzerainty of the Porte was virtually ignored, and its claim therein imperilled for the future. The sultan, who had concluded treaties of commerce with France and England, visited the exhibition at Paris in July, 1867, landed at Dover July 12, and was enthusiastically received in London. The sultan's government was greatly disturbed by the insurrections in Crete, which were fomented by Greece; but peace was ultimately restored at the close of the year 1868. A serious rising in Herzegovina occurred in 1874. Events followed one another in rapid succession. Ultimately the Sultan was deposed May 30, 1876, and was succeeded by his nephew Mourad V. After his deposition the ill-fated Abdul-Aziz was confined in one of the Royal palaces, where he was found dead on the morning of June 4, 1876. It was generally believed that he had committed suicide, but he was probably murdered.

ABDUL-HAMID II., Sultan of Turkey, was born Sept. 22, 1842, being a younger son and the fourth child of Abdul-Medjid, the sultan who died in 1861. On Aug. 31, 1876, he succeeded his brother, Mourad V., who was deposed, on proof of his insanity, after a reign of three months. He was solemnly girt with the sword of Othman, in the Eyoub mosque, Constantinople, on Sept. 7. About this time the Servians, who had been at war with the Sublime Porte, were completely defeated; but, after the capture of Alexinatz by the Turks, the Russian ambassador at Constantinople presented an ultimatum to the Turkish government demanding the immediate conclusion of an armistice for six weeks, which was accordingly granted, Nov. 1. The New Turkish Constitution, devised by Midhat Pasha, providing for the establishment of representative institutions on the West European model, was promulgated at Constantinople, and in the provinces of the Empire on Dec. 23. In the same month a conference of the representatives of the Great Powers was held at Constantinople, but their attempts to avert a war were unsuccessful. On Jan. 18, 1877, a resolution was passed by the Grand Council of Turkey, presided over by Midhat Pasha, rejecting absolutely all the proposals of the European Powers for administrative reforms, on the ground that their acceptance 'would sacrifice the independence of the Empire;' the result being that a week later all the plenipotentiaries left Constantinople. On March 1 a treaty of peace was concluded between Turkey and Servia on the basis of the *status quo ante bellum*. But the Porte had soon to face a more formidable antagonist, for on April 21 a circular despatch from the Russian government to the European Powers announced a declaration of war against Turkey. During the sanguinary conflict which ensued the Turkish troops fought with heroic valor, but they were eventually obliged to yield to superior numbers, and after the fall of Plevna the Porte sued for peace, and an armistice was accordingly signed in Feb. 1878. A Treaty of Peace was soon afterwards signed at San Stefano (March 3), but its provisions were considerably modified by the representatives of the great Powers assembled in Congress at Berlin. On July 8, 1378, the British Ministry announced that five weeks before they had concluded a defensive treaty with the Porte, by which England agreed to guarantee the Asiatic dominions of the sultan, who in turn engaged to introduce 'necessary reforms,' and to cede the island of Cyprus to be occupied and administered by Great Britain.

ABECEDA'RIANS, the name given to a small body of fanatical secretaries, followers of Storck, an Anabaptist, who appeared in the 16th c., and adopted, as their leading doctrine, the rejection of all worldly knowledge, even of the alphabet.

A'BECKETT, GILBERT ABBOTT, author. Educated at Westminster school, and studied for the bar; magistrate of a London Police Court, 1849, contributor to *Punch*, author of *Comic Histories of England and Rome*. Born in London, 1811; died 1856.

ABEEL, DAVID, D. D., missionary to China, born in New Brunswick, N. J., 1804; died at Albany, 1846. He was educated principally at his native place. He was ordained to the ministry in 1826, and labored at Athens, N. Y., two years. His health failing, he went in Oct. 1829 as a missionary to China, and thence to Java, Batavia, Singapore, and Siam, visiting Europe in 1833. On returning home he published *The Claims of the World to the Gospel; Residence in China* in 1829–33; and *Missionary Convention at Jerusalem*, 1838. He went again to Canton in 1839; but the 'opium war' precluding his usefulness there, he visited Malacca, Borneo, and other places, and settled at Kolingsu. Ill health compelled him to return home in 1845, after beginning a mission at Amboy in 1842; and he died soon after.

ABEGG, JULES FREDERIC HENRY, an eminent German jurist, and author of several valuable works on penal law. Born at Erlangen, 1796; died 1868.

ABEL, NIELS HENDRICH, mathematician, a native of Findöe, Norway, studied at the university of Christiana, and was one of the first contributors to the famous *Crelle's Journal*, a publication devoted to mathematics. As a mathematician, he ranks deservedly high, and the Swedish government undertook the publication of his works. He died from consumption at the early age of 27. Born 1802; died 1829.

ABEL DE PUJOL, Alexandre Denis, French painter. Was employed to paint ceilings at the Louvre, altar pieces, and other large works. Born at Valenciennes, 1785; died at Paris, 1861.

AB'ENSBERG, a town of Bavaria, on the river Abense. The manufactures are chiefly woollens. Pop. 1200. Here the Austrians were defeated by Napoleon I., in April, 1809.

ABERCROMBIE, James, of Glassaugh, a British general, born 1706; died deputy-governor of Stirling Castle, April 28, 1781. He was descended from a wealthy Scotch family; entered the army, became a colonel April 16, 1746; major-general January 31, 1756; lieutenant-general March 31, 1759; general May 25, 1772. He was sent to America in June, 1756, with the rank of major-general, to which he had been promoted for services on the continent, and held the chief command until the arrival of Londoun in August, resuming the command on the return of that officer in 1758. On July 8, 1758, at the head of 15,000 men, he attacked Ticonderoga with the bayonet,—causing the death of nearly 2000 brave men. He still further displayed his incapacity by unnecessarily retreating to his intrenched camp on the south side of Lake George. Superseded by Amherst, he returned to England in 1759, and, as a member of parliament, supported the arbitrary measures which resulted in the independence of the United States.

ABERCROMBY, David, M.D., a Scotch physician, spent a considerable portion of the early part of his life on the Continent, and while at Amsterdam was received into the college of physicians in that city. It is likely that he also practised medicine in London. He wrote several medical treatises, besides works on other subjects, of which the principal is his *Fur Academicus*. He died in October, 1701.

AB'ERDARE, a market town and parish in Glamorganshire, on the Cynon, 4 miles from Merthyr. It has coal and iron mines. There are several fine churches and chapels, three banks, and other public buildings, and a People's Park. A large quantity of coal is sent to Cardiff for export. Aberdare forms a portion of the parliamentary borough of Merthyr Tydvil. Station on the Taff Vale Extension of the Great Western Railway. Pop. 37,774.

ABERNETHY, John, a dissenting minister, was born in 1680, at Coleraine, in Ireland, and received his education at Glasgow, where he was made M.A. In 1708 he was called to the ministry, by the Presbyterian congregation at Antrim, where he labored with great diligence. When, however, the controversy arose about subscription to the Westminster Confession of Faith, Mr. Abernethy acted with so much energy on the side of liberty, as to give offence to his congregation. A separation consequently took place, and he removed to Dublin, where he officiated in Wood Street meeting until his death in December, 1740. After he came to Dublin he preached a set of sermons upon the divine attributes, and published in one volume those relating to the existence and natural perfections of the Deity. After his death the second volume, on the moral attributes, was published by his friends. Other sermons by him have also been published.

ABGAR, the name or title of a line of kings of Edessa in Mesopotamia. One of them is known from a correspondence he is said to have had with Jesus Christ. The letter of Abgar, entreating Jesus to visit him and heal him of a disease, and offering him an asylum from the wrath of the Jews, and the answer of Jesus promising to send a disciple to heal Abgar after his ascension, are given by Eusebius, who believed the documents to be genuine. The same belief has been held by a few moderns, but there can be no doubt whatever that the letter of Jesus at least is apocryphal. It has also been alleged that Abgar possessed a picture of Jesus, which the credulous may see either at Rome or at Genoa. Some make him the possessor of the handkerchief a woman gave Jesus, as he bore the cross, to wipe the sweat from his face with, on which, it is fabled, the features of Jesus remained miraculously imprinted.

ABI'ATHAR, 'father of abundance,' a Jewish high-priest, was the son of Abimelech, who was killed by Saul, and a descendant of Eli. He succeeded his father, and attached himself to David, but on his death, attempting to put Adonijah on the throne, he was deposed and banished by Solomon, 1014 B.C., the propheey in the First Book of Samuel, respecting the descendants of Eli, being thus fulfilled.

A'BIB, the first month of the Mosaic Hebrew year, corresponding to our April. The name signified the month of the ears of corn; but after the Babylonish Captivity it was changed to Nisan, month of flowers.

ABIMELECH, occurs first in the Bible as the name of certain kings of the Philistines at Gerar (Gen. xx. 2, xxi. 22, xxvi. 1). From the fact that the name is applied in the inscription of the thirty-fourth psalm to Achish, it has been inferred with considerable probability that it was used as the official designation of the Philistinian kings. The name was also borne by a son of Gideon, judge of Israel, by his Shechemite concubine (Judges viii. 31). On the death of Gideon, who had refused the title of king both for himself and his children, Abimelech set himself to obtain the sovereignty through the influence of his mother's relatives. In pursuance of his plan he slew seventy of his brethern 'upon one stone' at Ophrah, Jotham, the youngest of them, alone contriving to escape. This is one of the earliest recorded instances of a practice exceedingly common on the accession of Oriental despots. Abimelech was eventually made king, although his election was opposed by Jotham, who boldly appeared on Mount Gerizim and told the assembled Shechemites the fable of the trees desiring a king. At the end of the third year of his reign the Shechemites revolted, and under the leadership of Gaal made an unsuccessful attempt to throw off the authority of Abimelech. In Judges ix. there is an account of this insurrection, which is specially interesting owing to the full details it gives of the nature of the military operations. After totally destroying Shechem, Abimelech proceeded against Thebez, which had also revolted. Here, while storming the citadel, he was struck on the head by the fragment of a millstone thrown from the wall by a woman. To avoid the disgrace of perishing by a woman's hand, he requested his armor-bearer to run him through the body. Though the immediate cause of his death was thus a sword-thrust, his memory was not saved from the ignominy he dreaded (2 Sam. xi. 51). It has been usual to regard Abimelech's reign as the first attempt to establish a monarchy in Israel. The facts, however, seem rather to support the theory of Ewald (*Gesch.* ii. 444), that Shechem had asserted its independence of Israel, when it chose Abimelech as its king.

ABINGTON, Frances, a comic actress of great celebrity, whose maiden name was Barton, and whose father was a common soldier. She began life as an errand-girl to a French milliner. For more than thirty years she was the leading comic actress on the London stage. Her last appearance was in April, 1799. Born 1731, or according to some, 1738; died 1815.

AB'IOGENESIS, a term used by modern biologists, to indicate the production of living from inanimate matter. It was first used by Professor Huxley, to replace the older, but less definite phrase, 'spontaneous generation.' It is the opposite of biogenesis, or 'derived from life.'

ABIPONES, a tribe of South American Indians, inhabiting the territory lying between Santa Fé and St. Iago. They originally occupied the Chaco district of Paraguay, but were driven thence by the hostility of the Spaniards. According to M. Dobrizhoffer, who, towards the end of last century, lived among them for a period of seven years, they have many singular customs and characteristics. They seldom marry before the age of thirty, are chaste and otherwise virtuous in their lives, though they practise infanticide, and are without the idea of God. 'With the Abipones,' says Darwin, 'when a man chooses a wife, he bargains with the parents about the price. But it frequently happens that the girl rescinds what has been agreed upon between the parents and bridegroom, obstinately rejecting the very mention of marriage. She often runs away and hides herself, and thus eludes the bridegroom.' The Abiponian women suckle those infants that are spared for the space of two years,—an onerous habit, which is believed to have led to infanticide as a means of escape. The men are brave in war, and pre-eminently expert in swimming and horsemanship. Numerically the tribe is insignificant. M. Dobrizhoffer's account of the Abiponians was translated into English by Sara Coleridge, at the suggestion of Mr. Southey, in 1822.

ABKHASIA, or ABASIA, a tract of Asiatic Russia, on the border of the Black Sea. The surface of this country is generally mountainous, but there are some fertile valleys. There is a considerable traffic in slaves. The principal town in Sukum Kaleh. The territory which lies between long. 37° 3′ and 40° 36′ E. and lat. 42° 30′ and 44° 45′ N., was ceded to Russia by the treaties of Akermann (1826), and Adrianople (1829).

AB'NER, the first cousin of Saul, whom he served with great loyalty against David. Murdered by Joab, 1048 B.C.

ABOMA'SUM, the fourth stomach of ruminating animals, in which the food is converted into chyme, after being macerated and ground down in the first three stomachs.

ABOMEY, capital of the kingdom of Dahomey, in Africa, built without order or regularity. There are four large market places, and the town contains the principal palace of the kings of Dahomey. It is the scene of the yearly 'customs,' at which sometimes as many as 2,000 human beings are put to death. Pop. 30,000. Lat. 7° N., long. 2° 4′ E.

ABOMINATION, a term applied in the Old Testament to certain idols of the heathen, to the worship of which the Israelites were seduced. The idol Chemosh is spoken of as 'the abomination of Moab,' and Moloch as 'the abomination of the children of Ammon.'

ABOMINATION OF DESOLATION. This phrase was used by Christ in prophesying the approaching destruction of Jerusalem (Matt. xxiv. 25, and Mark xiii. 14). Reference is made to the prophet Daniel, who, in three places, refers to the abominations which make desolate (ix. 27, xi. 31, xii. 11).

ABORTION. Of the more recent statutes in the United States, the law of New York provides that 'any person administering, prescribing, advising, or procuring to take by a woman with child any drug or thing whatever, or advising or procuring her to submit to operation with intent to procure miscarriage, unless necessary to preserve her life, shall, if the women or child die through such means, be guilty of manslaughter in the second degree, punishable not less than four nor more than twenty years in state prison.' Any person who does any act calculated to prevent a child being born alive, is guilty of abortion; this extends to the giving of any drug or other matter or substance, or the use of any instrument calculated to produce miscarriage, whether the object be attained or not; if miscarriage be the intention, that constitutes the crime. The administration of a drug, or the actual use of an instrument, is not necessary to the incrimination; if any person sells or supplies any drug or thing to be taken, or any instrument to be used, knowing that miscarriage is the intention, that person is legally guilty of the crime of abortion. The intention is what the law looks at so completely, that it has been laid down that the probable consequence of any act or administration does not signify. If a person administers a bit of bread, with intent to commit abortion, that person is guilty of the crime. If the act be done with the mother's consent, and the child has not quickened, it is not a crime by the common law. Procuring an abortion is not murder by the common law, even if the child has quickened. When, in consequence of the means used to secure an abortion, the death of the woman ensues, it is murder. If a person intending to procure an abortion, does an act which causes a child to be born so much earlier than the natural time that it is born in a state much less capable of living, and afterwards dies in consequence of its exposure to the external world, the person who, by this misconduct, so brings the child into the world, and puts it thereby in a situation in which it cannot live, is guilty of murder; and the mere existence of a possibility that something might have been done to prevent the death will not render it less murder.

ABRAHAM'S BOSOM. This phrase is used by Christ in the parable of the rich man and Lazarus (Luke xvi. 22). It refers to the oriental custom of reclining on couches at meals and in such a way that each guest rested upon the bosom of his neighbor. The position with respect to the master of the house was of especial honor. To be in Abraham's bosom thus became a metaphor expressive of the highest spiritual condition and felicity. At the Last Supper, John, the beloved disciple, 'was leaning on Jesus' bosom' (John xiii. 23).

ABRAN'TES, a fortified town on the Tagus, in Portuguese Estremadura, 70 miles N.E. of Lisbon. The exports are grain, fruits, and oil. Pop. 6000.—Another town in Brazil.

ABSINTHE, a liqueur or aromatized spirit, prepared by pounding the leaves and flowering tops of various species of wormwood, chiefly *Artemisia Absinthium*, along with angelica root, sweet flag root, the leaves of dittany of Crete, star-anise fruit, and other aromatics, and macerating these in alcohol. After soaking for about eight days the compound is distilled, yielding an emerald-colored liquor, to which a proportion of an essential-oil, usually that of anise, is added. The liqueur thus prepared constitutes the genuine *Extrait d'Absinthe* of the French; but much of an inferior quality is made with other herbs and essential oils, while the adulterations practised in the manufacture of absinthe are very numerous and deleterious. In the adulterated liqueur the green color is usually produced by turmeric and indigo, but the presence of even cupric sulphate (blue vitriol) as a coloring ingredient has been frequently detected. In commerce two varieties of absinthe are recognized—common and Swiss absinthe—the latter of which is prepared with highly concentrated spirit; and when really of Swiss manufacture, is of most trustworthy quality as regards the herbs used in its preparation. The chief seat of the manufacture is in the canton of Neufchâtel in Switzerland, although absinthe distilleries are scattered generally throughout Switzerland and France. The liqueur is chiefly consumed in France, but there is also a considerable export trade to the United States. In addition to the quantity distilled for home consumption in France, the amount imported from Switzerland in recent years has not been less than 2,000,000 gallons yearly. The introduction of this beverage into general use in France is curious. During the Algerian war (1844–47) the soldiers were advised to mix absinthe with their wine as a febrifuge. On their return they brought with them the habit of drinking it, which is now so widely disseminated in French society, and with such disastrous consequences, that the custom is justly esteemed a grave national evil. A French physician, M. Legrand, who has studied the physiological effect of absinthe drinking, distinguishes two trains of results according as the victim indulges in violent excesses of drinking or only in continuous steady tippling. In the case of excessive drinkers there is first the feeling of exaltation peculiar to a state of intoxication. The increasing dose necessary to produce this state quickly deranges the digestive organs, and destroys the appetite. An unappeasable thirst takes possession of the victim, with giddiness, tingling in the ears, and hallucinations of sight and hearing, followed by a constant mental oppression and anxiety, loss of brain power, and, eventually, idiocy. The symptoms in the case of the tippler commence with muscular quiverings and decrease of physical strength; the hair begins to drop off, the face assumes a melancholy aspect, and he becomes emaciated, wrinkled, and sallow. Lesion of the brain follows, horrible dreams and delusions haunt the victim, and gradually paralysis overtakes him and lands him in his grave. It has been denied by a French authority, M. Moreau, that these symptoms are due to wormwood or any of the essential oils contained in absinthe, and he maintains that the strong spirit and such adulterations as salts of copper are sufficient to account for the effects of the liqueur. There is, however, no doubt that proportionately the consumption of absinthe is much more deleterious to the human frame than the drinking of brandy or other strong spirits. The use of absinthe has been prohibited in both the army and navy of France.

ABSORP'TION, is the interpenetration of certain bodies by other bodies or influences, which by this means disappear or become lost. There are several important examples of this in Physics.

A. (in Chem.), the disappearance of a gaseous fluid on entering into combination with a liquid or solid; thus, when the gas, ammonia, is passed into water, absorption takes place, and the result is the liquid commonly called spirits of hartshorn.

A. (in Physiol.), a term employed to designate that natural function of the body which is exercised by the absorbent vessels; as the absorption of the chyle by the lacteal vessels.

A. (of Heat), is where the heat-rays seem to disappear within the substances of bodies subjected to their influence, the effects differing greatly according to surface and color. See HEAT.

A. (of Light), will be best explained by considering the causes of transparency, opacity, and color. Transparency in a body is caused by one part of the light striking on it being transmitted through its substance, another being reflected from its surface, and a third being absorbed or lost in its interior. When a body reflects nearly the whole of the light, absorbing only a very small portion, it is said to be opaque. Color is produced in transparent media by part of the color contained in white light being absorbed.

ABSTE'MII, a name given by the early Reformers to members who refused to partake of fermented wine, and, therefore, abstained from the cup in the eucharist. Calvin permitted them to partake of the bread only, touching the cup with their lips; but the Lutherans held such a partial taking of the sacrament to be a profanation.

ABULFAZL, vizier of Akbar, the Mogul emperor. Author of many valuable historical works, among which is *the Ayin-i-Akbari*, a geographical and statistical account of the Mogul empire. This work was translated into English by a Mr. Gladwin, in 1785. Died by assassination, 1602.

ABULGA'SI-BAYATUR, khan of the Tartars. After a reign of twenty years, like Charles V. of Spain, he resigned the crown to his son, and led a retired life, during which he wrote the history of the Tartars, which valuable work was afterwards translated into German and French. Born at Urgens, capital of Khorasan, 1605; died 1663.

ABYSSINIAN CHURCH. See AFRICAN CHURCH.

ACADE'MUS, or ECADEMUS, an Athenian, whose house was employed as a philosophical school in the time of Theseus. He had the honor of giving his name to a sect of philosophers, or rather three sects, called Academics. The old academy had Plato for its chief, the second Arcesilaus, and the last Carneades. No one was suffered to laugh in the academy at Athens, under the penalty of expulsion.

ACANTHA'CEÆ, in Botany, the *Acanthus* order. Herbs or shrubs found in most parts of the world, and abounding in the tropics. There are nearly 1400 known species, some having very beautiful flowers. The elegant lobed and sinuated leaves of the acanthus, which may be taken as the type of the order, are stated to have suggested the capital of the Corinthian pillar.

ACAN'THOPHIS, in Zoology, a genus of venomous serpents, allied to the vipers. From these, however, they are distinguished by their having a single series of plates beneath the tail, except towards the very end of it, where, in some instances, they are separated into two small rows. They are viviparous, and conceal themselves among the roots of trees, depending for their prey on the effects of the poison with which they are imbued

ACAN'THURUS, a genus of fishes, of the order *Thoracici*, natives of the Indian and Arabian seas. The genus contains a large number of species, many of which are extremely beautiful in form and color.

ACAS'TUS, son of Pelias, king of Thessaly, married Astydamia or Hippolyte, who fell in love with Peleus, son of Æacus, when in banishment at her husband's court. Peleus, rejecting the addresses of Hippolyte, was accused before Acastus of attempt upon her virtue, and soon after, at a chase, exposed to wild beasts. Vulcan, by order of Jupiter, delivered Peleus, who returned to Thessaly, and put to death Acastus and his wife.

AC'CENT, is the stress of the voice in pronouncing certain syllables of words. There are three kinds of accents—viz., the acute, the grave, and the circumflex. The acute accent, marked thus (ˊ), shows that the voice is to dwell on the syllables over which it is placed. The grave accent is marked thus (ˋ), and points out when the voice ought to be lowered. The circumflex accent is compounded of the other two, and marked thus (ˆ), it denotes a quavering of the voice between high and low. Accents were first introduced in the Greek language by Aristophanes of Byzantium, about 265 B.C., and were first used by the French early in the 17th century.

Accent and Quantity.—Accent is not identical with quantity, that is the length or shortness of vowel sounds or syllables, but in metrical composition it sometimes modifies it.

Accent and Emphasis.—These are not identical; the former being fixed, the latter depending on the value of the words in their relation to others.

Accented Syllables.—On many words of three or more syllables, there is a double accent, one being less marked than the other, as in 'epi'cur''ean,' in which the doubled accent-mark shows the syllable on which greater stress is to be laid.

ACCEPT'ANCE is the act by which a person binds himself to comply with the request contained in a bill of exchange addressed to him by the drawer. In all cases it is understood to be a promise to pay the bill *in money*, the law not recognizing an acceptance in which the promise is to pay in some other way, as, for example, partly in money and partly by another bill. A. may be absolute, conditional, or partial. *Absolute* A. is an engagement to pay the bill strictly according to its tenor, and is made by the drawee subscribing his name, with or without the word 'accepted,' at the bottom of the bill, or across the face of it. *Conditional* A. is a promise to pay on a contingency occurring, as, for example, on the sale of certain goods consigned by the drawer to the acceptor. No contingency is allowed to be mentioned in the body of the bill, but a contingent acceptance is quite legal, and equally binding with an absolute acceptance upon the acceptor when the contingency has occurred. *Partial* A. is where the promise is to pay only part of the sum mentioned in the bill, or to pay at a different time or place from those specified. In all cases A. involves the signature of the acceptor either by himself or some person duly authorized on his behalf. A bill can be accepted in the first instance only by the person or persons to whom it is addressed; but if he or they fail to do so, it may, after being protested for non-acceptance, be accepted by another '*supra* protest,' for the sake of the honor of one or more of the parties concerned in it. It has been decided in some instances that A. need not be written on the bill, nor, in fact, be in writing at all. But in England, by statute, an A. must be in writing; and in this country similar laws have been passed in the states of Alabama, California, Delaware, Kansas, Maine, Minnesota, Missouri, Oregon, New York, Pennsylvania, and Wisconsin.

ACCES'SORY. It was formerly provided by the common law that the A. cannot be guilty of any other or graver offence than his principal; that he cannot be convicted except jointly with the principal; that he is not guilty if the principal is not guilty; and that if the principal is acquitted, so is the A. Recent statutes, however, in England and in almost all the United States have changed the law. The statutes of Massachusetts and New York provide that any person who, by counselling, hiring, or otherwise procuring the commission of a felony, becomes an A. before the fact, shall be punished in the same manner as the principal felon. In New York it is also provided that the A. before or after the fact may be indicted, tried, convicted, and punished, notwithstanding that the principal felon has been pardoned or otherwise discharged before conviction; and in Massachusetts, if for any reason the principal is not amenable to justice. There are similar statuary provisions in Pennsylvania; and nearly all the states have statutes of the same character.

ACCIAJUOLI, DONATO, a noble and learned Florentine, distinguished as a statesman and scholar. He wrote a commentary on the 'Ethics' of Aristotle, and translated some of the 'Lives' of Plutarch, to which he added those of Hannibal and Scipio. He also wrote a life of Charlemagne. Born at Florence, 1428; died at Milan, 1478.

A'CCIDENT, denotes, in a general sense, any casual event, or, in more philosophical language, an attribute of a thing, or class of things, which neither belong to, nor is in any way deducible from, the essence of that thing or class.

In Grammar, A implies a property attached to a word without entering into its essential definition.

In Heraldry, it is in coat-armor an additional mark, which may be omitted without effecting any change in the dignity.

In Optics, Accidental colors are those which depend on the affections of the eye. The term is applied to the ocular spectrum, which is generally perceived after the eye has been for some time steadily fixed upon a colored object. Thus, if we look for some time upon a yellow piece of cloth, and suddenly turn the eye from it, we will see the color of indigo; red will give a blueish green, and so on. These colors are also called complementary colors, because, when taken in conjunction with those of the spectrum, they make up all the colors of a white light.

In Design, the Accidental point (in perspective) is that point in the horizontal line where the projections of parallel lines meet the perspective plane.

ACCLAMATION, the expression of the opinion, favorable or unfavorable, of any assembly by means of the voice. Applause denotes strictly a similar expression by clapping of hands, but this distinction in the usage of the words is by no means uniformly maintained. Among the Romans acclamation was varied both in form and purpose. At marriages it was usual for the spectators to shout 'Io Hymen, Hymenæe,' or 'Talassio;' a victorious army or general was greeted with 'Io triumphe;' in the theater acclamation was called for at the close of the play by the last actor, who said, 'Plaudite;' in the senate opinions were expressed and votes passed by acclamation in such forms as 'Omnes, omnes, Æquum est, Justum est, &c;' and the praises of the emperor were celebrated in certain pre-arranged sentences, which seem to have been chanted by the whole body of senators. The acclamations which authors and poets who recited their works in public received were at first spontaneous and genuine, but in time became very largely mercenary, it being customary for men of fortune who affected literary tastes to keep applauders in their service and lend them to their friends. When Nero performed in the theater his praises were chanted, at a given signal, by five thousand soldiers, who were called 'Augustals.' The whole was conducted by a music-master, 'mesochorus' or 'pausarius.' It was this case of Nero which, occurring to the recollection of the French poet Dorat, may be said to have originated the well-known Paris 'claque.' Buying up a number of the tickets for a performance of one of his plays, he distributed them gratuitously to those who promised to express approbation. From that time the 'claque,' or organized body of professional applauders, has been a recognized institution in connection with the theaters of Paris. In the early ages of the Christian church it was by no means uncommon for an audience to express their approbation of a favorite preacher during the course of his sermon. Chrysostom especially was very frequently interrupted both by applause and by acclamations. In ecclesiastical councils vote by acclamation is very common, the question being usually put in the form, 'placet' or 'non-placet.' This differs from the acclamation with which in other assemblies a motion is said to be carried, when, no amendment being proposed, approval is expressed by shouting such words as 'Aye' or 'Agreed.'

ACCOL'TI, BENEDETTO, Italian lawyer and historian; chancellor of the republic of Florence. He wrote a history of the Crusade under Godfrey of Bouillon, printed at Venice, in 1532, which was consulted by Tasso in the composition of his *Jerusalem Delivered*. He likewise wrote a little book of the famous men of his time. Born at Arezzo, 1415; died at Florence, 1466.

ACCORAMBONI, VITTORIA, an Italian lady, famous for her great beauty and tragical history. She was maried first to Francesco Peretti, who was assassinated, and afterwards to the Duke of Bracciano, who died bequeathing her the whole of his large fortune, on account of which she was murdered by Lndovico Orsini, a relative. Her history forms the basis of Webster's tragedy, *The White Devil*, and a romance by Tieck. Died 1585.

ACCORSO, FRANCESCO, professor of law at Bologna. Reduced the Code, Digests, and Institutes into one system, printed at Lyons, in 6 vols, folio, 1627. Born at Florence, 1182; died at Bologna 1260.

ACCOUNT, in general, denotes all arithmetical computations. Among merchants it is used for the books in which their business is entered. See BOOK-KEEPING.

ACCOUNT, in law. An open account is one in which some item of the contract is not settled by the parties, whether the account consists of one item or many, or where there have been running or current dealings between the parties, and the account is kept open with the expectation of further dealing. A stated account is an agreement between the parties to an account that all

the items are true. A stated account is in the nature of a new promise. A voluntary settlement of accounts between parties affords presumption that all items properly chargeable at the time were included. This presumption is not conclusive, but clear and convincing proof that such items were unintentionally omitted is necessary to sustain a subsequent claim to recover them. Account Current, is an open or running account between the parties. The acceptance of an account by the party to be charged must be shown, in an action at law, by the party relying upon a stated account; and the acknowledgment, that the sum is due, is sufficient, though there be but a single item in the account. Acceptance may be inferred from retaining the account a sufficient time without making objections.

AC'CRA, a kingdom, of about 500 miles area, and also one of the English ports, Gold Coast, Western Africa. Lat. 5° 30′ N. Long. 0° 12′ W.

ACCUMULA'TION, is that kind of motion existing in some kind of machines at the end of intervals of time during which the velocity of the moving body has been constantly accelerated.

ACCUMULATOR, an electrical machine which generates or accumulates, by means of friction, electric currents of high tension. It is an adaptation of the ordinary cylindrical frictional machine, and the exciting body consists of a large disc or circular plate of vulcanite, or 'ebonite,' as it is generally named by electricians.

ACEPH'ALOCYST, (Greek, 'a headless bladder'), an intestinal parasite which has the appearance of a simple bladder without any visible organs.

A'CETATE, in Chemistry, a compound formed by the union of a base with acetic acid. Many of the acetates are of great importance in the arts. The most important is acetate or sugar of lead. All the acetates are soluble in water.

A'CETYLENE, a luminous hydrocarbon gas, resembling coal-gas, discovered by Berthelot, the eminent French chemist.

ACHÆ'I, the descendants of Achæus, the son of Xuthus, and grandson of Helen. Achæus having committed manslaughter, was compelled to take refuge in Laconia, where he died, and where his posterity remained under the name of *Achæi*, until they were expelled by the Aeraclidæ. Upon this, they passed into the northern parts of Peloponnesus, and, under the command of Tisamenus, the son of Orestes, took possession of the country of the Ionians, and called it Achaia. The successors of Tisamenus ruled until the time of Gyges's tyranny, when Achcia was parcelled into twelve small republics, or so many cities with their respective districts, each of which comprised seven or eight cantons. Four of these—Patræ, Dymæ, Tritæa, and Pharæ—established a confederacy, 284 years B.C., which received the addition of other important places, and continued formidable upwards of 130 years, under the name of the *Achæan League*, and was most illustrious whilst supported by the splendid virtues and abilities of Aratus and Philopœmeu, They directed their arms for three years against the Ætolians, and rose to be powerful by the accession of neighboring states, and freed their country from foreign slavery. At last, however, they were attacked by the Romans, and, after one year's hostilities, the Achæan League was totally destroyed, B.C. 146. From this period the Peloponnesus was reduced to the condition of a Roman province, bearing the name of Achaia.—The name of *Achæi* is generally applied to all the Greeks indiscriminately, by the poets.

ACHARE, Louis Amédée Eugene, a French novelist, born at Marseilles in April, 1814; died March 24, 1875. During the earlier part of his life he was engaged in business, and held several political offices. He then went to Paris, where he made considerable reputation as a journalist. In 1846 he accompanied the Duke of Montpensier to Spain as a reporter. In 1847 he published *Belle-Rose*, a successful novel (5 vols. 8vo); and he afterwards wrote many others, besides a number of plays.

ACHATES, a friend of Æneas, whose fidelity was so exemplary that *fidus Achates* (the faithful Achates) became a proverb.

ACHEEN, a kingdom in the N. W. part of Sumatra, powerful enough, in former times, to expel the Portuguese from the island, and important enough for its sovereigns to receive embassies from some of the greatest potentates of Europe. The climate is comparatively healthy, being freer from woods and swamps than the other parts of the island. The chief produce are fine fruits, rice, cotton, betel-nuts, birds' nests, gold-dust, and sulphur. The imports are salt, soap, opium, wine, arms, gun powder, and manufactured goods. The exports are mace, cloves, nutmegs, pepper, sugar, coffee, and rice. Pop. about 320,000. Religion, Mohammedan. —The Achinese are taller, stouter, and darker complexioned than the other Sumatrans. They are more active and industrious than their neighbors, and have more sagacity and penetration.

ACHEEN, the capital of the above kingdom, seated near the mouth of a river, on the N.W. point of the island, or Acheen Head, in a wide valley formed by two lofty ranges of hills. The houses are built of bamboos and rough timbers, and are raised some feet from the ground, this part of the country being overflowed in the rainy season. A Dutch force obtained possession of the town in 1874. Lat. 5° 22′ N.; long. 95° 34′ E.

ACHENBACH, Andreas, a modern German landscape painter of great eminence. Born at Cassel, 1815.

ACHENWALL, Gottfried, Professor of the University of Göttingen; termed 'the founder of the science of statistics,' an eminent writer on statistics and political economy. Born at Elbing, Prussia, 1719; died at Göttingen, 1772.

ACHERON'TIA, a genus of Lepidopterous insects, fam. *Sphingidæ*, which embraces some of the largest European Lepidoptera, the most remarkable of which is the *Acherontia atropos*, or Death's-head Hawk-moth.

ACHILLES TATIUS, a Greek writer, who probably lived in the fifth century. An erotic romance, *The Loves of Clitophar and Leucippe*, has been several times translated.

ACHILLINI, John Philotheus, born 1538. Was author of a poem, entitled *Viridario*, containing the eulogy of many learned men of his time.

ACIS, in *Mythology*, the son of Faunus and the nymph Symæthis, was a beautiful shepherd of Sicily, who was beloved by Galatea, which so enraged Polyphemus the giant that he crushed his rival with a rock, and his blood gushing forth from under the rock, was metamorphosed into the river bearing his name. This river, now *Fiume di Jaci*, or *Acque Grandi*, rises under a bed of lava on the eastern base of Etna, and passing Aci Reale, after a rapid course of one mile, falls into the sea. The waters of the stream, once celebrated for their purity, are now sulphureous.

ACK'ERMANN, Konrad Ernst, a comedian of Germany, who founded the modern German theater. Born 1710; died 1771.

ACŒ'METŒ, (Gr. for 'sleepless'), an order of Syrian monks instituted by one Alexander, about the middle of the 5th century. They celebrated divine service uninterruptedly night and day, dividing themselves into three sections who relieved each other. Their chief place of meeting was a cloister at Constantinople, known as the Studium, from which they were sometimes known as the Studites. They were put down by the Papacy about the year 536, having adopted the Monophysite heresy, which affirmed that Christ had only one nature.

ACO'MA, or St. ESTEVAN DE ACOMA, a town of New Mexico, seated on a high mountain, with a strong castle. It is the capital of a province.

ACONCAG'UA, a district of the kingdom of Chili, South America, bounded on the north and west by the province of Quillota, east by the Andes, and south by Santiago. Area, 12,000 square miles. The country is mountainous, and fertile in the valleys. It brings forth maize, wheat, beans, pumpkins, melons, and other garden produce; vineyards and orchards are plentiful, and in summer, numerous flocks are pastured on the slopes of the Andes; figs, nectarines, peaches, &c., are sent to Santiago and Valparaiso. Gold and copper are found. Pop. 134,000. The chief town is San Felipe.

ACOSTA, Joaquim, a colonel of engineers in the service of New Granada, and a distinguished geographer and historian, served in 1831 in the Columbian army. In 1834, with the botanist Cespedes, he undertook a scientific expedition, extending from the valley of Socorro to that of Magdalena, and seven years later visited the country from Antioca to Anserma. A. afterwards repaired to Europe, and lived in Spain several years. He has published an excellent map of the territory of New Granada. His most important publication, however, is one on the *Discovery and Colonization of New Granada*. A. has made some valuable contributions to the Geographical Society of Paris.

ACOSTA, Joseph d', a Spanish Jesuit, who, from being a missionary in Peru, became provincial of his order. His *History of the West Indies*, first printed in Spanish, in 1521, 8vo, is universally known and esteemed. Born at Medina del Campo, 1539; died at Salamanca, 1600.

ACROCERAU'NIUM, a promontory of Epirus, with mountains called Acrocerannia, which separate the Ionian and Adriatic seas. The word comes from *akros*, high, and *keraunos*, thunder; because, by reason of their great height, they were often struck by lightning. They were remarkable for attracting storms and thence dreaded by mariners.

AC'ROCORIN'THUS, a steep and lofty mountain, overhanging the city of Corinth, on which was built a citadel, called by the same name.

ACRON, a Sicilian physician, who expelled the plague from Athens by burning perfumes. Flourished B.C. 430.

ACTA ERUDITO'RUM, *Acts of the Learned*, the name of a literary journal founded at Leipsic in 1682 by Otto Mencke, and others, and written in Latin. It had a high reputation, and was

continued until 1782. The whole collection is contained in 117 quarto volumes.

ACTINOM'ETER, an instrument invented by Sir John Herschel to ascertain the intensity of the heat of the direct rays of the sun. It consists of a thermometer, with a large bulb filled with a dark blue fluid. This is enclosed in a box, the sides of which are blackened, and the whole covered with a thick plate of glass. The amount of the heating power of the sun's rays is ascertained by exposing the bulb for equal intervals of time in sunshine and shade alternately.

ACTON, John F. E., Sir, son of an Irish physician, and originally in the French naval service, but subsequently prime minister at the court of Naples. Many of the political persecutions which took place in Naples after the French invasion of 1799 are attributed to the influence of Acton at the Neapolitan court. In 1806, on the entry of the French into Naples, he took refuge in Sicily. Born at Besançon, France, 1736; died at Palermo, 1811.

ACTON-BURNEL, a village of England, eight miles from Shrewsbury.—A parliament was held here in the reign of Edward I., when the lords sat in the castle, and the commons in a barn, which is still standing. A large part of the castle remains, the walls exhibiting great strength, and adorned with fine battlements and rows of windows curiously carved. Its remains still bear testimony to the magnificence of the original structure.

ADAIR, Sir Robert, a statesman and diplomatist. He was the son of Robert Adair, sergeant-surgeon to George III. He negotiated the treaty of the Dardanelles, was afterwards ambassador to Constantinople, and was sent on a special mission to Prince Leopold, when besieged in Liege. Sir Robert married a daughter of the Marquis of Hazincourt, in 1805, but had no issue. In 1802, he represented Appleby, and in 1806–7, Camelford. Born in London, 1763; died 1855.

ADALBERT, an archbishop of Prague, and successful missionary in Hungary, Prussia, and Lithuania, where he was murdered by a pagan priest. It is affirmed that Boselaus, prince of Poland, ransomed the body of this archbishop with its equal weight in gold. Born 939; died 997.

ADALBERT, an archbishop of Bremen and Hamburg. Died 1072. He was a distinguished politician, and, during the minority of Henry IV, was appointed regent of the empire.

ADAM, Adolphe Charles, musical composer. Author of above forty comic operas, and some masses. Born in Paris, 1803; died 1856.

ADAMAWA, a country of Central Africa, about midway between the Bight of Biafra and Lake Tchad. The boundaries are not strictly defined, but it extends about 200 miles from N.W. to S.E., and has a breadth of from 70 to 80 miles. The Benuwe, a branch of the Niger, flows through it, and is joined by a large river, the Faro, which rises in the south. The country was formerly known as Fumbina. A large portion of the population are slaves. The chief town is Yolla, which has about 12,000 inhabitants. Lat. 9° 28′ N., long. 12° 13′ E.

ADAMS, Charles B., an American naturalist, who has devoted much of his time to the study of the Molluscs. Three winters which he passed in the island of Jamaica enabled him to throw much light on the formation of that island, of which a complete monograph is meditated. He has both written and published a great many papers on Conchology. Born at Dorchester, Mass. 1814; died in 1853.

ADAMS, Charles Francis, LL.D., grandson of John Adams, second President, and son of John Quincy Adams, sixth President of the United States, was born at Boston, August 18, 1807. His father holding diplomatic positions in Europe, he spent most of his first ten years abroad, returning to America in 1817, when he entered Harvard College, graduating in 1825. He was admitted to the bar in 1838, but never engaged in practice, having previously married the daughter of Peter C. Brooks, a wealthy merchant of Boston. Previous to 1848 he had served as a member of the Massachusetts Legislature for five years. In 1848 he was nominated by the newly organized 'Free Soil' party for the Vice-Presidency of the United States. This party, composed mainly of Democrats who were opposed to the extension of slavery, cast but few votes; but its members finally coalescing with most of the Northern members of the Whig party formed the Republican party, which came into power in 1860. Meanwhile, in 1858, Mr. A. was elected a member of Congress. In 1861 he was appointed by President Lincoln Minister to Great Britain, a post which he retained until 1868, when he was recalled at his own request. In 1871–72 he acted as arbitrator for the United States in the Commission to settle the respective claims of Great Britain and the United States growing out of the civil war. He was one of the originators of the 'Liberal Republican' movement in 1872, but was defeated by Mr. Greeley in securing the presidential nomination. He subsequently joined the Democratic party, by whom he was nominated for Governor of Massachusetts in 1876. He has furnished many contributions to the *North American Review* and to the *Christian Examiner*, and in 1870 delivered before the New York Historical Society an able discourse on 'American Neutrality,' which has been printed. He has published *The Life and Works of John Adams* (10 vols., 1850–56), and *The Life and Works of John Quincy Adams* (13 vols., 1874–76). His son, John Quincy Adams, born in Boston, Sept. 22, 1833, graduated at Harvard College in 1853, and was admitted to the bar in 1855. In 1866 he was elected to the State Legislature as a Republican, but having favored the 'reconstruction' policy of President Andrew Johnson, failed of re-election in the following year. He has since been a prominent leader in the Democratic party, by which he was sent to the Massachusetts Legislature in 1869–70, and nominated for Governor in 1867 and 1871, but he was not elected. Another son, Charles Francis Adams, jun., born at Boston, May 27, 1835, graduated at Harvard College in 1856, and was admitted to the bar in 1858. During the civil war he was in command of a regiment of colored troops, and was brevetted brigadier-general. He has since been identified with railroad development, has served as Railroad Commissioner of Massachusetts, and ranks high as an authority upon all matters pertaining to railroad management. He has been a contributor to the *North American Review*, and is the author of *The Railroad Problem*, 1875, and, with his brother Henry, of *Chapters of Erie*, 1871. The residence of the family is Quincy, Massachusetts. Henry Brooks Adams, (born in 1838), a third son of Charles Francis Adams, graduated at Harvard College in 1858. During the latter part of his father's service as Minister to Great Britain he acted as his private secretary. In 1870 he was appointed assistant professor of history in Harvard College, and became editor of the *North American Review*.

ADAMS, Edwin, comedian, born at Medford, Mass., Feb. 3, 1834. He first appeared at the National Theater, Boston, Aug. 29, 1853, as Stephen in *The Hunchback*. His first appearance in Philadelphia was Sept. 20, 1854, at the Chestnut, as Charles Woodley in *The Soldier's Daughter*. His first great hit was at the St. Charles Theater, Baltimore. He appeared as a star in all the principal cities of the United States; died Philadelphia Oct. 28, 1877.

ADAMS, Hannah, born at Medfield, Mass., in 1755, was one of the first women of America to engage in literary pursuits. She wrote a *View of all Religions* (1784), *History of New England* (1799), *Evidences of the Christian Religion* (1804), *History of the Jews* (1812), *Letters on the Gospels*, an *Autobiography*, and other works. Died at Brookline, Mass., Nov. 15, 1831. She was the first person whose remains were buried at Mount Auburn.

ADAMS, John, real name Alexander Smith, the patriarch of Pitcairn's Island, and one of the mutineers in His Majesty's ship *Bounty*, 1789. He settled, with several other of the mutineers and some Otaheitans, in Pitcairn's Island, where, after the death and destruction of his English companions, he became, from a rough and desperate character, a humane and religious man; he introduced Christianity and the laws of marriage amongst those that were with him on the island, and regulated the community entirely upon Christian principles. Born 1764; died 1829.

ADAMS, Nehemiah, D.D., Congregational clergyman, born at Salem, Mass., Feb. 19, 1806. He graduated from Andover Theological Seminary in 1829. He settled as colleague with Rev. Dr. Holmes of the First Church, Cambridge, Dec. 17, 1829, and in March 26, 1834, became pastor of the Essex street Church, Boston. He was for many years an officer of the American Tract Society. Dr. A. took an active part in the Unitarian controversy, and has published *Remarks on the Unitarian Belief; The Friends of Christ*, 1851; *Autobiography of Thos. Shepard*, &c., 1832; *Life of John Eliot*, 1847; *Southside View of Slavery*, 1854, presenting a favorable view of the institution; *Correspondence with Governor Wise of Virginia* on the same subject; occasional discourses, &c. He was a frequent contributor to the *Spirit of the Pilgrims*, Boston, 1826–33. He died Oct. 6, 1878.

ADAMS, Thomas, Puritan divine. At one time chaplain to Sir Henry Montague, Lord Chief Justice of England, considered to be the first preacher of his time. His style abounds in brilliant fancies, bearing wit and even humor. Southey designated him 'the prose Shakespeare of Puritan theologians.' Although a Puritan in theology, he was not a Nonconformist. He died previous to 1660.

ADAMS, William, D.D., born at Colchester, Ct., 1807 He graduated at Yale College 1827. His father, John Adams, LL. D., was principal of the Colchester Academy, and afterward of that at Andover, Mass. In 1834 he left his parish to visit the south for his health, became pastor of the Broome street Church, N. Y. (1835–53), and later pastor of the New School Presbyterian Church of New York. He afterwards became a professor of the Union Theological Seminary of the same city. Among his published works are *The Three Gardens of Eden* and *Gethsemani and Paradise*. He died Aug. 31, 1880.

ADAMS, William T., an American writer of juvenile books, under the pseudonym of 'Oliver Optic,' born at Medway, Massachusetts, July 30, 1822. For many years he was a teacher in the public schools of Boston, and is now the editor of *Oliver Optic's Magazine for Boys and Girls*. His principal works are *The Boat Club, Woodville, and Army and Navy* series, 6 vols. each; *Young America Abroad, The Starry Flag, Lake Shore*, a series of stories; *The Riverdale Story Books*, and *In Doors and Out*, a volume of domestic tales.

ADAPTATION, in Biology, the process by which an organism or species becomes modified to suit the conditions of its life. As employed by evolutionists, the term generally implies such modification as arise in an individual, when some change of function and structure is produced by a change of external conditions. *Indirect adaptations* are those which are directly generated in an organism, but only become apparent in its offspring.

A'DAR, the twelfth month of the ecclesiastical and the sixth of the civil year of the Jews. It comprehends a portion of February and the beginning of March.

ADDINGTON, Henry. See Sidmouth, Lord, in Am. Supp.

ADELUNG, Friedrich Von, philologist. Studied at Leipsic, then visited Italy, and collated some ancient German MSS. in the Vatican library. In 1803 appointed instructor to the young brothers of the Czar of Russia, and afterwards became director of the Oriental Institute and president of the Academy of Sciences. Author of works on the Sanscrit and Russian languages. Born at Stetten, 1768; died at St. Petersburg, 1843.

ADET, P. A., an envoy, who represented France in the United States, 1796. He is known both as an original author in chemistry and a translator; he suggested new chemical characters and nomenclature.

ADIAPH'ORITES, a name given to Melanchthon and the party of which he was the leader, because of their submission upon indifferent points to imperial edicts. The imposition by Charles V., in 1548, of an edict known as the Augsburg Interim, proposing a temporary accommodation of the dissensions between the Protestants and Papists, till the dispute could be decided by a council, was the origin of the name. Flacius and the primitive Lutherans opposed Melanchthon in the controversy. The two principal questions debated were—first, whether it was lawful to submit to the opponents of truth, even in unimportant points; and, secondly, whether, granting that it was so, the matters upon which the Interim required submission were unimportant. The point in the edict chiefly insisted on was the doctrine of justification by faith. Melanchthon drew up the so-called Leipsic Interim, which declared that certain rites and observances of the Romish Church, and the jurisdiction of the Roman Catholic bishops, were *adiaphora* (things indifferent). From this controversy other divisions sprung, and from these divisions many of the schisms among Protestants had their origin.

ADIRONDACK MOUNTAINS, a group of mountains in the N. of the state of New York, North America, lying between Lakes Champlain and Ontario. They rise from an extensive plateau about 2000 feet above the level of the sea, and are chiefly of granite formation. Mount Marcy, the highest summit, has an altitude of 5337 feet, and others of the group are from 4000 to 5000 feet high. The two principal streams which take their rise in this region—the Hudson flowing south, and the Richelieu flowing northwards from Lake Champlain—afford abundant means of conveying from the mountains the valuable timber, chiefly pine, with which they are covered. Extensive deposits of magnetic iron ore, of great value, have been discovered; and a village, called Adirondack, has recently sprung up, where smelting is extensively prosecuted. Emerson, in his poem *Adirondacks*, has familiarized the literary world with the scenery of these mountains.

ADIT, in Mining, the entrance to a mine, generally driven horizontally into the side of a hill. Formerly mines were worked by vertical shafts, but now adits are always used where practicable. The doors of ancient theaters were called adits.

ADLER, George J., Ph.D., author, born at Leipsic, Germany, 1821; died Bloomingdale Insane Asylum, N. Y., Aug. 24, 1868. He came to the United States in 1833; was professor of German at the University of New York from 1846 to 1854, and, until he became insane in 1860, was a teacher, and author of text-books. Among his works are a German grammar, 1846; and reader, 1847; a dictionary, 1848, and a manual of German literature, 1853; a Latin grammar, 1858; translations of the *Iphigenia* of Goethe, and a history of Provençal Poetry, by C. C. Fauriel, 1860; *Notes on the Agamemnon of Æschylus*, 1861. He delivered lectures in New York on 'Roman Literature' in 1862, and in 1864 on Goethe's *Faust*. His *Letters of a Lunatic* were published in 1854.

ADME'TUS, the most remarkable of this name was a king of Pheræ, in Thessaly. Apollo, when banished from heaven, is said to have tended his flocks for nine years, and to have obtained from the Parcæ that Admetus should never die, if another person laid down his life for him. This was cheerfully done by his wife, Alcestis.—Admetus was one of the Argonauts, and was at the hunt of the Caledonian boar. Pelias promised his daughter in marriage only to him who could bring him a chariot drawn by a lion and a wild boar. Admetus did this by the aid of Apollo, and obtained Alcestis in marriage.

AD'MIRAL. The grades of rear-admiral and commodore in the United States navy were first established by act of July 16, 1862, which provides that the number of each grade shall not exceed 9 rear-admirals, 18 commodores, 36 captains, 72 commanders, 144 lieutenant-commanders, 144 lieutenants, 144 masters, and 144 ensigns. By act of Congress of Dec. 21, 1864, the President was authorized to appoint from the rear-admirals one vice-admiral, who shall be the ranking officer in the navy of the United States, and whose relative rank with officers of the army shall be that of lieutenant-general in the army. This grade was created for and bestowed upon Rear-Admiral Farragut. By act of July 25, 1866, it was provided that the number of officers of each grade on the active list should be 1 admiral, 1 vice-admiral, 10 rear-admirals, 25 commodores, 50 captains, 90 commanders, 180 lieutenant-commanders, 180 lieutenants, 160 masters, 160 ensigns, and in other grades the number now allowed by law. The rank of admiral was bestowed upon Vice-Admiral David Farragut. A law was passed at the 3d session of the 42d United States Congress abolishing the grades of admiral and vice-admiral in the navy. It provides that vacancies occurring in the grades of admiral and vice-admiral shall not be filled by promotion or in any manner, and that when the offices of said grades shall become vacant, the grades shall cease to exist. The pay of admiral is $13,000 a year; of vice-admiral $9000; and of rear-admiral $6000.

AD'MIRALTY. In the United States exclusive admiralty and maritime jurisdiction is by the Constitution delegated to the Federal courts. It rests with Congress to determine upon what court the jurisdiction shall be conferred. It has accordingly vested it in the first instance in the district court. No distinction is taken here between the instance and the prize court. Admiralty jurisdiction is either civil or criminal. Its civil jurisdiction embraces cases of maritime contracts and maritime trespasses in general. The principles and course of practice of the court in civil cases are principally derived from the Roman or civil law.

ADOLPHUS, Count of Nassau, elected emperor of Germany in 1292. His rapacity and tyrannical conduct caused a confederation to be formed against him, at the head of which was Albert, duke of Austria. Born 1252; fell in battle, 1298.

ADOLPHUS, G., a warlike duke of Holstein and son of Frederick, king of Denmark.—His name frequently occurs in the military transactions of Germany. Born 1526; died 1586.

ADOLPHUS FREDERICK, II., of Holstein Gottorp, king of Sweden, succeeded his father in 1751. He reformed the laws, and encouraged learning and the arts of peace.—This sovereign instituted, at Torneo, in Lapland, an academy of inscriptions and *belles-lettres*. Born 1710; died 1771.

ADOLPHUS, John, historian and barrister was born in London on the 7th August 1768. He was educated under the care of a grand-uncle, and after making a voyage to the West Indies was enrolled as an attorney about the year 1790. Called to the bar in 1807, he devoted himself to practice in criminal causes, and in a few years attained a leading position among Old Bailey counsel. His masterly defence of Thistlewood and the Cato Street conspirators, for which he had been retained only a few hours before the trial, did much to extend his reputation. He was very skilful in the management of his cases, but his hastiness of temper frequently led to unseemly altercations with other counsel. He held a good position in society, and was on terms of intimacy with the leading literary men of the day. *The History of England from the Accession of George III. to* 1783, which he published in 1802, was favorable noticed in the *Edinburgh Review* for its impartiality and accuracy. A new and enlarged edition of this work, in eight volumes, was in preparation, but only seven volumes were completed when the author died, 16th July 1845. His other literary works were—*Biographical Memoirs of the French Revolution* (1799); *The British Cabinet* (1799); *History of France from* 1790 *to* 1802 (1803); *Memoirs of John Bannister*.

ADOLPHUS, John Leycester, son of the above, also a distinguished barrister (died 1862), was the first to pierce the mask of the author of *Waverley*, in a series of critical letters addressed to Richard Heber, which he published in 1821.

ADON'IC, in Poetry, a verse which consists of a dactyle and a spondee or trochee; as *rara juventus*. It was so called from being first used in the elegies on Adonis, the lover of Venus.

ADORATION, an act of homage or worship which, among the Romans, was performed by raising the hand to the mouth, kissing it, and then waving it in the direction of the adored object. The devotee had his head covered, and after the act turned himself

round from left to right. Sometimes he kissed the feet or knees of the images of the gods themselves, and Saturn and Hercules were adored with the head bare. By a natural transition the homage that was at first paid to divine beings alone came to be paid to men in token of extraordinary respect. Those who approached the Greek and Roman emperors adored by bowing or kneeling, laying hold of the imperial robe, and presently withdrawing the hand and pressing it to the lips. In eastern countries adoration was performed in an attitude still more lowly. The Persian method, introduced by Cyrus, was to bend the knee and fall on the face at the prince's feet, striking the earth with the forehead, and kissing the ground. Homage in this form was refused by Conon to Artaxerxes, and by Callisthenes to Alexander the Great. In England the ceremony of kissing the king's or queen's hand, and some other acts which are performed kneeling, may be described as forms of adoration. Adoration is applied in the court of Rome to the ceremony of kissing the Pope's foot, a custom which is said to have been introduced by the popes after the example of the Emperor Diocletian. In the Romish Church a distinction is made between *Latria*, a worship due to God alone, and *Dulia* or *Hyperdulia*, the adoration paid to the Virgin, saints, martyrs, crucifixes, the host, &c.

ADRASTA, one of the Oceanides, who nursed Jupiter.

ADRIAN, a town of the United States, capital of Lenawee county, Michigan, situated on a branch of the Raisin river, and on the Michigan Southern Railway, 73 miles W.S.W. of Detroit. Adrian is the center of trade for the surrounding district, which is chiefly grain-producing. Its extensive water-power is employed in mills of various kinds. It has several fine churches and other public buildings. Pop. in 1880, 7849.

ADUL'TERY. Adultery is not a crime by the common law, but is made so by statute in some of the States. To make the offence adultery at least one of the parties must be married. A person may be indicted in the following States for the crime of adultery: Alabama, Arkansas, Connecticut, Georgia, Illinois, Iowa, Maine, Massachusetts, Michigan, Minnesota, Mississippi, New Hampshire, New Jersey, North Carolina, Nebraska, Ohio, Pennsylvania, Rhode Island, Tennessee, Vermont, Virginia, Wisconsin. In the following States the parties must have publicly lived together in order to be punished for the crime: California, Missouri, Texas, Indiana.

AD'VENTISTS, a sect of Christians who are found principally in the United States. The main characteristics of their faith are the speedy advent or second personal coming of Jesus Christ; the final annihilation of the wicked; and the sleep of the dead till the day of judgment. The founder of this sect was William Miller, of Massachusetts, who in 1833 prophesied that the second advent of Christ would occur in 1843—hence the members of this denomination are often termed Millerites. Another branch of Adventists, called Seventh Day Adventists, originated in 1844. They set no time for the coming of Christ, believing that the year 1844 only brought the world to the cleansing of the tabernacle, a period of brief duration preceding the coming of Christ. The census of 1880 returns the number of Adventists in the United States as 90,079, including 746 ordained ministers.

A'DVERB. As an adjective is joined to a noun, so is an A., for analogous purposes, to a verb, an adjective, or another A. From the frequency with which adverbs are joined to verbs, they get their name. An A. cannot be the subject, the copula, or the predicate of a proposition; and is, therefore, a secondary part of speech, logically speaking. According to their signification, adverbs may be divided into—1. Adverbs of Place, as, *where, towards;* 2. of Time, as *ever, immediately;* 3. of Degree, as, *very, almost;* 4. of Manner, as, *thus, wisely;* 5. of Belief or Doubt, as, *perhaps, no,* &c.—It is commonly said, that 'some adverbs admit of comparison;' as if in this respect they differed from adjectives. The truth is, that adverbs admit of comparison under the same limitations, neither more nor less, that restrict the comparison of adjectives. Thus, *soon* is compared as naturally as *hard.* If *now* or *thus* cannot be compared, neither can *wooden* nor *circular;* and in both cases, for the same reason—the sense forbids it. The laws of euphony prevent alike *miserable* and *miserably* from being compared grammatically, i. e., by the addition of *er* and *est;* but both admit of logical comparison by the use of *more* and *most.*— A large class of adverbs in English are formed from adjectives by annexing the syllable *ly*, which is just the word *like.* Most languages have some such means of distinguishing the A. from the adjective, except the German, in which they are alike. Adverbs in general may be looked upon as abbreviations of phrases; thus, *here = in this place, then = at that time, wisely = like a wise man.* Combinations of words that can thus be represented by a single adverb, and all combinations that are analogous, though they may have no single word equivalent to them, are called adverbial expressions.

ADVE'RTISEMENT (Fr. *avertissement*). The public notification of a fact. This is now commonly effected either by means of the ordinary newspapers, or of newspapers, printers' lists, and other publications specially devoted to the purpose. Advertisements, both printed and written, are still posted on church-doors and other places of public resort, in which case they are commonly called bills or placards. The most formal kind of A., and that which is employed in the case of royal proclamations and the like, is publication in the *Gazette* (q. v.); but so little is the *Gazette* read by private persons, that, as regards the customers, publication in it alone is not a sufficient notice of a dissolution of partnership to free the partners from debts afterwards contracted in name of the company. Public notifications are frequently enjoined by statute; as, for example, under Road and Bridge Acts, the Bankrupt Statutes, &c. In many other ways, their legal effects are important. Advertisements by public carriers, railway companies, and the like, are equivalent to offers whereby the advertiser will be bound to those who send goods on the faith, and in accordance with the terms of the A. By advertising a *general ship*, for a particular voyage, the master places himself on a footing of a public carrier, and is bound to receive goods for the port to which the vessel is advertised to sail. A merchant in such circumstances can insist on his goods being received, unless the ship be full, or the entire freight engaged. The contract of affreightment is completed by the A., and the shipping of the goods in conformity and with reference thereto. See CHARTER-PARTY, CARRIER.—In 1833, the duty on advertisements, was 3*s.* 6*d.* in Great Britain, and 2*s.* 6*d.* in Ireland for each A., was reduced to 1*s.* 6*d.* in the former country, and 1*s.* in the latter (3 and 4 Will. IV. c. 23). In 1853, it was wholly repealed (16 and 17 Vict. c. 62). In 1832, the year previous to the reduction, the duty amounted to £170,650; in 1841 it was £131,608; and in 1853, the year of the repeal, it had increased to £180,000, thus exceeding the amount before the period of reduction. Advertisements are found in England as early as the middle of the 17th c.; but advertising was not general till the beginning of the 18th. In America, advertising has long been practised to an enormous extent; and since the repeal of the duty, it has increased in this country at a very rapid rate. Most newspapers are rendered remunerative to their proprietors only by means of the advertisements which they contain. See Sampson's *History of Advertising* (1874). See NEWSPAPER.

Æ'ACUS, son of Jupiter, by Ægina, and king of the Island of Œnopia. A pestilence having destroyed all his subjects, he entreated Jupiter to repeople his kingdom; and, according to his desire, all the ants which were in an old oak were changed into men, and called by Æ. *myrmidons*, from *murmex*, an ant. Æ. married Endies, by whom he had Telamon and Peleus. He was a man of such integrity that the ancients have made him one of the judges of hell, with Minos and Rhadamanthus.

ÆGINE'TA, PAULUS, a native of the island Ægina, who first noticed the cathartic quality of rhubarb. His knowledge of surgery, as shown in his works which have been preserved, was very great. His works were published at Paris in 1532, folio. Lived in the 7th century.

ÆGIS'THUS, king of Argos, was son of Thyestes by his daughter Pelopea. Being left guardian of Agamemnon's kingdoms, and of his wife Clytemnestra, he fell in love with her and lived with her. They were both put to death afterwards, by Orestes, after a reign of seven years from the murder of his father Agamemnon.

ÆGYP'TUS, son of Belus, and brother to Danaus, gave his fifty sons in marriage to the fifty daughters of his brother. Danaus, who had established himself at Argos, and was jealous of his brother, obliged all his daughters to murder their husbands the first night of their nuptials. This was executed, with the exception that Hypermnestra alone spared her husband, Lynceus. Even Æ. was killed by his niece Polyxena. Æ. was king after his father, of a part of Africa, which from him has been called Egyptus.

Æ'LIA CAPITOLINA, a name given to a city built by the Emperor Adrian in 134, near the spot where the ancient Jerusalem stood.

ÆLIANUS, CLAUDIUS, an Italian historian and rhetorician, who, though he never left his native country, became so perfect in the Greek language as to write it with the greatest purity. In the reign of Antoninus he taught rhetoric at Rome, and wrote a *Varia Historia*, which consists of a curious collection of anecdotes. He also wrote a valuable *History of Animals.* Probably lived about the middle of the 3d century.

ÆLST, EVERT VAN, a Dutch painter, famous for his dead-game and fruit pieces. Born at Delft, 1602; died 1658.

AELST, WILLIAM VAN, Dutch painter, nephew and pupil of the preceding, and an excellent painter of fruit and flowers. Visited Italy, where some of his finest works are preserved. Born at Delft, 1620; died at Amsterdam, 1679.

ÆOL'IPILE, a hollow ball of metal, to which a pipe is attached. On being filled with water, and placed on the fire, the steam issues from the tube with sufficient force to turn a wheel placed within its power. Aranca, who was an Italian mechanician of the 17th century, is supposed to be the first who applied the æolipile to useful purposes, but a somewhat similar apparatus was described by Vitruvius in the first century. In Italy a form of æolipile is used to cure smoky chimneys, by creating an upward draught.

ÆOLIS, or ÆOLIA, in *Ancient Geography*, a country of Asia Minor, settled by colonies of Æolian Greeks. The name in its limited sense was applied to the coast extending from the river Hermus to the promontory of Lectum, on the north side of the entrance to the Gulf of Adramyttium, and lying between Ionia to the S. and Troas to the N. In its wider acceptation it comprehended Troas and the coast of the Hellespont to the Propontis, where there where likewise several Æolian colonies.

ÆOLUS, was the son of Hippotes. He reigned over Æolus, the island Lipari, to the north of Sicily; and because he was the inventor of sails, and seems to have acquired a considerable knowledge of meteorology, the poets have called him the god of the wind. According to Virgil, Æ. was indebted to Juno for his royal dignity.

ÆPINUS, Franz Maria Ulrich Theodor, a distinguished electrician, who was the first to see the affinity between magnetism and electricity in its full extent, and to perceive how these may illustrate each other. He is also the inventor of the condensor of electricity and of the electropus. He published several memoirs relating to philosophical subjects, and seems to have devoted a considerable portion of his time to mechanical pursuits. Professor of physics at the Imperial Academy of Sciences, St. Petersburg. Born at Rostock, Lower Saxony, 1724; died at Dorpat, in Livonia, 1802.

ÆQUI, a people of Italy, inhabiting the valley of the Anio, who, after long hostilities, were subdued by the Romans, 302 B.C.

ÆRAR'IANS, a clan in ancient Rome who had been degraded by the censors. They were heavily taxed, could not vote in assemblies, serve in the army, nor occupy any post of honor or profit.

ÆRA'RIUM, (Lat.), among the Romans, the term applied to the place where the public money was kept, the care of which devolved upon the quæstors.

AE'RIANS, a sect of Christians, formed about 342, followers of Aerius, a presbyter, native of Pontus. They objected to the observance of Easter, Lent, and other festivals and fasts, and to the practice of offering prayer for the dead. Being exposed to persecution, they assemblied in woods and caves.

AEROE, or Arroe, an island of Denmark, in the Little Belt, lying 7½ miles S. of Funen, between Alsen and Langeland. It is of an irregular triangular shape, about 15 miles long and 8 broad at the widest points, with a hilly surface, but a fertile and well-cultivated soil. Pop. 10,200; chief town, Aeroeskjobing, on the east coast.

AESIR. See Scandinavian Mythology.

ÆSO'PUS, Claudius, a famous actor, who had the honor of instructing Cicero in oratory. He was a great epicure, and at an entertainment is said to have had a dish of singing birds which cost above £800. His son was also noted for his luxuriousness; and Horace says that he swallowed a pearl of great value dissolved in vinegar. Died worth £160,000., 60 years B.C.

Æ'TION, a Greek painter, whose picture of the nuptials of Alexander and Roxana, shown at the Olympic games, obtained for him the daughter of Proxenidas, one of the judges, in marriage, although he was quite unknown.

AETIUS, a famous general, sometimes spoken of as 'the last of the Romans,' in the reign of Valentinian III., emperor of the West. He was brought up in the emperor's guards, and after the battle of Pollentia in 403, was delivered as a hostage to Alaric, and next to the Huns. On the death of Honorius, he took the side of the usurper John, for whose service he engaged an army of Huns. He was afterwards taken into favor by Valentinian, who gave him the title of count. Being jealous of the power of Boniface, governor of Africa, he secretly advised his recall, and at the same time counselled the governor not to obey the mandate. This produced a revolt, which caused an irruption of the Vandals into that province. The treachery of Aëtius being discovered, a war ensued between him and Boniface, in which the latter was slain. Aëtius now appealed to the Huns, of whom he raised a large army, and returning, so greatly alarmed Placidia, the mother of Valentinian, that she put herself into his power. He defended the declining empire with great bravery, and compelled Attila to retire beyond the Rhine. Stabbed, 454, by Valentinian.—This crime was committed under the conviction that Aëtius entertained a design upon the throne of the emperor.

AETIUS, a bishop of Antioch, who, before entering into orders, was a physician, and remarkable for a contentious and sceptical spirit. He contended for a dissimilarity between the Father and the Son, for which he was banished by Constantius, but recalled by Julian. His followers were named Ætians. Died at Constantinople, 367.

AFANASIEF, Aleksandr Nikolaevich, a Russian scholar, distinguished for his researches into Slavonic literature and archæology, was born about 1825. He contributed many valuable articles to the serial literature of his country, but his reputation rests chiefly on two works of more permanent interest. The first was an extensive collection, in eight parts, of *Russian Popular Stories;* the other a treatise, in three volumes, on the *Poetical Views of the Old Slavonians about Nature*, completed just before the author's death, which occurred in the autumn of 1871.

A'FER, Domitius, an ancient orator, who obtained the prætorship of Rome; but being disappointed of further promotion, he became an informer against Claudia Pulchra, cousin of Agrippa, and by his abilities succeeded in gaining the favor of Tiberius. He wrote an inscription, which he affixed to a statue of Caligula, and which embodied the remark that he had been a second time consul at the age of twenty-two. This was meant for an encomium, but the emperor took it as a sarcasm, and made a violent speech in the senate against the author. A., instead of replying, supplicated pardon, saying that he feared less the power of the emperor than his eloquence, which flattery so pleased Caligula, that he raised him to the consular dignity. Born at Nismes; died at Rome, A.D. 60.

AFFIDAVIT. In the United States, judges, justices of the peace, commissioners of deeds, notaries public, and other officers have authority by law to take affidavits. All the states appoint commissioners residing in other states and give them authority to exercise this power. By recent statutes of New York affidavits to be used there may be taken in foreign countries and in other states by any person who is authorized there to exercise similar power. Judges of the higher courts in other states are also vested by most of the states with the same powers given to their commissioners. Ministers and consuls of the United States residing abroad, may take affidavits, and their consular seals sufficiently authenticate their acts. By the English law British ambassadors and consuls have similar powers.

AFFIRMATION. The use of affirmation in the United States instead of oaths is now quite general, as experience seems to have demonstrated that the force of evidence is not lessened thereby.

AFFO, Ireneo, Italian critic and historian. A Franciscan monk, and professor of Philosophy, and librarian of the Ducal Library at Parma. Author of many historical, biographical, and literary works of great value, and a volume of sonnets published under an assumed name. Born at Basseto, 1741; died there, 1797.

AFRAGO'LA, a Neapolitan town, where straw bonnets are largely made. It is six miles from Naples. Pop. 16,500.

AFRA'NIA, the inventor of the bassoon. He flourished at Ferrara in the 16th century.

AFRICA. History and Progress of Discovery.—The name Africa was given by the Carthaginians to the territory adjacent to their city, on the shores of the Mediterranean, including the basin of the river Bagradas: and to this day the district bears the name of Frikeah, or Afrikeah. Greek and Roman geographers gave the name Libya to the then Roman portion of Africa, next to Egypt. The following are the dates of the most remarkable expeditions of discovery.

	B.C.
Traditionary circumnavigation of Africa by the Phœnicians	610–594
Hanno sailed from Carthage, said to have passed the Straits of Gibraltar, and reached a point to the south of Senegal, about	500
	A.D.
Cape of Good Hope discovered by Bartholomew Diaz	1487
Vasco de Gama doubled the Cape and explored the coast	1497
An English African company formed under a patent granted by Queen Elizabeth	1581
An English expedition sent to the Gold Coast	1599
Thomson explored the Gambia, and was killed	1611
Dutch colony at the Cape founded	1598
Bruce commenced his travels	1768
An English settlement established at Sierra Leone	1787
Mungo Park's two expeditions to trace the Niger	1795–1804
Clapperton, Denham, and Oudney crossed the Great Desert	1822–1825
The brothers Lander traced the course of the Niger	1830
The great Niger expedition to found a colony in Central Africa, supported by a Parliamentary grant of £60,000, but resulting in a total failure	1841
Richardson explored the Great Sahara	1846

Livingstone explored the country north of Cape Colony and discovered Lake Ngami..... 1849
Livingstone's second expedition, in which he reached Loando, and crossed the continent to Quillimane on the east coast. He walked 11,000 miles, discovered the Victoria Falls and traced the Zambesi 1851–1856
Second expedition of Richardson, accompanied by Oberweg and Barth, the two former die..... 1852
Silva Parto, a Portuguese trader, crossed the Continent from Benguela to the mouth of the Rovuma, on the east coast. 1853
Du Chaillu visited equatorial Africa.....1856–1859
Burton and Speke discovered Lake Tanganyika..... 1858
Livingstone having engaged in another expedition, discovered Lakes Shirwa and Ayassa..... 1859
Speke and Grant discovered Lake Victoria Nyanza, supposing it to be the source of the Nile..... 1863
Du Chaillu's second expedition..... 1863
Baker discovered Lake Albert Nyanza..... 1864
Livingstone started from Zanzibar on an expedition to discover the source of the Nile... 1866
Dr. Schweinfurth's Explorations.....1868–1871
Stanley (sent out by the proprietor of the *New York Herald.*) reached Livingstone..... 1872
Livingstone died, after having discovered an immense lake district..... 1873
Lieut. Cameron surveyed the Southern portion of Lake Tanganyika, and crossed the continent on foot..... 1874
Stanley arrived at the West Coast, having traversed the continent, discovered the source, and traced the course of the Congo..... 1877
Col. Gordon in the Equatorial Regions solved several important geographical problems; assisted by two Americans, Col. Long and Col. Mason, and Purdy Bey....1874–1879
Dr. Braza's Explorations on the West Coast.....1875–1879
Serpa Pinto's journey across Africa.....1877–1879
Thompson's journey to the African Lakes.....1878–1879
Stanley's Expedition for the International Association..... 1879
Lieut. Wiseman's journey across Africa.....1880–1882

AFRICA, CHURCH OF. Christianity, from the very beginning, spread among the peoples of the entire northern seaboard, and up the valley of the Nile to Nubia, Abyssinia or Ethiopia. The churches founded in the south and west of the continent, are of modern origin. Of the North-African churches the most famous are those of Egypt and Carthage. The historian Eusebius attributes to the evangelist St. Mark the foundation of the see of Alexandria. There, as in Asia Minor, Greece, and in Rome itself, the numerous Jewish residents were among the first believers, and the most zealous propagators of the faith. During the persecutions the African churches had their illustrious martyrs and confessors, while the rigor exercised against the Christians drove many into the solitudes on both banks of the Nile, and gave rise to the colonies of recluses and monks which flourished there in the fourth century. At the beginning of this same century (306) the heresiarch Arius, a native of Libya, began to dogmatize, sapping the established belief in the divinity of Christ. The religious troubles caused by his teaching were only very partially settled by the provincial council of Alexandria in 321, and even by the general council of Nice in 325. The heresy spread all over the Roman empire, infected some of the barbarian tribes, who possessed themselves of Italy, Gaul, Spain, and Northern Africa, and disturbed the peace of Christendom for two hundred years and more. The church of Egypt produced many great and learned men, such as Clement of Alexandria, St. Athanasius, and St. Cyril. The church of Carthage early possessed Tertullian and St. Cyprian, and later St. Augustine. The first seeds of Christianity are believed to have been sowed in Ethiopia and along the Upper Nile by the officer of Queen Candace, baptized by Philip the Deacon (Acts viii, 27). Their growth seems to have been checked or entirely destroyed afterward; for St. Frumentius of Tyre, visiting the country with his uncle in 316, saw the latter murdered by the natives, was himself reduced to slavery in the court of Axum, where his saintly example won the esteem of the Abyssinians. Having been given his liberty, he returned to Alexandria, was ordained priest by St. Athanasius, and sent back as bishop of Ethiopia to be the apostle of that country. Before he died the Abyssinian church possessed eight episcopal sees. The numerous councils held by the North African church before the invasion of Mohammedanism, attest the vigorous spiritual life prevailing her faithful. Unhappily the Greek proclivity toward disputatiousness infected not only Alexandria and all Egypt, but the other provinces as well. The court of Byzantium, which undertook to regulate church doctrine and discipline as it did temporal matters, protected or proscribed alternately both the true believers and the heretics. The Arian Vandals then took possession of Africa, ruining the churches there; and then the Mohammedan wave swept the entire north shore, annihilating Christianity there. In Abyssinia, which had, like Egypt itself, become heretical, the Christian faith survived, overrun by errors and superstitions, down to the sixteenth century, when the Jesuit missionaries were called in to give it the beginning of a new life. With the conquest of Algeria by the French in 1830, dawned a new era on the extinct church of Carthage. There is, at present, an Archbishop's see at Algiers, suffragans at Oran and Constantine, and a Vicariate at Tunis; in Egypt there are two Vicars Apostolic, one Coptic, and the other Latin, with jurisdiction over Abyssinia; in Central Africa is another Vicariate Apostolic, with its seat at El Obeid in Cordofan. Passing by, on the west coast, the episcopal sees in the Canary and Cape de Verd Islands, we find a vicariate at Senegambia; a French Missionary Society evangelizing the entire coast between Sierra Leone and the Niger together with the vicariate of Benin. There is a Portuguese bishop at Angola; between the Portuguese territory and Orange River, is the vicariate of Cinibebasia; two vicariates at the Cape of Good Hope, a third at Natal. The Jesuits are in charge of the missions along the Zambesi. Then Madagascar had flourishing missions before the calamitous war with France. And in the Mauritius the bishop of Saint Louis depends immediately on the Holy See. The missions in Upper Egypt are, for the time being, blotted out by the successes of the Mahdi. But among the Gallas, the populous tribes swarming around the equatorial lakes, and along the Congo missions are being slowly but surely established. —The Christian SCHOOL OF ALEXANDRIA, sprung from the Jewish School which flourished in that city under the Ptolemies, and produced the Septuagint Version of the Old Testament, enjoyed a world-wide fame in the third century, when Pantænus, Origen, and Clement taught there.

AFRICAN METHODIST EPISCOPAL CHURCH. This religious body was organized in 1816 by colored Methodists, who had formerly belonged to the Methodist Episcopal Church. Rev. Richard Allen was elected their first bishop in 1816. Their doctrines are almost similar to those of the parent Church. They have four high academies, one university, and two weekly journals. In 1880 they reported 1418 itinerant preachers, 3168 local preachers, and 214,808 members.

AFRICAN METHODIST EPISCOPAL ZION CHURCH. A religious body formed in 1820 by a secession of African Methodists from a congregation of the Methodist Episcopal Church in New York city. Their first annual conference, in 1821, was composed of 22 preachers, and reported 1426 church members. In 1838 Rev. Christopher Rush was elected by the conference its first bishop, with the title of superintendent. Its superintendents are elected quadrennially by the general conference. Their doctrines are similar to those of the Methodist Episcopal Church. In 1880 they claimed 1500 itinerant preachers, 2500 local preachers, and 190,900 members.

AGGERHUUS', or AKERSHUUS' a province of Norway, the largest and in many respects the most important in the kingdom, having an area of 36,380 square miles. Its mines, agriculture, and commerce are considerable and valuable. (See NORWAY.) Pop. 165,000. Lat. between 58° 48′ and 62° 40′ N., long., between 7° 40′ and 12° 30′ E.

AGGREGATION, STATES OF. The three states in which matter occurs, solid, liquid, and gaseous. In the solid state, the molecules adhere so firmly that their relative positions cannot be changed without the application of force; in the liquid state, they more freely and readily act on each other; in the gaseous state, they have a tendency to separate and diffuse through a vacant space.

AGLA'OPHON. There are two Grecian painters distinguished in antiquity by this name, natives of the island of Thasos. Flourished about 500 B.C.

AG'NOETA, a sect founded about 370 by Theodosius of Cappadocia; they are said to have doubted the omniscience of God. The name is applied about 530 to the followers of Themistius of Alexandria, who held peculiar views as to the nature of Christ, maintaining that his human nature did not become omniscient by its union with his divinity. The sect was anathematized by Pope Gregory the Great.

AGNOLO, BACCIO D', a Florentine wood-engraver, which profession he abandoned for that of an architect. Whilst in Rome, pursuing his studies among the remains of antiquity, his workshop was visited by Raphael, Michael Angelo, and others, and on returning to Florence he rose into eminence, notwithstanding the ridicule and detraction which too often follow the footsteps of originality. Michael Angelo was his most powerful opponent. When he died, his son Giuliaeo directed the works he had left unfinished. Born in Florence, 1460; died 1543.

AGNO'MEN, a kind of honorary name given by the ancient Romans to a person on account of some distinguishing circumstance in his life. It was the fourth in order of the Roman names: the others being the *prænomen*, corresponding to our Christian name; the *nomen*, or name of the clan; and the *cognomen*, or name of the family; as in Publius Cornelius Scipio Africanus.

AGNOSTICS, a name applied generally to describe those who, without professing atheism, or actual denial of the possibility of the existence of God, consider that his existence is not proved, and therefore not to be accepted as a demonstrated truth.

AG'OBARD, an archbishop of Lyons, who was deprived of his dignity for deposing Louis the Meek, in the assembly of Compiègne, but was afterwards restored. He opposed image-worship, and wrote against the belief of witchcraft and the practice of duelling. His works were printed in 1666, in two vols. Born in 779; died at Saintonge, 840.

AGON'IC LINES, the imaginary lines on the earth's surface where the magnetic needle indicates a declination or deviation from the terrestrial meridian—that is, points to the true north and south.

AGOSTINO and AGNOLO (or Angelo.) DA SIENA, two brothers, architects and sculptures, who flourished in the first half of the 14th c. Della Valle and other commentators deny that they were brothers. They certainly studied together under Giovanni Pisano, and in 1317 were jointly appointed architects of their native town, for which they designed the Porta Romana, the church and convent of St. Francis, and other buildings. On the recommendation of the celebrated Giotto, who styled them the best sculptors of the time, they were chosen to execute the tomb of Guido, bishop of Arezzo, which that artist had designed. It was esteemed one of the finest artistic works of the 14th c., but unfortunately was destroyed by the French under the Duke of Anjou.

AGOSTINO, Paolo, an eminent Italian musician, born at Valerano in 1593. He studied under Nanini, and succeeded Ugolini as conductor of the Pope's orchestra in St. Peter's. His musical compositions are numerous and of great merit, an *Agnus Dei* for eight voices being specially admired. He died in 1629.

AG'REDA, Marie d', superior of the convent of the Immaculate Conception at Agreda, in Spain, who pretended to have received directions in a vision to write the life of the Virgin Mary, which she accordingly did, but the book was not published till after her death, when it was prohibited at Rome, and censured by the Sorbonne of Paris, though highly esteemed in Spain. Born 1602; died 1665.

AGRIC'OLA, Christoph Ludwig, landscape painter of Bavaria. His works are chiefly of the cabinet size. Born at Regensberg, 1667; died there, 1719.

AGRIC'OLA, George, an eminent metallurgist and physician, who wrote a number of books on metals, &c. Born at Glauchy, Saxony, 1494; died at Chemnitz, 1555.

AGRIC'OLA, Johann, German musician, pupil of Sebastian Bach, composed operas and choral music, and wrote on musical subjects. Born at Dobitschen, 1720; died, 1774.

AGRICOLA, Michael, one of the early Swedish reformers, and translator of the New Testament into Finnish. Bishop of Abo, 1544. Born in Nyland, Sweden, about beginning of 16th c.; died at Kyroniem, 1557.

AGRICULT'URAL EDUCATION. As early as 1844 professorships of Agriculture were established in the larger colleges. In 1855 the first American agricultural college was founded at Cleveland, Ohio; in 1857, another at Lansing, Mich. Pennsylvania and Iowa established similar institutions in 1859. In 1862, Congress granted from the public domain to each state 30,000 acres for each Senator and Representative in Congress, 'in order to promote the liberal and practical education of the industrial classes.' This was given to regular colleges in several states, and employed to endow an agricultural department. In other states it was used to found agricultural colleges or to endow those which were already in existence. In 1880 there were 46 institutions aided by the national land grant, in 30 of which agricultural instruction was given by about 100 professors to 1000 students. Agricultural periodicals are published in nearly all parts of the country.

AGRICULT'URE. The principal agricultural products of the United States are corn, wheat, hay, rye, oats, barley, potatoes, cotton, tobacco, hemp, and sugar. The largest quantities of wheat are raised in Minnesota, Iowa, Illinois, Indiana, California, and Ohio; while great quantities of corn are grown in Missouri, Illinois, Indiana, and Ohio. Cotton is the great staple of the Southern States, where it has been grown extensively since 1793, when the cotton-gin was invented. Tobacco is raised principally in Virginia, North Carolina, Kentucky, and Missouri, though considerable tobacco is also grown in Wisconsin and Connecticut.

The sugar-cane is a tropical plant, and its cultivation is almost entirely confined to the Mississippi delta in Louisiana. Potatoes are cultivated largely in New York, Pennsylvania, Ohio, Michigan, Illinois, and Wisconsin. The great hay crops come from the Northern and Western States. Rice, flax, hops, buckwheat are also cultivated in considerable quantities. Apples, pears, and plums flourish in the Northern States; melons and grapes in the Middle States; and pine-apples, figs, pomegranates, almonds and oranges in the Southern States. The total area of farms in the United States in 1880 was 539,309,179 valued at $10,197,096,776. The number of persons employed in agricultural pursuits according to the census of 1870 and 1880 was as follows:

	1870.	1880.
Agricultural laborers	2,885,996	3,323,876
Apiarists	136	1,016
Dairymen and dairywomen	3,550	8,948
Farm and plantation overseers	3,609	3,106
Farmers and planters	2,977,711	4,225,945
Florists	1,085	4,550
Gardeners, nursery and vine growers	32,547	51,482
Stock-drovers	1,085	3,449
Stock-herders	5,590	24,098
Stock-raisers	6,588	16,528
Turpentine farmers and laborers	2,478	7,450
Others in agriculture	....	45
Total engaged in agriculture	5,920,375	7,670,493

AGRICULTURE, Department of, was established by Congress in 1862, for the purpose of collecting statistics, introducing from foreign lands seeds of new plants, testing their adaptability to our soil and climate, and disseminating information to the farmers.

AGRIO'NIA, among the ancients, an annual festival in honor of Bacchus, which was usually celebrated during the night at Orchomenus, Bœtia, exclusively by women and priests. When first established, a virgin was killed as a sacrifice; but that practice was afterwards abandoned. According to Plutarch, it was so named on account of the rudeness and intemperance which generally attended its celebration.

AGUA, Volcano de, a huge mountain in Central America, 25 miles S.W. of Guatemala. It is of a conical shape, and rises to a height of 15,000 feet above the level of the sea. At the summit there is a crater, measuring about 140 yards by 120, from which stones and torrents of boiling water are occasionally discharged. In close proximity to Agua are the volcanoes of Pacaya, on the S. E., and Fuego on the W., and the three present together a scene of great magnificence.

AGUILAR, Grace (1816—47), an admired English authoress, was the daughter of a Jewish merchant in London. She was educated wholly by her parents, and commenced her literary career at an early age. Her works, written in a pleasing, elegant, and impressive style, consist chiefly of religious fictions, such as *The Martyr* and *Home Influence*. She also wrote, in defence of her faith and its professors, *The Spirit of Judaism*, and other works. Her services in the latter direction were acknowledged gratefully by the 'women of Israel,' in a testimonial which they presented shortly before her death. In 1835 she had a severe attack of measles, from the effects of which her constitution never wholly recovered. After a long struggle with increasing bodily infirmities, she died at Frankfort, on her way to Schwalbach, in the autumn of 1847.

A'GUIRRA, Josef Saenz d', a Spanish Benedictine monk, who received a cardinalship from Innocent XI. He compiled a collection of the councils of Spain, in six vols. folio, and wrote some theological pieces and commentaries on the Ethics of Aristotle. Born at Logrogno, 1630; died at Rome, 1699.

AHANTA, a district on the Gold Coast of Africa, extending from the Ancobra to the Chaddah.

A'HAZ, king of Judah, who, at the beginning of his reign, defeated Rezin, king of Syria, according to the promise of Isaiah. Notwithstanding this, he abandoned the worship of God, fell into idolatrous practices, and became so impious that his body was not permitted to be buried in the royal sepulchres.—Reigned 741—725 B.C.

AHAZI'AH, king of Israel. There are two kings of this name mentioned in Scripture: the first was the son of Ahab, and the other king of Judah. This last was slain by Jehu, 886 B.C.

AHIME'LECH, 'brother of the king,' the son of Ahitub, and the successor of Ahiah in the priestship of the time of David.

AHITH'OPHEL, 'brother of foolishness,' a native of Gillo, and the friend of David until the rebellion of Absalom, whose cause he espoused, but on foreseeing the probable issue of its failure, hanged himself to avert the certainty of a more ignominious death. This is the first suicide (B.C. 1023.) recorded in sacred history.

AH'MED SHAH EL AB'DALY, the founder of the kingdom of Cabul and Candahar. He was a great warrior, and broke the power of the Mahrattas, by defeating them in the battle of Panipat, on the 7th January, 1761. In the latter part of his life he was engaged in continual warfare with the Sikhs, but ended his days the sovereign of an empire which he had conquered, and which extended from Sirhind on the east to Herat on the west, and from the mouths of the Indus and the Arabian Sea on the south to the banks of the Oxus and Cashmere on the north.

AIGUILLON, DUKE D', member of Foreign Affairs under Louis XV. Distinguished by his wit and his political incapacity. Obtained promotion by favor of the mistresses of the king. Born 1720; died in banishment, 1798.

AI, a city standing in the east of Bethel, noted as the scene of the defeat of Joshua, and his subsequent victory.—Josh. vii. 2–5, viii. 1–29.

AIKEN, the county-seat of Aiken county, South Carolina, situated on the South Carolina Railroad, 120 miles N.W. from Charleston. Aiken has become a favorite winter resort for northern invalids, especially those suffering from pulmonary complaints. This is mainly on account of the sandy and porous soil and almost perfect system of natural drainage, which keeps the atmosphere exceedingly dry. It has several large hotels, seven churches, several private and public schools, a lyceum-hall, and a weekly newspaper. Pop. 1817.

AIKIN, ARTHUR, eldest son of Dr. John A., inherited much of his father's literary talent, but chiefly applied himself to scientific pursuits. He was for several years editor of the *Annual Review*, and in 1814 contributed to science a *Manual of Mineralogy*. He also produced a *Dictionary of Arts and Manufactures*, and another of *Chemistry and Mineralogy*. Besides being the author of the above, Mr. Aikin was a large contributor to scientific journals, and was, for several years, the resident secretary to the Society of Arts. Born 1784; died in London, 1854.

AI'KIN, JOHN, M.D., an eminent physician, but more distinguished as a popular author. He was the only son of the Rev. John Aikin, D.D., for many years a tutor of divinity at a dissenting academy at Warrington, Lancashire. After finishing his studies at the university of Edinburgh, he became a pupil of Dr. William Hunter, and first settled as a surgeon at Chester, afterwards at Warrington, and ultimately he succeeded in establishing himself in the metropolis. Here, with his sister, Mrs. Barbauld, he pursued literature with considerable success, producing several works, which aimed at making sciencepopular amongst those classes who, without such works, would, in all probability, have never entered upon scientific studies of any kind. He compiled a Biographical Dictionary, and his *Evenings at Home* still commands a wide reputation, and is decidedly the most useful of all Dr. Aikin's works. To this, which extended to six volumes, Mrs. Barbauld contributed, but not to a geater extent than about half a volume. His *Natural History of the Year* is another work which has enjoyed considerable popularity. Born at Warrington, 1747; died at Stoke Newington, 1822.

AIKIN, LUCY, a daughter of the preceding, historian and biographer. Her best known works are *Memoirs of the Courts of Queen Elizabeth, James I., and Charles I.*, and biographies of Addison and of her father. For the last forty years of her life she resided at Hampstead, devoted to literary pursuits. Born at Warrington, 1781; died at Hampstead, 1864.

AIK'MAN, WILLIAM, a Scotch painter, was the only son of William Aikman, Esq., of Cairney, Aberdeenshire, advocate, by Margaret, sister of Sir John Clerk, of Pennycnik, bart. He was intended for the profession of the law, but his passion for the fine arts was so great that he determined to cultivate it. After studying three years in Italy, he visited Turkey; thence he went to Rome, whence, after a short stay, he went back to England, and found a patron in the Duke of Argyle. He excelled most in portrait-painting. Born at Cairney, 1682; died in London, 1731.

AI'LLY, PIERRE D', a bishop of Cambray, and a zealous champion of the Pope. He presided at the council of Constance, where he condemned John Huss to the stake. Nicknamed, 'The Hammer of Heretics.' Pope John XXIII. created him a cardinal. Born at Compiègne, 1350; died 1420.

AILRED, or ALURED, English ecclesiastical historian, abbot and saint. Monk, and afterwards abbot of the Cistercian abbey of Rievaulx, Yorkshire. He wrote a *Genealogy of English Kings*, *The Life of Edward the Confessor*, and many other works. Born about 1109, at Hexham, Northumberland; died at Rievaulx, 1166; canonized, 1191.

AIMARD, GUSTAVE, novelist, was born about 1818, embarked as a cabin-boy at an early age for America, and lived nearly ten years amongst savage tribes. He afterwards traveled through Spain, Turkey, and the Caucasus, being often mixed up in conspiracies and wars. In 1848 he went to Paris, and was appointed an officer in the Garde Mobile. After various other travels A. resolved to publish his adventures in the form of romances. *Les Trappeurs de l'Arkansas* (one of his most popular works), *Le Grand Chef des Aucas*, and *Le Chercheur de Pistes* appeared in 1858; *Le Cœur loyal*, *Les Francs-Tireurs*, and *Les Rôdeurs de Frontières* in 1861; *La Main-Ferme* and *Valentin-Guillois* in 1862; *Les Aventuriers* and *Les Nuits Mexicaines* in 1863; *L'Araucan*, *Les Chasseurs d'Abeilles*, *Les Fils de la Tortue*, &c., in 1864. Several of his works have appeared in the *Moniteur*. Under a pseudonym he published, in 1847, a work entitled, *Un Coin du Rideau*. He died April 30, 1883.

AINS'WORTH, HENRY, an ingenious and learned commentator on the Bible, who from a follower of the founder of the Brownists became an Independent, and proceeded to Amsterdam, where he grew so popular as to gather a congregation for himself. Quarreling with some of the members of his church, he left them and went to Ireland for a time, but once more returned to Amsterdam. A. was well versed in the Hebrew, and his commentary on the Pentateuch, the Psalms, and the Song of Songs, is both curious and valuable. Born near Blackburn, 1560; died at Amsterdam, 1623.

AIR'AY, HENRY, an English divine, who, from a fellow of Queen's College, Oxford, was in 1600, elected provost; and in 1606 served the office of vice-chancellor. He was a cultivated Puritan, and wrote a few theological pieces. Born at Kentmere, Westmoreland, 1560; died 1616.

AI'TON WILLIAM, a Scotch gardener, who going to London to seek employment, obtained it, and became superintendent of the botanical garden at Kew, which he greatly improved, and in 1783 was appointed to manage also the pleasure and kitchen gardens. In 1788 he published his *Hortus Kewensis*. Born near Hamilton, Lanark, 1731; died 1793.

AIT'ZEMA, LEON VAN, a resident represenative of the Hanse Towns at the Hague, who became eminent as an historian. His *History of the United Provinces* is written in Dutch, and extends to fifteen volumes. It has been continued down to 1692 and published. Born at Doccum, Friesland, 1600; died 1669.

AIZA'NI, the modern Tchafter Hissar, a city of Asia Minor, about nine hours' journey from Kutahia. Little is known of its history; but from the extensive remains of which it is composed, it was evidently a place of note. The ruins of a temple dedicated to Jupiter, built on an elevated platform, cut out of a hill side, are very extensive. The columns were single blocks of white marble of great size. Remains of a theater, stadium, and gymnasium have also been discovered.

AJEHO, also called ALCHUKU, a city of Manchuria, in the Chinese empire. It is a busy town, inhabited by Chinese emigrants, who cultivate grain and opium in the surrounding district. Pop. about 40,000.

AK'ABAH, GULF OF, the smaller of the two arms into which the Red Sea is divided at its northern extremity, and about 100 miles long and 12 wide. It is generally about 200 fathoms deep, but its navigation is very unsafe, especially during the prevalence of north winds. The Straits of Tiran, less than half a mile wide, connect it with the Red Sea, and the small island of Tiran lies at its entrance.

AK'ERBLAD, JAN DAVID, a learned Swede, who, being appointed secretary to the Swedish embassy at Constantinople, had opportunity of pursuing researches into Runic, Phœnician, and Egyptian literature. Afterwards Swedish *chargé d'affaires* in Paris. He was not only able to read but to converse in several European and Oriental languages. Born 1760; died at Rome, 1819.

AKERS, BENJAMIN PAUL, American sculptor, born at Sacarappa, Me., July 10, 1825; died Philadelphia, May 21, 1861. In 1843 he went to Portland, where he worked in a printing-office; but seeing Chantrey's statue of Washington in the State House, Boston, he decided to become a sculptor. In 1849, he opened a studio in Portland, and modelled busts of Longfellow, and others. In 1851–52, he visited Italy, and, on returning to Portland, modelled a statue of 'Benjamin in Egypt.' He also made busts of Judge McLean, Edward Everett, Gerrit Smith, and Sam Houston. In 1855, he revisited Europe, residing two years in Rome, where he produced his 'Una and the Lion,' a statue of 'St. Elizabeth of Hungary,' the 'Dead Pearl-Diver,' and an ideal head of Milton. In 1859, he revisited Rome, where he modelled a statue of Commodore M. C. Perry for the Central Park of New York. After returning to America in 1860, he established himself first in Portland, and then in Philadelphia, where he died of consumption. He executed about 40 portrait busts and statutes, besides some marble copies from the antique. His wife, Elizabeth Akers, contributed to juvenile literature under the pseudonym of 'Florence Percy.' A volume of her poems was published in Boston in 1866.

AKI'BA, a Jewish rabbi, who was at first a shepherd, but at the age of forty devoted himself to learning, and became a teacher. He was flayed alive by the Romans, at the age, it is said, of 120 years. He is one of the ten Jewish martyrs named in a penitential prayer used once a year in the synagogues.—A. was one of the first compilers of the cabalistic traditions of the Jews. He died 135 A.D.

AKOLA, the chief town of the above district. There are an English church and school, and barracks for a detachment of troops. Pop. 12,500. Lat. 20° 6′ N., long. 76° 2′ E.

ALABAMA, one of the Southern States of the North American Union, lies betwen 30° 13′ and 35° N. lat., and between 85° and 88° 35′ W. long. It is bounded by Florida and the Gulf of Mexico on the S., Mississippi on the W., Tennessee on the N., and Georgia on the E. Its length is 330 miles, average breadth 154, and area 50,722 square miles. The Alleghany range stretches into the northern portion of the state, but the elevation is nowhere great; the center is also hiliy and broken; on the south, however, for nearly 60 miles inland, the country is very flat, and raised but little above the sea-level. The Alabama is the chief river of the state. It is formed by the junction of the Coosa and the Talapoosa, which unite about 10 miles above the city of Montgomery. Forty-five miles above Mobile the Alabama is joined by the Tombigbee, and from that point is known as the Mobile River. It is navigable from Mobile to Wetumpka, on the Coosa, some 460 miles. The Tombigbee is navigable to Columbus, and the Black Warrior, one of its chief tributaries, to Tuscaloosa. The Tennessee flows through the northern portion of the state, and the Chattahoochee forms part of its eastern boundary. The climate of Alabama is semi-tropical. The temperature ranges from 82° to 18° Fahr. in winter, and in summer from 105° to 60°; the mean temperature for the year being a little over 60°. The average severity of the winter months is considered to have increased—a result due, it is said, mainly to the felling of the forests, which gives more unrestricted scope to the cold north-west winds from the Rocky Mountains. The uplands are healthy, but the inhabitants of the low-lying lands are subject to attacks of intermittent, bilious, and congestive fevers. The stratified rocks of the state belong to the silurian, carboniferous, cretaceous, and tertiary systems. The silurian strata throw up numerous mineral springs along the line of the anti-clinal axes, some of which, such as Blount Springs and the St. Clair Springs, are much resorted to for their health-giving properties. There are also several noted springs arising from the tertiary beds, such as those of Tallahatta and Bladon. Alabama possesses extensive coal deposits. Mr. Tait, the state commissioner for the industrial resources of Alabama, considers that the area of the coal-lands in the state amounts to 5500 square miles, of which 5000 belong to the Warrior, and the remaining 500 to the Cahawba and Coosa fields. Assuming that only one-half of this area can be worked to advantage, Mr. Tait further estimates the aggregate possible yield at 52,250,000,000 tons. The product of the mines was, in 1869, 11,000 tons; in 1876, 100,000 tons; in 1877, 175,000 tons; in 1878, 200,000 tons; in 1879, 250,000 tons. In regard to iron, the natural wealth of Alabama is also very great. Mr. Tait asserts that a ridge of iron, of an average thickness of 15 feet, runs parallel to one of the principal railway lines for a distance of 100 miles; and in other parts of the country there are large deposits of ore, both red hematite and blackband. The ores of Alabama are said to yield from 10 to 20 per cent. more iron than those of Britain. Granite, marble, flagstones, roofing-slate, lime, and porcelain clay, are among the other mineral products. A little gold has also been found in the state.

The soil of Alabama varies greatly in character, but is for the most part productive to a greater or lesser extent, except in the south, where there are considerable tracts of sandy, barren, and almost worthless soil. The forests are mainly in the central and northern parts of the state, and embrace oaks, poplars, cedars, chestnuts, pines, hickories, mulberries, elms, and cypresses. The principal crops are corn and cotton, and both grow abundantly. The average value per acre of cleared land, is $6.53. There were raised in 1880, 21,162,000 bushels of corn, 946,620 bushels of wheat, and 699,654 bales of cotton. The principal other crops are sweet potatoes, sugar cane and rice, and the semi-tropical fruits are produced in large quantities. The total number of farms in 1880 was 135,864 with 6,375,706 acres of improved land. The state contained at that time 113,950 horses; 121,081 mules and asses; 75,534 working oxen; 271,443 milch cows; and 404,213 other cattle. Among the important industries is the manufacture of cotton goods, there being in operation in 1880, 1,060 looms, and 55,072 spindles, consuming 14,887 bales, and employing 1,600 persons. In 1880, 77,190 tons of pig iron were made. The amount produced in 1872 was 12,512 tons; in 1874, 32,863 tons; in 1877, 41,241 tons; and in 1879, 49,841 tons. There are fifteen furnaces in the state. In 1880 there were in all 253,840 manufacturing establishments with a total capital of $2,790,223,506, which employed 2,738,930 hands. Mobile, the chief mercantile city of the state, is connected with the general network of railways of the United States. A line runs from the city through Montgomery and on to Atlanta in Georgia; another runs from Mobile to Meridian in Mississippi; a line crosses the state from Meridian through Cahawba to Montgomery; a loop-line runs from Montgomery to Troy, and proceeding round by Columbus in Georgia, rejoins the main line at Opelika; from Selma a line proceeds north-easterly, following the valley of the Coosa, and passing through Georgia and Tennessee; and another traverses the valley of the Tennessee, from which a branch strikes off to the north to join the Tennessee group of railways at Nashville. A line also connects Mobile with New Orleans. The part of the line from Mobile to Montgomery between Mobile and Tensas was completed under considerable engineering difficulties. It crosses the Mobile River by a swing drawbridge 1000 feet in length, with a draw of 260 feet; while the Tensas River bridge is built on cylindrical piers, each span measuring 152 feet, and its total length 2084 feet. There are at present 1854 miles of railway and 2136 of telegraph lines in operation in Alabama.

Alabama is divided into 66 counties of which the following is an alphabetical list with the respective population of each county: Autauga, (13,113); Baldwin, (8,446); Barbour, (34,026); Bibb, (9,487); Blount, (15,526); Bullock, (29,079); Butler, (19,685); Calhoun, (19,591); Chambers, (23,440); Cherokee, (19,109); Chilton, (10,806); Choctaw, (15,731); Clarke, (17,806); Clay, (12,938); Cleburne, (10,976); Coffee, (8,061); Colbert, (16,154); Conecuh, (12,606); Coosa, (15,132); Covington, (5,650); Crenshaw, (11,755); Cullman, (6,355); Dale, (12,677); Dallas, (48,437); De Kalb, (12,675); Elmore, (17,674); Escambia, (5,719); Etowah, (15,398); Fayette, (10,135); Franklin, (9,155); Geneva, (4,342); Greene, (21,931); Hale, (26,553); Henry, (18,760); Jackson, (25,114); Jefferson, (23,272); Lamar, (12,142); Lauderdale, (21,035); Lawrence, (21,391); Lee, (27,373); Limestone, (21,600); Lowndes, (31,178); Macon, (17,373); Madison, (37,625); Marengo, (30,889); Marion, (9,364); Marshall, (14,585); Mobile, (48,602); Monroe, (17,091); Montgomery, (52 392); Morgan, (16,428); Perry, (30,736); Pickens, (21,479); Pike, (20,640); Randolph, (16,575); Russell, (24,840); Shelby, (17,236); St. Clair, (14,463); Sumter, (2[illegible],728); Talladega, (23,360); Tallapoosa, (23,400); Tuscaloosa, (24,559); Walker, (9,323); Washington, (4,538) Wilcox, (31,832); Winston, (4,253). The city of Montgomery, on the Alabama R., is the capital of the state. The principal cities are Mobile (pop. 29,132); Montgomery, (pop. 16,714); Selma (pop. 7529); Huntsville (pop.4977); Enfaula, (pop. 3886); Greenville, (pop. 2471); Marion; Opelika; Florence; Talladega; Birmingham; Greensboro; Tuscaloosa; Demopolis; Union Springs; Tuscumbia, Wetumpka; Troy; and Cullman.

There is an insane hospital in Tuscaloosa, opened in 1861. It has accommodations for at least 350 persons. The institution for the deaf and dumb at Talladega is also in successful operation, and at Mobile there is an asylum for the blind. The State Penitentiary is at Wetumpka. The constitution provides that free schools shall be maintained in every district for the education of all children between the ages of seven and twenty-one years, but it is forbidden to unite white and colored children in one school, except by the unanimous consent of their parents and guardians. The school fund consists of the sixteenth section land grant, a poll tax of $1.50 per head, and special appropriations made annually by the legislature. The school population is as follows: White, 214,279; colored, 155,168; enrolled, white, 86,485; colored, 54,745. There are 1700 school districts, and 2,696 white and 1,423 colored schools, with 2722 white and 1423 colored teachers. The university of Alabama, at Tuscaloosa, founded in 1831, has an endowment of $300,000. There is a normal school for white teachers at Florence, and two for colored teachers and students at Marion and Huntsville. The state agricultural and mechanical college at Auburn has 7 professors and a large number of students. It has a college farm of 100 acres, and the income from the fund of congressional land scrip is $20,000 per annum. There are 129 periodicals in the state, of which 7 are dailies and 111 are published weekly.

Alabama returns 8 members to Congress. The state government is vested in a governor, Senate, and House of Representatives. The Senate consists of 33 members elected for four years, one half retiring every two years. The House of Representatives consists of not more than 100 members, elected for two years, and apportioned among the counties according to population, each county, however, being entitled to at least one representative. The pay of members of both houses is fixed at $4 a day with an allowance of 10 cents for each mile of necessary travel. The sessions are limited to fifty days. The governor, lieutenant-governor, secretary of state, treasurer attorney-general and superintendent of education are chosen for two years by the electors of the state. The sheriff in each county is elected for four years. The Auditor is chosen for one year. The elections take place on the Tuesday after the first Monday in November. Senators must be at least 27 years old; but any elector is eligible as representative. The constitution provides, that all male residents of the state, 21 years old, born in the United States or naturalized, who have resided in the

state six months preceding an election, shall be citizens of Alabama. Temporary absence does not cause a forfeiture of citizenship.

The Supreme Court consists of a Chief Justice and associate judges, and has appellate jurisdiction only. It meets twice a year at the seat of government. The state is divided into circuits of not less than three or more than eight counties. A judge is chosen for each circuit, who shall, after his election, reside therein. Circuit Courts are held twice a year in each county. The Court of Chancery is composed of four Chancellors. The judges of the Supreme Court receive a salary of $3,000; those of the Circuit Courts and the Chancellors $2,250. All the judges of these courts and the Chancellors are chosen for terms of 6 years, during which they cannot hold non-judicical offices of profit or trust under the state or the United States. The clerk of the Supreme Court is appointed by the judges. The attorney-general resides at the seat of government, and a solicitor is appointed for each county.

Alabama was first penetrated by the Spaniards in quest of gold in 1541, under the celebrated leader De Soto. The natives defended themselves stubbornly, and in their defence inflicted and sustained very severe losses. The present site of Mobile was first occupied by the French in 1711. In 1763 the French possessions east of the Mississippi, including Alabama, were ceded to England. Alabama was originally included in Georgia, but in 1802 became part of the territory of Mississippi. In 1813 the Creek Indians made a desperate effort to check the encroachments of the Anglo-Saxons, but were eventually crushed in the battle of Horse-Shoe Bend by Generel Jackson, who compelled them to surrender three-fourths of their territory. In 1819 Alabama was admitted into the Union as an independent member of the confederation. It seceded in the year 1861, but since the close of the war has been again admitted into the Union. Reconstruction measures were commenced in April, 1865, by the nomination of a provisional governor, and a convention held the same year declared the ordinance of secession and the State war debt null and void, and passed an ordinance against slavery. In 1867, Alabama became a part of the Third Military District under the command of Major-Gen. Pope; in February, 1868, a new constitution was adopted; the fourteenth amendment was ratified in June, and on July 14, the State was turned over to the civil authorities, its representatives having already been admitted to Congress. The fifteenth amendment was ratified in 1870, and the present constitution was adopted in 1875. Alabama has been a democratic state from the time of Jackson down to 1880, supporting Jackson twice, Van Buren twice, and voting for Polk, Cass, Pierce, Buchanan and Breckenridge. In 1864 there was no election, but in 1868 Gen. Grant had a majority of 4,278, and in 1872, 18,828. In 1876, Samuel J. Tilden's majority was 33,682 votes, and in 1880, Gen. Hancock received 35,000 votes.

At the census of 1880 the total population of Alabama was 1,262,794; males, 622,890; females, 639,904; native, 1,253,121; foreign, 9,673; colored, 600,103, including 4 Chinese, and 213 Indians. The census of 1870 showed the following results:—Total population of Alabama, 996,992; colored, 475,510; with 98 Indians. Of these, 987,030 were native born, and 9962 foreign. In 1860 the population was 964,201, of whom 526,271 were whites and 437,770 (435,080 slaves) were colored; in 1820 (the year after Alabama had been admitted into the Union) the numbers were—total, 127,901; whites, 85,451; colored, 42,450 (41,879 slaves). Of the total population in 1870, 488,738 were males (255,023 whites, 233,677 colored, 38 Indians) and 508,254 females (respectively, 266,361, 241,833,060). Amount of State debt, October 1, 1883: funded, $9,164,600; unfunded, $2,999,423; interest at 3 to 6 per cent. The State adjusted its debt in 1876 by issuing 30 year bonds bearing 2 per cent. interest until 1881, then 3 per cent. until 1886, then 4 per cent. until 1896, and then 5 per cent. for the last 10 years, till 1906, thus retiring the old bonds for their face without any allowance for past due coupons. State receipts for year ending October 1, 1883, $1,129,976.11. State expenditures for year ending October 1, 1883, $1,112,148.62. Amount raised by taxation same year, $906,807.54. Amount of taxable property as assessed: real, $91,740,536; personal, $64,285,883. Rate of state tax, 65 cents on the $100, besides the poll tax of $1.50 levied on males from 21 to 45, for the use of the school fund.

Governors of Alabama.

TERRITORIAL.

Wm. Wyatt Bibb.....1817—1819.

STATE.

Thomas Bibb.....1819—1821
Israel Pickens.....1821—1825
John Murphy.....1825—1829
Gabriel Moore.....1829—1831
John Gayle.....1831—1835
Clement Comer Clay.....1835—1837
Hugh McVay.....Nov. to July, 1837
Arthur P. Bagby.....1837—1841
Benjamin Fitzpatrick.....1841—1845
Joshua L. Martin.....1845—1847
Reuben Chapman.....1847—1849
Henry W. Collier.....1849—1853
John A. Winston.....1853—1857
Andrew B. Moore.....1857—1861
John G. Shorter.....1861—1863
Thomas H. Watts.....1863—1865
Lewis E. Parsons.....1865
Robert M. Patton.....1865—1868
Wm. H. Smith (appointed).....1868—1870
Robert B. Lindsey.....1870—1872
David P. Lewis.....1872—1874
Geo. S. Houston.....1874—1878
Rufus W. Cobb.....1878—1882
Edward A. O'Neil.....1882—1884

ALABAMA CLAIMS. The lengthy negotiations were completed by the treaty of Washington, of which Article I. read as follows: 'Now, in order to remove and adjust all complaints and claims on the part of the U. S., and to provide for the speedy settlement of such claims, the high contracting parties agree that all the said claims growing out of acts committed by the aforesaid vessels, and generally known as the Alabama claims, shall be referred to a tribunal of arbitration,' &c. In a correspondence between Secretary Fish and Sir Edward Thornton, the British minister to the U. S., in Jan., 1871, Mr. Fish wrote, Jan. 30th, that 'the removal of the differences which arose during the rebellion, and which have existed since, growing out of the acts committed by the several vessels which have given rise to the claims generically known as the Alabama claims, will also be essential to the restoration of cordial relations.' Sir Edward Thornton acceded to this request, and a joint high commission was agreed upon to negotiate the treaty. The high commission consisted, on the part of the U. S., of Hamilton Fish, the secretary of state, Robert C. Schenck, the American minister to Great Britain, Samuel Nelson, one of the justices of the Supreme Court, Ebenezer R. Hoar, and George H. Williams; and on the part of Great Britain, of Earl de Grey and Ripon, president of the queen's council, Sir Stafford Northcote, M.P., Sir Edward Thornton, Sir John Macdonald, and Professor Montague Bernard. They finished the treaty of Washington on the 8th May, 1871. In the deliberations the commissioners of the U. S. claimed compensation for 'direct losses' in the destruction of vessels and cargoes, and in national expenditure in the pursuit of the Confederate cruisers, and for 'indirect injury' in the transfer of American shipping to the British flag, in the enhanced rates of insurance, in the prolongation of the war, and in the addition to the cost of the war; they insisted that Great Britain should pay a round sum, to be agreed upon, for all these claims. The British commissioners proposed arbitration. The American commissioners declined to agree to arbitration 'unless the principles which should govern the arbitrators were first agreed upon.' Finally, however, arbitration was adopted, and the rules which should govern the arbitrators were agreed upon. Articles I. to XI. of the treaty refer to the Alabama claims. Art. I. describes the matters submitted for decision; the others describe the constitution of the tribunal, its procedure, and the form of its decision. Art. VII. contains the following three rules:

First. That a neutral government is bound, first, to use due diligence to prevent the fitting out, arming, or equipping, within its jurisdiction, of any vessel which it has reason to believe is intended to cruise or carry on war against a power with which it is at peace; and also to use like diligence to prevent the departure from its jurisdiction of any vessel intended to cruise or carry on war as above, such vessel having been specially adapted in whole or in part within such jurisdiction to warlike use. *Secondly.* Not to permit or suffer either belligerent to make use of its ports or waters as the base of naval operations against the other, or for the purpose of the renewal or augmentation of military supplies or arms, or the recruitment of men. *Thirdly.* To exercise due diligence in its own ports or waters, and as to all persons within its jurisdiction, to prevent any violation of the foregoing obligations and duties; it being a condition of this undertaking that these obligations should in future be held to be binding internationally between the two countries. The tribunal, in making their award, stated, 'Due diligence should be exercised by neutral governments in exact proportion to the risks to which either one of the belligerents may be exposed by failure to fulfil the obligations of neutrality on their part. The government of Great Britain cannot justify itself for its failure in due diligence on the plea of the insufficiency of the legal means of action which it possessed. The claim of the U. S. for the national cost of pursuing the Confederate cruisers cannot be distinguished from the general expenses of the war, and is therefore an indirect loss which cannot be allowed. Prospective injuries to shippers and ship-owners, such as

loss of future profits, are equally uncertain and indirect. All double claims for the same losses are rejected, but interest is allowed.' The tribunal awarded, for actual losses of ships and cargoes and interest, the sum of $15,500,000, but denied all claims of the U. S. for indirect and national losses, confining its judgment to the compensation of American private citizens for losses of ships, cargoes, freight, and wages.

A'LAIN DE LILLE', surnamed the Universal Doctor, and a divine of great reputation in the university of Paris. Born 1114; died about 1203.

ALAMO, a fort in Bexar county, Texas, near San Antonio, on the left bank of the San Antonio river, celebrated in connection with the Texan war of independence. The fort was about an acre in extent, surrounded by a wall 8 or 10 feet high and 3 feet thick. Gen. Sam Houston had caused San Antonio to be dismantled, upon which Santa Anna with a large detachment of his army took possession of Fort A., February 23, 1836. The Texans, consisting of 140 men, commanded by Col. William Barrett Travis, retired into the fort, while the Mexicans, 4,000 strong, erected batteries on both sides of the river, and bombarded the fort for 24 hours. Several assaults were made, but each time the Mexicans were repulsed with loss, the Texan sharp-shooters standing on the ramparts being able to kill a great number of the enemy. Col. Travis sent couriers to San Felipe asking for assistance, but only 32 men succeeded in reaching the garrison. On the 6th of March an attack was made by the whole Mexican force, but they were twice repulsed with severe loss. After the Texans were no longer able to load, they clubbed their rifles and fought with great bravery until they were all cut down but six, who were subsequently put to death by the Mexicans by order of Santa Anna. Among the 6 were Col. Crockett, Col. Bowie, and Major Evans. The Mexicans lost 1,600 men. Eight weeks after the massacre of the A. occurred the battle of San Jacinto, causing the defeat of the whole Mexican army, and the capture of Santa Anna with his generals. At this battle, the war-cry of 'Remember the Alamo!' inspired the Texan troops to fight like tigers.

ALAN, ALLEN, or ALLEYN, William, was educated at Oriel College, Oxford, and in 1550 became one of its fellows. In 1556, he was chosen principal of St. Mary's Hall, and two years afterwards was made canon of York; but on the accession of Elizabeth he went to Louvain, and was appointed head of the English college. Here he wrote, in defence of the Romish church, some treatises, which raised his reputation as a controversialist to such a degree, that he obtained several valuable preferments. In his own country, however, he was considered a traitor, and a man was hanged for bringing over from the continent some of his books. In 1586, he published a defence of the Pope's bull for excommunicating Queen Elizabeth, to which he added an exhortation to her subjects to revolt against her in favor of the Spaniards, maintaining that the heresy of a sovereign absolved subjects from the allegiance. In 1587, he was made a cardinal, and in 1589 archbishop of Mechlin. He founded the college for English Catholics at Douay. Born at Rossall, in Lancashire, in 1532; died at Rome in 1594.

ALANI, a number of nomadic tribes of eastern origin, who spread themselves over Europe during the decline of the Roman empire. The name was probably at first confined to one tribe of Tatar race, whose original seat was on the northern shores of the Caspian Sea, and was afterwards, as the power of that race extended, applied to other tribes. It is supposed that their first encounter with the Romans was during the Mithridatic war, when Pompey led an expedition into the Caucasus. Isolated statements in contemporary writers show that the Alani were frequently in conflict with the Roman power. In March 276 A.D. they received a decisive check in an attempt to make their way eastward into Persia, being defeated by the emperor Tacitus, who forced them to recross the Phasis. The most complete account of the Alani is to be found in the pages of Ammianus Marcellinus (lib. xxxi.), who describes their manners and customs at considerable length. From him, too, we learn of the advance of the Huns, who signally defeated the Alani in a battle fought on the banks of the Tanais in 375. The race thereupon divided, some retiring to the east, while the great majority joined their conquerors in an invasion of the kingdom of the Goths. Associated with the Vandals and Suevi, they left the settlements they had in Pannonia and entered Gaul in 406, whence three years later they crossed the Pyrenees into Spain, and founded a settlement in Lusitania and Bœtica, where they remained in peace for some years. In 418, however, they were attacked and defeated by Wallia, king of the Visigoths, with whom they had quarrelled. Their king, Ataces, was slain in the battle, and they became subject to Gunderic, king of the Vandals, their national independence being lost. Those of the Alani who had remained in Gaul when the others invaded Spain, settled near Valence and Orleans. Though serving under Theodoric, they sympathized with Attila and the Huns, and by deserting at Chalons (451), all but changed the victory of the Romans into a defeat. Soon afterwards their separate national existence in Gaul was merged in that of the Visigoths. The small portion of the Alani that had remained in their original seat in the Caucasus are frequently noticed in history down to the middle ages. In 572, they were allied with the Armenians under King Saroes. They seem to have afterwards regained their independence. In 1221, they were defeated by Gengis Khan, and in 1237, they were so completely subjugated by Batu-Khan that their very name disappears in subsequent history.

A'LARF, is the name given by Mohamedans to the wall which they say divides heaven from hell.

ALARCON, Hernando de, a Spanish navigator of the 16th century, known only in connection with the expedition to the coast of California, of which he was leader. He set sail on the 9th May, 1540, with orders from the Spanish court to await at a certain point on the coast the arrival of an expedition by land under the command of Vasquez de Coronado. The junction was not effected, though Alarcon reached the appointed place and left letters, which were afterwards found by Diaz, another explorer. Alarcon was the first to determine with certainty that California was a peninsula and not an island, as had been supposed. He made a careful and exact survey of the coast, sailed a considerable distance up the Rio del Tizon (Colorado), and was thus able, on his return to New Spain in 1541, to construct a map of California, which, accordingly to M. Duflot de Mofras, scarcely differs from one of the present day.

ALAS'CO, John, uncle to Sigismund king of Poland. Having embraced the Protestant religion, after several years spent in various places in Germany and the Netherlands, he came to England in the reign of Edward VI., and became pastor to a Dutch church in London. On the accession of Mary, he returned to his own country, where he distinguished himself so greatly in the cause of the Reformation, that he received the title of Reformer of Poland. He was greatly esteemed by the leading men among the Reformers; particularly by Erasmus, whose library he purchased. Born 1499; died 1560.

ALASKA, or ALIASKA, formerly Russian America, but now a territory of the United States, is a vast tract of country forming the north-west portion of North America, bounded on the N. by the Arctic Ocean, on the S. and W. by the Pacific Ocean. The name was formerly confined to a long narrow peninsula stretching into the Pacific, but has been extended to the whole territory. Alaska comprises the whole of North America from 141° W. long. to Behring Strait, and also numerous islands along the coast, notably Prince of Wales Islands, and the Aleutian Islands, which stretch seaward from the extremity to the peninsula. From the main portion of the territory a narrow strip, with a breadth of about 50 miles, extends south-east along the Pacific coast and terminates at the confines of British Columbia, in 54° 40′ N. lat. From north to south the extreme length of Alaska is about 1100 miles, and the greatest breadth from east to west is 800 miles. The area of the whole territory is estimated at 514,700 square miles.

The numerous islands, creeks, and inlets of Alaska lengthen out its coast-line to 7860 miles, an extent greater than that of the eastern coast-line of the United States. Beginning at the south-east, the chief creeks and bays are Cook's Inlet, Bristol Bay, Norton Sound, and Kotzebue Sound; while, following the same order, the principal headlands, in addition to the extremity of the peninsula, are Cape Newenham and Cape Romanzoff in the Pacific, Cape Prince of Wales in Behring Strait, and Cape Lisburne, Icy Cape, and Point Barrow in the Arctic Ocean. Point Barrow is in 71° 23′ N. lat., and is the extreme northern point of the country. The exploration of the northern coast was chiefly the work of the British navigators Cook, Beechy, and Franklin, and of the officers of the Hudson Bay Company. The principal river of Alaska is the Yukon, or Kwichpak, which rises in British America, and, receiving the Porcupine river at Fort Yukon, flows westward across the territory, and falls into the Pacific Ocean to the south of Norton Sound. At a distance of 600 miles from the sea this magnificent river has a width of more than a mile. Its tributaries would in Europe be reckoned large rivers, and its volume is so great that 10 miles out from its principal mouth the water is fresh. Among the other rivers of Alaska are the Copper river, the Suschitna, the Nuschagak, and the Kuskokwim, falling into the Pacific, and the Colville, flowing northward into the Arctic Ocean. A great mountain range extends from British Columbia, in a north-west direction, along the coast of Alaska, the summit being covered with snow and glaciers. Mount St. Elias, an active volcano, in 60° 18′ N. lat., and 140° 30′ W. long., rises to the height of 14,970 feet above the sea. The mountain chain runs out along the peninsula which has given its name to the country, and at the western extremity there are several volcanic cones of great elevation; while in the island of Uminak, separated from the mainland by only a narrow strait, there are enormous volcanos, one rising to more

than 8000 feet in height. In the interior and to the north the country is also mountainous, with great intervening plains.

The north-west coast of this part of America was discovered and explored by a Russian expedition under Behring in 1741; and at subsequent periods settlements were made by the Russians at various places, chiefly for the prosecution of the fur trade. In 1799 the territory was granted to a Russo-American fur company by the Emperor Paul VIII., and in 1839 the charter of the company was renewed. New Archangel, in the island of Sitka, was the principal settlement, but the company had about forty stations. They exported annually 25,000 skins of the seal, sea-otter, beaver, &c., besides about 20,000 sea-horse teeth. The privileges of the company expired in 1863; and in 1867 the whole Russian possessions in America were ceded to the United States for a money payment of $7,200,000. The treaty was signed on 30th March, and ratified on 20th June 1867; and on 9th October following, the possession of the country was formally made over to a military force of the United States at New Archangel. It still remains in the military keeping of the United States, no steps having been taken to organize a territorial government. It has, however, been constituted a revenue district, with New Archangel, or Sitka, as the port of entry. Since Alaska was ceded to the United States considerable information has been collected as to the resources of the less sterile parts of the country; but the central and northern parts of this region are only known as the inhospitable home of some wandering tribes of Indians and Esquimaux. Portions of Alaska have also been recently explored by the employees of the Russo-American Telegraph Company in surveying a route for a line of telegraph which was designed to cross from America to Asia near Behring Strait—a project which was abandoned, after an expenditure of £600,000, on communication with Europe being secured by the Atlantic cable.

The climate of the south-western coast of Alaska is tolerably mild, considering its high latitude. The great warm current of the Pacific, sweeping in a north-easterly circuit from the East India Islands, and corresponding very much in character and effects to the Gulf Stream of the Atlantic, washes its shores; and while it modifies the temperature, also causes an excessive rainfall. At Sitka the mean temperature is 42°·9, and the average rainfall about 80 inches. Alaska will never have any great agricultural value. From the great amount of rain and the want of heat, cereals grow, but will not ripen, and vegetables do not thrive. Native grasses and berries grow plentifully, but the chief wealth of the country is in its vast forests, in the furs of its wild animals, and in the fish with which its rivers and seas abound. The forests, rising from the coast and covering the mountains to a height of 2000 feet, consist of a very durable yellow cedar, spruce, larch, and fir of great size, and also cypress and hemlock. The wild animals include the elk, deer, and various species of bear, and also many fur-bearing animals, such as the wolf and fox, the beaver, ermine, marten, otter, and squirrel. Near the coast and islands there are innumerable fur-bearing seals, which are caught in great numbers by the settlers; but from the rigor of the climate and the arduous nature of the work, the trapping of the animals of the interior is left to the Indians. The salmon abounds in the rivers, and there are great banks along the shores, the favorite haunt of cod and other fish. About eighty whalers prosecute their fishing off the coast of Alaska. Coal and iron are the most important minerals, but the value of the deposits remains to be ascertained.

According to the census of 1880 Alaska has a population of 33,620; of which 430 are white; 1746 creole; and the remainder Indians. The Indians are rapidly decreasing in number, and are described as treacherous and discontented. New Archangel, now called Sitka, in the island of Sitka, in 57° 3′ N. lat., and 135° 18′ W. long., was the seat of the Russian governor, and is the headquarters of the United States authorities. It contains about 1500 inhabitants, is the residence of a Greek bishop, and has fortifications, magazines, and a magnetic observatory. Of the other settlements, Fort Nicholas on Cook's Inlet, and Fort St. Michael on Norton Sound, are the more important. The admirable harbors on the coast and the great navigable river Yukon afford facilities for the formation of new settlements and the increase of trade by the Americans. At the junction of the Porcupine river and the Yukon a fort was established by the Hudson's Bay Company in 1847. (See Whymper, *Travels in Alaska and on the Yukon*, 1868; Dall, *Alaska and its Resources*, 1870.

ALA'TRI, an Italian town built on a mountain, 6 miles from Frosinone. Manufacture chiefly woollens. Pop. 11,400.

ALA'VA, one of the three Basque provinces of Spain, mountainous and rich in iron-mines. The chief town is VITORIA. Area, 1,082 square miles. Pop. 96,000. Lat. between 42° 20′ and 43° N.

ALBANI, EMMA, vocalist, is a French Canadian, being a native of Montreal, and her real name is Emma La Jennesse. She was trained in the study of music from early childhood, by her father who was himself a skilful musician. Losing their mother while still of tender age, she and her sisters were sent to the convent of the Sacré Cœur at Montreal to complete their education. Her father afterwards sent her to Europe for musical instruction not obtainable elsewhere. Under the care of Baroness Lafitte, she was two years at Paris, where she studied under the famous Duprez. She then became a pupil of the old *maestro* Lamperti at Milan. Several years of hard study followed till at length, in 1870, she made her *début* at Messina under her present name, with entire success. Immediatedly afterwards she was engaged for Malta. In the winter of 1871–72 she sang at the theater of La Pergola at Florence with great success. Her crowning effort was in the *Mignon* of Ambroise Thomas, already condemned in four theaters in Italy, but which in Madame Albani's hands obtained a complete success among the jealous Italians. She appeared at the Royal Italian Opera, London, in 1872, and since then has been a great favorite both in England and the United States. In Feb. 1883, Madame Albani was singing in opera at Washington with great success, appearing in *Faust* and *Rigoletto*. She closed her American operatic tour at Philadelphia, April, 16, 1883, in the *Flying Dutchman*.

ALBA'NIA, a county of Asia, between the Caspian Sea and Iberia. All the inhabitants are said to have blue eyes. Some maintain that they followed Hercules from Mount Albanus, in Italy, when he returned from the conquest of Geryon.—The Caspian Sea is called Albanum Mare, as being near Albania.

ALBANY, a city of the United States, capital of the state of New York and of the county of Albany, picturesquely situated in a beautiful and fertile country on the western bank of the Hudson, 145 miles from New York. It is, for an American city, irregularly laid out, and much of its architecture is poor, although it contains several very fine buildings, and many of its more recently made streets are broad and handsome. The old Capitol, a brown stone edifice, 115 feet by 90, built in 1807, faces a square called Capitol Park; and opposite it, on the eastern side of the square, are the State Hall and City Hall, both constructed of white marble. The legislature passed a bill in 1865 authorizing the building of a new Capitol, the corner-stone of which was laid in 1871. Annual appropriations have been made, the sum total of which has amounted to $14,000,000, and it is estimated that the entire cost of the structure when completed will be $20,000,000. It is built of New England granite, and covers more than three acres of ground, being 290 feet wide by 390 feet long. Its architecture is in the Renaissance style, and has a main tower 320 feet high. Among other noteworthy buildings are the Merchants' Exchange, the Museum, Music Hall, Leland Opera-house, Tweddle Hall, Kenmore Hotel, Delavan House, Stanwix Hall, and the new U. S. Government building, containing the post-office, customs offices, and U. S. courts.

Albany is divided into 17 wards, each ward electing two members of the board of aldermen annually on the second Tuesday in April. The city has an excellent police force, several infantry companies of the national guard of the state, and four independent companies. There are in all seventy-six places of worship: Baptist, 12; Congregational, 1; Episcopal, 9; Evangelical, 2; Friends, 1; Jewish, 3; Lutheran, 5; Methodist, 11; Presbyterian, 11; Reformed, 5; Roman Catholic, 12; Second Adventist, 1; Union, 2; Universalist, 1. The Roman Catholic cathedral of the Immaculate Conception and St. Peter's Episcopal church are considered handsome specimens of church architecture. All Saints' is the Episcopal cathedral, Albany being the seat of a diocese of that denomination, as well as of the Roman Catholic Church. The high school has 1 principal and 19 assistant teachers, and there are 25 other public schools, besides a state normal school founded in 1844. Instruction is also given in several charitable institutions. The Albany University was incorporated in 1852. Union University, located in Schenectady, has three departments in Albany—the law school, the medical college, and Dudley Observatory, which was opened in 1856. The latter (incorporated in 1852) has a 13-inch equatorial telescope, and a fine library. The State Library contains with the law department over 100,000 volumes, and the records of the State Agricultural Rooms are very valuable. The Albany Institute for the Advancement of Science was founded in 1791. The Young Men's Association was founded in 1835, and the Young Men's Christian Association in 1857. Among the benevolent institutions are—Albany Hospital, Child's Hospital, St. Peter's Hospital, City Homœopathic Hospital, and Eye and Ear Infirmary. Albany is an important center of trade, being situated at the point where the united Erie and Champlain canals join the Hudson, and possessing good railway communication with most cities of the United States. The principal railroads are—the New York Central and Hudson River; the New York and Harlem; the Boston and Albany; the Albany and Vermont; the Albany and Susquehanna; the Rensselaer and Saratoga, and the railroad along the west bank of the Hudson from New York, known as the 'West Shore road.' Steamers run to Troy, Poughkeepsie, New York, and other places. The river is spanned by

three bridges, and a number of ferries cross to East Albany on the opposite bank of the river.

The chief articles of commerce are timber, wheat, barley, wool, and tobacco, enormous quantities of which, especially of the first-mentioned, pass through the city annually. Besides its transit trade, its numerous foundries, its breweries, carriage and hat manufactories, and tanneries are of importance. There are four national banks, and 7 savings banks. The city has 8 daily newspapers, 2 semi-weekly, and 10 weekly newspapers, besides 3 monthly periodicals. There are street railways running through every part of the city, and extending to the principal suburbs. Albany was founded by the Dutch in 1623, and is thus one of the oldest European settlements in the United States, dating sixteen years after that of Jamestown in Virginia. It was captured by the British in 1664, who changed its name from Beaverwyck or Williamstadt in honor of the Duke of York and Albany. It received its charter in 1686, and became the capital of the state of New York in 1797. In 1790, the population of Albany was 3506; in 1850 it increased to 50,763, and at the census of 1880 it was 90,903. It is now (1884) estimated to have increased to 95,000, and ranks in population as the twenty-first city of the United States.

ALBANY, Duke of, Prince Leopold George Duncan Albert, K.G., Earl of Clarence, and Baron Arklow, Prince of Saxe Coburg and Gotha, fourth son of Queen Victoria, was born at Buckingham Palace, April 7, 1853. He matriculated at the university of Oxford in 1872, and was created a D.C.L. in 1876. Parliament voted him a grant of £15,000 a year on his attaining his majority, with an addition of £10,000 a year on his marriage. In May, 1881, he was created a peer of the realm with the title of Duke of Albany. His marriage with the Princess Frederica Augusta, daughter of His Serene Highness the Prince of Waldeck and Pyrmont, was celebrated at Windsor Castle, April 27, 1882. He died in Italy in March, 1884.

ALBATEGNI, an Arabian astronomer, who lived in Mesopotamia, and who wrote a book on the knowledge of the stars and the obliquity of the zodiac, which was printed at Nuremberg in 1537, 4to, and at Bologna in 1545. He was the first who substituted sines for chords, and who may be said to have determined the length of the tropical year. His contributions to astronomical science, in relation to the precession of the equinoxes, and the eccentricity of the earth's orbit, was very valuable. He is considered to have had a larger number of methods in spherical trigonometry than the Greeks, and to be the greatest of the Arabian school, which connects Greek science with that of our own times. Born at Batan, in Mesopotamia, about the middle of the 9th century; died, 929.

ALBEMARLE SOUND, an inlet in the United States, on the coast of North Carolina, in the N. E. part of the state. It is 60 miles long from E. to W. and 4 to 15 wide, may be considered as the estuary of the Roanoke and Chowan rivers, communicates with Pamlico Sound and the ocean by many narrow inlets, and with Chesapeake Bay by a canal cut through Dismal Swamp.

ALBERT EDWARD. See Prince of Wales in Chamb. Encycl.

ALBERTI, Leon Battista, distinguished as a painter, poet, philosopher, musician, and especially as an architect, was descended from the noble family of the Alberti of Florence. The place and date of his birth are variously given, but it is most probable that he was born at Venice about the year 1404. He was so skilled in Latin verse that a comedy he wrote in his twentieth year, entitled *Philodoxius*, deceived the younger Aldus, who edited and published it as the genuine work of Lepidus. In music he was reputed one of the first organists of the age. He held the appointment of canon in the metropolitan church of Florence, and thus had leisure to devote himself to his favorite art. He is generally regarded as one of the restorers of the ancient style of architecture, and has been called by some writers the Florentine Vitruvius. At Rome he was employed by Pope Nicholas V. in the restoration of the papal palace and of the fountain of Acqua Vergine, and in the ornamentation of the fountain of the Piazza de Trevi. At Rimini he designed the celebrated church of San Francesco, which is generally esteemed his finest work. On a commission from Rucellai, he designed the principal façade of the church of Santa Maria Novella in Florence, as well as the family palace in the Via della Scala, now known as the Palazzo Strozzi. In Mantua he was employed by the Marchese Ludovico Gonzaga to design several buildings, the most important being the church of Saint Andrea. Alberti wrote works on sculpture, *Della Statua*, and on painting, *De Pictura*, which are highly esteemed; but his most celebrated treatise is that on architecture, *De Re Ædificatoria*, which has been translated into Italian, French, Spanish, and English. A splendid edition of this work in English and Italian, by Leoni, was published at London in 1726, in 3 vols. folio. Alberti, being of an amiable and generous disposition, was highly esteemed by his contemporaries. He died at Rome in 1472, or, according to others, in 1484.

ALBERTINELLI, MARIOTTO, a pupil of Roselli, an imitator of Fra Bartolomeo, and one of the finest of the early Florentine painters. His *chef-d'œuvre* is in the Imperial Gallery of Florence, and is known as the Visitation of Elizabeth, mother of John the Baptist, to the Virgin. He was a man of singularly dissipated habits, to which he fell a victim at the early age of 45. Born at Florence, 1475; died 1520.

ALBINUS, Bernard, whose real name was Weiss, i. e. White, studied physic at Leyden, where, in 1702, he became professor in that faculty. He wrote several valuable treatises on medicine. Born at Dessau, 1653; died 1721.

ALBONI, Signora Marietta, a charming and popular contralto singer, who made her début in England, at the royal Italian Opera, as Arsace, in 'Semiramide,' in the spring of 1847. In 1882 she sang in opera and concert in the principal cities of the United States. In 1853 she married Count Peploi, an Italian nobleman. Retired from the stage 1863. Born at Forli, Italy, 1824.

AL-BORAK' (Arab., shining whiteness), the name given, in Mohammedan tradition, to an imaginary animal which was said to have carried Mahomet upon his journey from Jerusalem to the heavens.

ALBRECHTSBERGER, Johann Georg, German musician, one of the most learned composers of his age; organist to the Court of Vienna, and kapellmeister of St. Stephen's cathedral. Beethoven, Hummel, and Moscheles, were among his pupils. Author of treatises on composition. Born near Vienna, 1736; died 1809.

ALBRET, Jeanne d', Queen of Navarre, and mother of Henry IV. of France. She was a great supporter of the Reformation. It is supposed she was poisoned at Paris, whither she went to assist at the marriage of her son and Margaret of Valois. Born 1528; died 1572.

ALBUCA'SA, or ALBUCASIS, an Arabian physician, who composed many excellent works, excelled in surgery, and has described many instruments and operations. Lived in the 11th century.

ALBUMINURIA. See Bright's Disease in Chamb. Encycl.

ALCA'IC, name given to a kind of verse said to have been invented by the Greek poet Alcæus. It is formed of four feet, with a cæsura in the middle. The first foot is a spondee, rarely an iambus; the second an iambus; then the cæsura, followed by two dactyls; as—

Dūlce ēt | dĕcō | rum ēst | prō pătrĭ | ā mŏrĭ.
'It is sweet and glorious to die for one's country.'

Horace introduced this measure into the Latin language.

ALCAIDE', or ALCAYDE, a Spanish word, derived from the Arabic *kada*, to head or govern, and used by the Moors, Spaniards, and Portuguese for a governor, usually of a fortress or castle.

ALCAMENES, a famous Athenian sculptor, a pupil of Phidias, who is celebrated for his skill in art by Cicero, Pliny, Pausanias, Lucan, &c. He flourished from about 448 to 400 B.C., and appears as one of the great triumvirate of Greek sculptors, Phidias, Alcamenes, and Polycletus. He is said to have once competed with his master, the subject being a statue of Minerva. In this attempt the style of Alcamenes was exquisite in finish, but he had overlooked the consideration that the statue was to be placed on a high column, and there his work would not bear comparison with that of his great master. His statue of *Venus Urania*, in the temple of that deity at Athens, was reckoned his masterpiece.

ALCAVA'LA, in commerce, a custom-house duty paid in Spain, on imported goods, at the rate of 5 per cent. upon the value of the commodity.

ALCAZAR KEBIR, a city of Morocco, 80 miles N.W. of Fez. It was formerly of great importance, and the place where the expeditions of the Moors against Spain were prepared. The battle in which King Sebastian of Portugal was killed, was fought near the town in 1578. Pop. 6000.

AL'CIATI, Andrea, a famous lawyer, who in 1529 was chosen professor of law at Anjou. He subsequently removed to Bourges, to discharge the same office, at the desire of Francis I. The duke of Milan prevailed upon him to return to his native country, where he was created a senator. His most esteemed work is his *Emblems*. Born near Milan, 1492; died 1550.

ALCIN'OUS, a son of Nausithous, king of Phæacia, in the island now known as Corfu, praised for his love of agriculture. According to Homer, he was a grandson of Neptune, and entertained and listened to the wonderful adventures of Ulysses when shipwrecked on his coast; whence arose the proverb of the stories of Alcinous for improbability.

AL'CIPHRON, a Grecian sophist, whose epistles give a curious picture of Grecian manners. An English translation of them was published in 1791. Lucian is supposed to have imitated him.

ALCMÆ'ON was son of the soothsayer Amphiaraus and Eriphyle. When his father went to the Theban war, where, according to an oracle, he was to perish, he charged him to revenge his death upon Eriphyle, who had betrayed him. As soon as he heard of his father's death, he murdered his mother; for which crime the furies persecuted him till the river god Phlegens purified him, and gave him his daughter Alphesibœa in marriage. Alcmæon presented her with the fatal collar which his mother had received to betray his father, and afterwards divorced her and married Callirhoe, the daughter of Achelous, to whom he promised the necklace he had given to Alphesibœa. When he attempted to recover it, Alphesibœa's brothers murdered him, on account of his treatment of their sister, and left his body a prey to dogs and wild beasts. Alcmæon's children by Callirhoe revenged their father's death by killing his murderers.

ALCMÆ'ON, a philosopher of Crotona, and the disciple of Pythagoras. He was the first writer on natural philosophy, and believed in the theory that the stars were animated beings.

ALCME'NA, daughter of Electryon, king of Argos, by Anaxo. Her husband, Amphitryon, going against the Ætolians, Jupiter, who was enamored of A., resolved to visit her. The more effectually to accomplish this, he assumed the form of Amphitryon, declared that he had obtained a victory over A.'s enemies, and even presented her with a cup, which he said he had preserved from the spoils for her sake. The prophet Tiresias told Amphitryon of Jupiter's intrigue, when he returned to his wife, proud of the dignity of his rival. A. became pregnant by Jupiter, and afterwards by her husband; and the twins, Hercules the son of Jupiter, and Iphiclus the son of Amphitryon, were born. After Amphitryon's death, A. married Rhadamanthus, and went into Bœotia. This marriage, according to some authors, was celebrated in the island of Leuce. The people of Megara say that she was buried in their city, near the temple of Jupiter Olympus.

ALCOTT, Amos Bronson, teacher and philosopher, was born in Wolcott, Connecticut, November 29, 1799. After a brief mercantile experience he began teaching, at first in Connecticut, afterwards (1828), in Boston, and ultimately in Concord, Massachusetts, where he still resides. Mr. A.'s celebrity is founded not only on the success of his school and his methods of teaching, but also upon his fame as a philosophical thinker and conversationalist. In 1836 he published *Conversations with Children on the Gospels* (2 vols.); in 1868 *Tablets;* and in 1872 *Concord Days.* A description of his school may be found in E. P. Peabody's *Record of a School* (1834).

ALCOTT, Louisa May, daughter of Amos Bronson Alcott, born at Germantown, Pennsylvania, in 1833. She began to write at an early age, and her first book, *Fairy Tales*, was published in 1855. During the civil war she was a hospital nurse, and in 1863 published a volume of *Hospital Sketches*, made up from letters which she had written to her family. In 1863 she became a contributor to the *Atlantic Monthly.* She has published various novels, among which are *Moods*, 1864; *Morning Glories and other Stories*, 1867; *Little Women*, 1868; *An Old-Fashioned Girl*, 1869; *Little Men*, 1871; *Work: a Story of Experience*, 1873; *Cupid and Chow-Chow: and other Stories*, 1873; *Eight Cousins: or the Aunt Hill*, 1875; *Silver Pitchers and other Stories*, 1876; *Rose in Bloom*, a sequel to *Eight Cousins*, 1877; *Under the Lilacs*, 1878; *Jack and Jill*, 1880; and a series of short stories under the general title of *Aunt Jo's Scrap-Bag.*

ALCY'ONE, or HALCYONE, daughter of Æolus, married Ceyx, who was drowned as he was going to consult the oracle. The gods apprised A. in a dream of her husband's fate; and when she found, on the morrow, his body lying on the shore, she threw herself into the sea, and was, with her husband, changed into birds of the same name, who keep the waters calm and serene while they build, and sit on their nests on the surface of the ocean.

ALDAN, a river of Siberia, which rises on the confines of China, and joins the Lena in lat. 63° 12′ N., long. 129° 40′ E. There are several towns upon its banks, and, in a course of 500 miles, it is fed by various tributaries.

ALDAN MOUNTAINS, an E. Siberian chain of mountains, terminating at Behring Straits. Average height, 4,000 feet. A branch which traverses Kamtchatka reaches an elevation of 10,548 feet, and in Kliutshewskaja attains 15,763 feet. The lower limit of perpetual snow is at a height of 4,475 feet.

ALD'BOROUGH, or ALDEBURGH, a market-town and watering-place, in Suffolk, on the Alde, 9½ miles from Dunwich. Pop. of the parish, 1990. This town has a coasting trade, and many of its inhabitants are engaged in fishing. It is a sea-bathing resort, with a good hotel and many villas and lodging-houses. It was the native place of the poet Crabbe, who was born in 1754, and of whom there is a bust placed in the church, which is the largest in the county, and has been recently restored.

ALDEGONDE, Philip Van Marnix, Baron Von St., statesman and theologian. Studied at Geneva; resisted the introduction of the Inquisition into the Netherlands; fled to Germany, on the arrival of the Duke of Alva, 1566; returned on the establishment of the republic; professor of theology at Leyden. Born at Brussels, 1538; died at Leyden, 1598.

ALDEGRE'VER, Heinrich, a German painter and engraver, who was both a pupil and a successful imitator of the performances of Albert Durer. Born at Paderborn, 1502; died 1562.

ALDEN, James, rear-admiral U.S.N., born at Portland, Me., March 31, 1810. He was appointed midshipman April 1, 1828; lieutenant, February 25, 1841; commander, September 14, 1855; captain, January 2, 1863; commodore, July 25, 1866. He was a member of Wilkes's exploring expedition in 1839–42. During the Mexican war, he was at Vera Cruz, Tuspan, and Tobasco; commanded steamer *South Carolina* early in 1861; reinforced Fort Pickins; attacked the batteries in the rear of Galveston, and captured 13 schooners with valuable merchandise; commanded steam-sloop *Richmond* at the passage of Port Jackson and St. Philip and capture of New Orleans; commanded steam-sloop *Brooklyn* in the action with Forts Morgan and Gaines and rebel gunboats in Mobile Bay; and in the two attacks on Fort Fisher. He participated in nearly all the great naval battles of the war, and was honorably mentioned in the official reports. In April, 1869 he was appointed chief of the bureau of navigation, and rear-admiral, July, 1871.

ALDEN, John, Pilgrim, born in England, 1599; died at Duxbury, Mass., September 12, 1687. He was engaged as a cooper at Southampton, where *The Mayflower* victualed, and signed the compact in her cabin in 1620. He is said to have proposed marriage to Priscilla Mullens, in behalf of his friend, Miles Standish, whereupon the pilgrim lady replied: 'Prithee, John, why do you not speak for yourself?' In 1621, he accordingly led the fair Priscilla to the altar. Longfellow has made this incident the subject of a poem. He died at the age of 88, having been a magistrate of the colony for over half a century.

ALDEN, Joseph, D.D., LL. D., born at Cairo, N. Y., January 4, 1807. After graduating at Union College, in 1829, he studied theology for two years at the Princeton Seminary. He was ordained pastor at Williamstown, Mass., July 3, 1834; became professor in Williams College from August 1734 to 1852; professor of moral philosophy in Lafayette College, Pa., 1852–57; president of Jefferson College, Pa., 1857–67; and, since 1867, president of the New York State Normal School. Author of numerous Sabbath-school books, *Elements of Intellectual Philosophy*, *Science of Government in Connection with American Institutions*, and *Christian Ethics.* At one time editor, and for many years a contributor to the *N. Y. Observer.*

ALDEN, Timothy, D.D., Congregational clergyman and educator, born at Yarmouth Mass., August 28, 1771; died at Pittsburg, Pa., July 5, 1839. He graduated from Harvard in 1794. He was from November 20, 1799, to August 11, 1805, minister of Portsmouth, N. H., where he taught school from 1800 to 1808, and in 1810–17 taught in the academy at Newark, N. J. He prepared and published his collection of Epitaphs in 5 vols. 1814, and while teaching in Boston, in 1808–10, prepared a Catalogue of the Library of the New York Historical Society. He next removed to Meadville, Pa., where he founded Alleghany College, of which he was first president (inaugurated July 28, 1817), and for which he collected a valuable library. He withdrew from the college November 11, 1831; resumed his educational labors in Cincinnati in 1832, and in 1834 took charge of an academy at East Liberty, near Pittsburg, Pa. He published *An Account of Sundry Missions among the Senecas*, N. Y., 12mo, 1827; *New Jersey Register*, 1811 and 1812; *Alleghany Magazine*, 1815; *History of the Pine Creek Church*, 1839.

ALDENHOVEN, a town in Prussia, between Juliers and Aix-la-Chapelle. Near this town, in 1793, the Prince of Coburg defeated the French, inflicting immense loss.

AL'DERMAN. A magistrate or member of a town or city corporation, next in order to the mayor. In New York and other American cities the term is applied to the members of the city council, who are elected by the people.

ALD'HELM or ADELM, St., bishop of Sherborne, and consecrated at Rome by Sergius I. He is said to be the first Englishman who wrote in Latin, and the first who introduced poetry into England. The people in his time being extremely illiterate, paid little regard to prosaic discourses, which suggested to Aldhelm the idea of entertaining them with ballads of his own composition, in which he blended religious subjects with those of a lighter kind, and thus induced numbers to listen to his addresses. Born at Malmesbury 656; died 709.

ALDI'NI, Giovanni, a nephew of Galvani, the discoverer of galvanism. He was a Knight of the Iron Crown and Councillor of State at Milan. He delighted in philosophical pursuits, and at his death bequeathed his philosophical instruments and a large sum of money to found a public institution at Bologna, to instruct artizans in chemistry and physics. Born at Bologna, 1762; died at Milan, 1834.

AL'DOBRANDI'NI, Sylvester, a Florentine writer, who was appointed advocate of the treasury and apostolic chamber by Pope Paul III. He died in 1558.

ALDRICH, Thomas Bailey, born at Portsmouth, New Hampshire, Nov. 11, 1836. He entered the counting-house of his uncle, a New York merchant, where he remained three years, during which period he began to write for the journals, and was afterwards for a time proof-reader. He has contributed prose and verse to various periodicals, most of which have subsequently been published separately. Among the collected volumes are *The Bells*, 1855; *The Ballad of Baby Bell and other Poems*, 1856; *The Course of True Love never did Run Smooth*, 1858; *Pampinea and other Poems*, 1861; a volume of *Poems*, 1865; *Cloth of Gold and other Poems*, 1874; *Flower and Thorn*, 1876; *Lyrics and Sonnetts*, 1880; and *Friar Jerome's Beautiful Book*, 1881. Among his prose tales are *Daisy's Necklace and What Came of it*, 1857; *Out of his Head, a Romance in Prose*, 1862; *The Story of a Bad Boy*, 1869; *Margery Daw*, 1873; *Prudence Palfrey*, 1874; *The Queen of Sheba*, 1877; and *Stillwater Tragedy*, 1880. In 1881 he became editor of the *Atlantic Monthly*, Boston.

ALEANDRO, Girolamo, cardinal. He studied at Venice, and attained distinction as a Latin, Greek, Hebrew, Chaldee, and Arabic scholar; then taught the belles-lettres at Paris, where he became professor and rector of the university, and afterwards entered into the service of Pope Leo X., who appointed him librarian of the Vatican. At the diet of Worms he displayed his eloquence against Luther, causing the works of the great reformer to be burned, and himself proscribed. Clement VII. made him archbishop of Brindisi, and appointed him his nuncio to France. He was present with Francis I. at the battle of Pavia, in 1525, and shared his captivity, but in the following year returned to Rome. In 1531 he was despatched to Germany in the same capacity, and vainly endeavored to prevent Charles V. from making a truce with the Protestants. In 1538 he was made a cardinal by Paul III. Born at Motta, near Venice, 1480; died at Rome, 1542.

AL'EGAMBE, Philip, a Jesuit who took the religious habit in Sicily, and afterwards became professor of philosophy and divinity at Gratz, in Austria. In 1638 he went to Rome, and was retained there by the general of his order as secretary for Germany and president of spiritual affairs. He wrote various histories and biographies relating to the Jesuits. Born at Brussels, 1592; died at Rome, 1652.

AL'EMAN, Louis, a Roman cardinal, who, in 1422, being archbishop of Arles, was sent legate to Sienna by Pope Martin V. The object of his mission was to procure the removal of the council of Pavia to that city. Afterwards the Pope made him a cardinal, and he was appointed subsequently president of the council of Basil, in which he opposed Eugenius IV., who excommunicated him. Nicholas V. restored him to his dignities, and sent him as legate into Germany. Born at Bugey, 1390; died 1450; and was canonized in 1527.

ALES, Alexander, a Scotch divine, who, from being a zealous Catholic, became as zealous a Protestant. His real name was Alane, but he is known in Polemical literature as Alesius. In 1535 he visited England, and was greatly esteemed by Henry VIII. and Archbishop Cranmer; but soon after went to Germany, where he rose successively to the professorial chairs of Divinity in the universities of Frankfort and Leipsic. He wrote several books on theological subjects, particularly on the doctrine of the Trinity and the necessity of good works to justification. Born at Edinburgh, 1500; died 1565.

ALESHKI, a Russian town in the government of Tauride, opposite Kherson, on the estuary of the Dnieper. Pop. 1,500.

ALEXANDER, Archibald, D.D., a Presbyterian divine of America, was born of a family, originally Scotch, in Rockbridge county, Virginia, on the 17th April 1772; died 1851. After completing his preliminary education at Timber Ridge, he came under the influence of the religious movement known as the 'great revival,' and devoted himself to the study of theology. Licensed to preach in 1791, he was engaged for seven years as an itinerant missionary in his native state, and acquired during this period the facility of extemporaneous speaking for which he was remarkable. For a time president of Hampden Sidney College, he resigned that position in 1807 to become pastor of Pine Street Church, Philadelphia. In 1810 the degree of doctor of divinity was conferred upon him by the College of New Jersey, and in the following year he was appointed first professor in the newly-established Presbyterian theological seminary at Princeton. He filled the chair until his death in 1851. Dr. Alexander wrote a considerable number of works on theology, which have had a large circulation. Among these may be mentioned his *Outlines of the Evidences of Christianity* (1823), which has passed through several editions, and been translated into various languages; and his *Treatise on the Canon of the Old and New Testament* (1826). He was also a frequent contributor to the *Biblical Repertory*, edited by Professor Hodge.

ALEXANDER, James Waddell, D.D., a Presbyterian clergyman and author, born near Gordonsville, Louisa county, Virginia, March 13, 1804; died at the Virginia Springs, July 31, 1859. He was the eldest son of Dr. Archibald Alexander, and after graduating from the N. J. College in 1820, became a tutor in that institution in 1824. He was a minister in Charlotte county, Va., from 1825 to 1827; in Trenton, N. J., from 1829 to 1832, and of the Duane Street Church, New York City, from 1844 to 1851, when he was elected pastor of the Fifth Avenue Church. He became editor of the *Presbyterian* newspaper published in Philadelphia; professor of rhetoric and belles-lettres in New Jersey College in 1833–44; and from 1849 to 1851 professor of ecclesiastical history and church government in the theological seminary at Princeton. He published a volume of sermons entitled *Consolation; Thoughts on Family Worship; The American Mechanic and Workingman;* a biography of his father, Dr. Archibald Alexander; *Discourses on Christian Faith and Practice* (1858); a volume of *Sacramental Discourses*, and *Gift to the Afflicted; Geography of the Bible* (1830); *Plain Words to a Young Communicant*, 12mo.; *American Sunday School and its Adjuncts* (Phila. 1856); numerous contributions to the *Biblical Repertory* and *Princeton Review*, and some of the publications of the American Tract Society. He wrote for the *Literary World* under the signature of 'Cæsariensis.'

ALEXANDER, Joseph Addison, D.D., third son of Dr. Archibald Alexander, one of the most eminent biblical scholars of America, was born in Philadelphia in the year 1809. He studied at New Jersey, devoting himself specially to Hebrew and other Oriental languages. He graduated in 1826, and from 1830 to 1833 was adjunct professor of ancient languages and literature in his *alma mater*. In 1838 he was appointed professor of biblical criticism and ecclesiastical history in the theological seminary at Princeton. He was transferred in 1852 to the chair of biblical and ecclesiastical history, which he occupied till his death in January 1860. Dr. Alexander wrote several valuable works in his own department, the most important being a *The Psalms Translated and Explained. The Prophecies of Isaiah*, and an abridgment of the same work and a treatise on primitive church government. He also contributed numerous articles to the *Biblical Repertory* and the *Princeton Review*. At the time of his death he was engaged along with Dr. Hodge in the preparation of a commentary on the New Testament.

ALEXANDER, Stephen, LL.D., born at Schenectady, New York, September 1, 1806. He graduated at Union College, in 1824; and in 1834 was elected adjunct professor of mathematics in the College of New Jersey. In 1840 the professorship of astronomy was created, and he was assigned to it. In 1845 he was transferred to the chair of mathematics, but in 1854 exchanged it for the professorship of mechanics and astronomy, which he retained until he was retired in 1878. He has published numerous papers on astronomy, mathematics, physics, &c., which have attracted the attention of eminent astronomers in Europe and America. Among these are: *Physical Phenomena attendant upon Solar Eclipses, Fundamental Principles of Mathematics, On the Origin of the Forms and the present Condition of some of the Clusters of Stars*, and *Harmonies in the Arrangement of the Solar System which seems to be confirmatory of the Nebular Theory of La Place*. He has conducted two expeditions to make observations on solar eclipses, one to Labrador in July, 1860, and one to the West, to observe the solar eclipse of August, 1869.

ALEXANDER, William, Earl of Stirling, a Scotch statesman and poet, who received the honor of knighthood from James I. In 1621 the same monarch gave him a grant of Nova Scotia, which he intended to colonize, and Charles I. afterwards patronized the scheme by appointing him lieutenant of that country, and founding an order of knight-baronet in Scotland, each of whom was to contribute towards the settlement, and to have a portion of the same. The number for these baronets was limited to 150. Sir William afterwards sold Nova Scotia to the French. In 1626 he was appointed Secretary of State for Scotland; in 1630 created a peer, as Lord Alexander, of Tullibody, and Viscount Stirling, and the following year appointed judge in the Court of Session; in 1633 he was created Earl of Stirling, and in 1639 Earl of Dovan. Notwithstanding the great affluence of Alexander in powers of versification, he was very deficient in the poetic faculty. His poem entitled *Aurora* was published in 1604, and in 1607 a collection of his tragedies appeared. The title is now extinct, the last

of the male descendants having died in 1739. Born at Menshie, Scotland, 1580; died in London, 1640.

ALEXANDER BALAS, an impostor, who was employed by the Romans to personate the son of Antiochus Epiphanus, king of Syria, in order to take possession of that kingdom. He defeated Demetrius Soter, the lawful heir; but that prince, with the aid of Ptolemy, king of Egypt, afterwards gained a victory over the usurper, who fled into Arabia, where he was slain, 145 B.C.—There are in the British Museum many copper and silver coins with the head of Balas.

ALEXANDER JANNÆUS, king of the Jews, was the son of Hyrcan, and succeeded his brother Aristobulus, 104 B.C. Aristobulus had cast him into prison; whence he was taken at his death and placed on the throne. He began his reign by murdering one of his brothers, and entered into hostilities, which lasted long, with Ptolemy Lathyrus, king of Egypt. His cruelties irritated his subjects, and produced a civil war, which endured six years. Alexander, however, proved successful, and in one day caused 800 captives to be crucified, after their wives and children had been murdered before their eyes. Having secured the throne, he carried his arms into foreign countries, and made several important conquests. Died of intemperance, 79 B.C.

ALEXANDER OF APHRODISIAS, the most celebrated of the Greek commentators on the writings of Aristotle, and styled, by way of pre-eminence, *the Expositor*. He was a native of Aphrodisias in Caria, and taught the Peripatetic philosophy at Athens in the end of the 2d and the beginning of the 3d centuries of the Christian era. Commentaries by Alexander on the following works of Aristotle are still extant: The *Analytica Priora*, I.; the *Topica;* the *Meteorologica;* the *De Sensu;* and the *Metaphysica*, I.–V., together with an abridgment of what he wrote on the remaining books of the *Metaphysica*. His commentaries were greatly esteemed among the Arabians, who translated many of them. There are also several original writings by Alexander still extant. The most important of these are a work *On Fate*, in which he argues against the Stoic doctrine of necessity; and one *On the Soul*, in which he contends that the undeveloped reason in man is material, and inseparable from the body. He identified the active intellect, through whose agency the potential intellect in man becomes actual, with God. Several of Alexander's works were published in the Aldine edition of Aristotle, Venice, 1495–98; his *De Fato* and *De Anima* were printed along with the works of Themistius at Venice, 1534; the former work, which has been translated into Latin by Grotius and also by Schulthess, was edited by Orelli, Zurich, 1824; and his commentaries on the *Metaphysica* by Bonitz, Berlin, 1847. Nourisson has treated of his doctrine of fate, Paris, 1870.

ALEXANDER III. (ALEXANDROVITCH), EMPEROR AND AUTOCRAT OF ALL THE RUSSIAS, who succeeded to the throne on the murder of his father by Nihilist conspirators on March 13, N.S. 1881, was born March 10, 1845. He was educated at the Russian universities, trained in military affairs, and held a subordinate command during the Turko-Russian war. Since his elevation to the throne he has seldom appeared in public, but has lived in the closest retirement at Gatchina, being in constant dread of the machinations of the secret societies of Socialists. His coronation took place at Moscow, May 27, 1883. He married, in 1866, Mary-Féodorovna (formerly Mary Sophia Frederica Dagmar), daughter of Christian IX., King of Denmark.

The Nihilist conspiracy has confined the attention of the Czar's government to home affairs, and his aim has been to maintain amicable relations with foreign powers. Still, he represents the feeling that is intensely Russian, a sentiment which might give a more positive coloring to his foreign policy were he free from danger of domestic revolution. Nihilists are punished with unrelenting severity, and at times the Government's repressive measures seem on the verge of success, but it is only in appearance. The national strength is paralyzed by this internal malady. Only the dread of dynamite plots could have occasioned the unparalleled delay of the coronation ceremony for more than two years. And when the event had taken place, the Czar was credited with great courage in so far braving Nihilistic attacks as to be publicly crowned. It is believed, however, by many that Alexander III. may succeed eventually in suppressing these revolutionary demonstrations. It was said of him that he had his grandfather's energy and his father's humanity, while his private life has been free from scandal. He has no favorites of either sex, and he possesses a high sense of the sacredness of his mission. The coronation ceremonies were performed in Moscow with the utmost magnificence and splendor. Large sums of money were given to the poor, prisoners (not political, of course) were freed in honor of the day, food and drink were furnished to the multitude. Contrary to a very common fear, nothing occurred to mar the general festivity. The private property of the Emperor yields him a large annual revenue. He possesses a million square miles of cultivated land and forests, besides owning gold and other mines in Siberia, the vast revenue of which is not known, as, being the Emperor's personal estate, the amount never appears in the budget. The sum arising from all these sources is estimated, however, at over $12,000,000, of which sum $2,000,000 are expended in charities, schools, and theaters, leaving a net income of $10,000,000. Alexander III. has five children: Grand-duke Nicholas, heir apparent, born May 6, 1868; Grand-duke George, born April 28, 1871; Grand-duchess Xenia, born April 6, 1875; Grand-duke Michael, born Nov. 23, 1878; Grand-duchess Olga, born June 1, 1882.

ALEXANDER VI. (pope), a sketch of whom is given in another part of this cyclopædia, has become a myth, and his 'acts' are in some respects almost as legendary as those of the primitive saints and martyrs. The peculiar odium attached to his memory rests partly on the charge of incest, of which he must be acquitted; partly on that of secret poisoning, which is at least not established; partly on the confusion between his actions and Cæsar Borgia's. Nearly everything actually criminal in his pontificate is subsequent to the preponderance of the latter. Profligate alike in public and private life, he was no malignant tyrant,—affable, familiar, easy, he justly took credit for his moderation towards notorious malcontents, and his indifference to personal injuries. These virtues, however, as well as his family affection, were merely constitutional with him,—as the many beneficial acts of his administration were rather prompted by a sense of policy than a sense of duty. His ability as a ruler is evinced by the tranquillity he maintained in Rome, his effectual provision against dearth, the regular discharge of financial obligations, the energetic prosecution of useful public works. As a statesman he ranks high in the second class. He was too destitute of morality to have the least insight into the tendencies of his times; but from the point of view of political expediency, his policy was eminently sagacious and adroit. He cannot be accused of preparing the misfortunes of Italy, but he did not disdain to profit by them. His licentiousness and contempt of ecclesiastical decorum are partly palliated by the circumstances of his initiation into the Church. He was untrained to the ecclesiastical profession, never felt himself a priest, and was wholly regardless of the Church's interest as such. In this respect he is almost unique among the successors of St. Peter. Were controversies regulated by reason rather than by convenience, the parties to this would change sides,—Alexander's accusers would become his advocates, and his advocates his accusers. The Church in her secret heart must rate him the lowest of her chiefs; the world must feel that he deserves much better of it than many much better popes.

The principal contemporary authority for the reign of Alexander is the diary of the papal master of the ceremonies, Joannes Burcardus, a record replete with trivialities and not exempt from interpolations, but containing indisputable evidence of perfect candor. An excellent edition, commenced in 1855 by the Abbé Gennarelli, was discontinued after the publication of a few parts. The uncritical histories of Gordon and Tomasi are indebted to Burcardus for any value they possess. Among modern Roman Catholic apologists are Jorry, Favé, Cerri, and others. The Abbé Ollivier (*Alexandre VI. et les Borgia*, tom. i., Paris, 1870) excites respect by his good faith. Of late years the archives of the Italian courts have become accessible, and the transactions of Alexander's reign have been sagaciously investigated from this source by two German scholars, Von Reumont (*Die Stadt Rom*, Bd. 3, Abth 1, Berlin, 1868) and Gregorovius (*Rom in Mittelalter*, Bd. 7, Stuttgart, 1870). The latter is the more copious, but his general estimate of Alexander is much too low. By far the ablest English contribution to the history of Alexander is a notice of Gregorovius in the *North British Review*, vol. iii., entitled *The Borgias and their Latest Historian*.

ALFONSO XII. (ALFONSO FRANCESCO DE ASSISI FERDINANDO PIO JUAN MARIA DE LA CONCEPCION GREGORIO, &c.), King of Spain, eldest son of the ex-Queen Isabella II., was born Nov. 28, 1857. When his mother was driven from the throne by the revolution of 1868, he accompanied her to Paris, where he resided with her for some time, but subsequently he went to Austria, in order to prosecute his studies in the Theresianum, or nobleman's academy, at Vienna, to which he was admitted Jan. 20, 1872. He remained there three months. On June 25, 1870, Queen Isabella formally abdicated her right to the throne of Spain in favor of her son, but no open steps were taken at that time to secure for him the position which this abdication left open to him. His pretensions were, however, opposed by his cousin, the eldest son of the Duke of Montpensier, and his aunt the Infanta Luisa, but as so many pretenders were calculated to complicate matters, the claim of Louis Philippe's grandson was ultimately waived in favor of the heir of Isabella. Early in 1874 the Prince of the Asturias, as he was then styled, visited this country, was entered as a student at the Military College at Sandhurst, and witnessed the autumn manœuvres at Aldershot, Dartmoor, and other places in the fall of the year. On Dec. 29, 1874, General Martinez Campos proclaimed him King of Spain in Valencia, and a few days later Al-

fonso, who had gone over to Paris in order to spend the *Jour de l'An* with his mother, left France for Spain, arriving at Madrid Jan. 14, 1875. He was most enthusiastically received. On Feb. 16, 1876, he departed from Madrid to take the command of the troops operating against the Carlists, and on the 20th of the following month he returned in triumph to the capital at the head of 25,000 men, having subdued the Carlist insurrection. In the same year the ex-Queen Isabella returned to Spain, and was received by her son at Santander (July 29). King Alfonso married on Jan. 23, 1878, at Madrid, his cousin the Princess Maria de las Mercedes, Infanta of Spain, daughter of the Due de Montpensier. (She was born June 24, 1860). The ex-Queen Isabella was much opposed to this union, and to mark her disapproval she left Spain and went to Paris before the marriage ceremony took place. Queen Mercedes died on June 26, 1878. King Alfonso married secondly on Nov. 29, 1879 Maria Christina daughter of the late Archduke Charles Ferdinand of Austria. (She was born July 21, 1858.) On Oct. 25, 1878, King Alfonso was fired at in Madrid by Juan Moncasi, a workman, but escaped unhurt. On Dec. 30, 1879, as the King and Queen were driving in an open carriage through the palace gates at Madrid, a youth named Francisco Otero Gonzalez Igans fired two pistol shots at the royal pair, one passing between them, and the other through an attendant's hat; but fortunately without doing further damage. Otero was tried in Feb. 1880, and sentenced to death. King Alfonso was invested with the Order of the Garter, at Madrid, by the Marquis of Northampton, Oct. 11, 1881. Queen Christina has given birth to two daughters—Maria de las Mercedes, Princess of the Asturias (born Sept. 12, 1880), and the Infanta Maria Teresa Isabel, born Nov. 12, 1882.

AL GAZALI, Abu Hamed Muhammed, Arabian philosopher and theologian. Head of a theological college at Bagdad; but, being unsatisfied as to the truth of the doctrines he taught, retired for ten years to Damascus. He then returned to Bagdad, and resumed teaching for fifteen years, the remaining years of his life being devoted to meditation. He wrote a treatise against the teaching of Aristotle, and against the orthodox Islamites. He has been called the Oriental Descartes. Mr. Lewes and M. Renan have given much attention to his writings. Born at Tous, 1058; died there 1111.

ALGER, Horatio, jun., an American author, born at Revere, near Boston, Jan. 13, 1834. He graduated at Harvard College in 1852, and engaged in teaching and literary pursuits. Afterwards he spent a year in Europe, corresponding for several journals. Returning to America, he resumed teaching and writing for periodicals. In 1866, he took up his residence temporarily in New York, where he became deeply interested in the condition of the street boys, concerning whom he wrote two series of tales and sketches, *The Ragged Dick* series, and *The Tattered Tom* series. He has also contributed to various magazines, and published a a novel, *Helen Ford*.

ALGER, William Rounceville, cousin of the preceding, was born at Freetown, Massachusetts, in 1823. He graduated at Harvard College and the Cambridge Divinity School, and became pastor of a Unitarian church at Roxbury, near Boston. In 1855, he succeeded Theodore Parker as minister of the 'Liberal Christians,' who worship in Music Hall, Boston, where he still continues to conduct the services. He has published, *The Poetry of the Orient, or Metrical Specimens of the Thought, Sentiment, and Fancy of the East* (1856), *A Critical History of the Doctrine of a Future Life* (1861), *The Genius of Solitude, or the Loneliness of Human Life* (1867), and *Friendships of Women* (1870).

ALHAZEN (full name, Abu Ali al-Hasan Ibn Alhasan), a mathematician of the 11th century, was born at Bassora, and died at Cairo in 1038. He is to be distinguished from another Alhazen who translated Ptolemy's *Almagest* in the 10th century. Alhazen having boasted that he could construct a machine for regulating the inundations of the Nile, was summoned to Egypt by the caliph Hakem; but, aware of the impracticability of his scheme, and fearing the caliph's anger, he feigned madness until Hakem's death in 1021. Alhazen was, nevertheless, a diligent and successful student, being the first great discoverer in optics after Ptolemy. His researches were prosecuted under the greatest disadvantages, as he was compelled to eke out a livelihood by copying his own works and selling them. To him, and not to Ptolemy, is due the explanation of the apparent increase of heavenly bodies near the horizon. He correctly attributed the phenomenon to the fact that the eye compares these bodies with intervening terrestrial objects. He taught, previous to Vitello, that vision does not result from the emission of rays from the eye, and wrote also on the refraction of light, especially on atmospheric refraction, showing, e. g., the cause of morning and evening twilight. He solved the problem of finding the point in a convex mirror at which a ray coming from one given point shall be reflected to another given point. As a writer, Alhazen is remarkable for prolixity and scholastic subtilty. Only two of his works have been printed—his *Treatise on Twilight*, and his *Thesaurus Opticæ*. (See Casiri, *Bibl. Arab. Hisp. Escur.*)

A'LIAS, (Lat., otherwise) a word used to denote a name or title that has been assumed by, or accidentally given to a person; as, Smith, *alias* Jones. An alias may be assumed by any one, but does not absolve him from the responsibility of an act committed under his assumed name. It is also a second writ issued from the division of the High Court of Judicature, where the first has been issued, and returned without effect.

A'LI BEY, an adventurer, supposed to have been a native of the Caucasus, who, when young, was taken by robbers and conveyed to Cairo, where he was bought by Ibrahim, a lieutenant of the janissaries, who entered him among the Mamelukes. For his gallantry against the Arabs, he was created a bey. In 1758 his patron was murdered by a party headed by a person also called Ibrahim, a Circassian. In 1763 Ali attained the dignity of sheikecbalad, which was the first in the republic, and soon after slew Ibrahim, to revenge the murder of his patron. This raised against him numerous enemies, who obliged him to fly to Acre, where he was protected by the sheik Daher. In 1766 he was recalled by the people, and, after revenging himself upon his enemies, he declared war against the Arabs, and by the success of his achievements, encircled his name with renown. Having now risen to be the head of the government, Egypt, under his rule, began to revive; agriculture flourished, and the country seemed to bid fair to recover its former splendor. In 1768, war broke out between Russia and Turkey, and Ali sent 12,000 men to serve in the Ottoman army. His enemies reported at Constantinople that these troops were designed to assist the Russians; in consequence of which a capigi, and four attendants, were sent to take off his head. Ali being informed of this, seized these messengers of death and handed them over to the fate they designed for himself. He then declared war against the Porte, and for a time preserved his independence, and obtained several advantages. At last his principal commanders revolted with their troops, and in a battle which took place between Ali and the forces of one of his chief Mamelukes, he was taken prisoner, and died of his wounds. The object of Ali was to re-establish the independence of Egypt and to resuscitate some of the greatness of its former grandeur. Born 1728; died 1773.

ALIEN. An alien is a person born out of the jurisdiction of the United States, and not naturalized. An alien desiring to be naturalized must declare on oath his intention to become a citizen of the United States; two years afterwards must declare on oath his intention to support the constitution of the United States and renounce allegiance to every foreign power, including that of which he was before a subject; must prove residence in the United States for five years, and in the state where his application is made for one year, as a good citizen; and must renounce any title of nobility. Where a citizen of the United States removes to a foreign country, is married to a woman who is a native of that country, and remains an indefinite time, his child, in the absence of any law of the United States to the contrary, can inherit property as a citizen of the United States. But if their father is a citizen of a foreign country, and their mother a native of the United States who has married and settled abroad, then the children cannot inherit land in the United States. An alien cannot inherit land, but can hold land which he has purchased. If land is bequeathed to an alien, he holds it subject to the right of the state to forfeit it. Where an alien dies intestate, his land goes to the state, provided there are no heirs who are citizens. An alien can take and hold lands granted to him by the state, and his heirs, although they cannot inherit it. An alien cannot vote or hold any political office, but he can inherit personal property. An alien can sue or be made the defendant in a suit in the United States courts. If he is sued in a state court he can have the suit removed to the United States courts. See Naturalization in Am. Supp.

AL'LEGRI, Gregorio, a celebrated musician, whose compositions are still retained in the pontifical chapel. The chief is the *Miserere*, which is always sung on Good Friday. Clement XIV. sent a magnificent copy of the *Miserere* to King George III. The composer studied music under Nanini, the friend of Palestrine. He held a appointment in the choir of the Sistine chapel for more than 20 years, and was one of the composers for stringed instruments. Born at Rome, 1580; died 1652.

AL'LEINE, Joseph, a nonconformist minister, who, in 1655, became curate of Taunton. In 1662, he was ejected for nonconformity, but continued to preach privatly, for which he was imprisoned. His book entitled *An Alarm to Unconverted Sinners* has gone through numerous editions, and is still popular. Born at Devizes, 1634; died at Bath, 1668.

AL'LEINE, Richard, a nonconformist divine, educated at Oxford, and appointed rector of Batcomb, Somerset, 1641, but ejected in 1662. Author of the popular *Vindiciæ Pietatis*. Born at Dichet, Somerset, 1611; died at Frome Selwood, 1681.

ALLEN, Ethan, an American revolutionary soldier, born at Litchfield, Ct., Jan. 10, 1737; died Burlington, Vt., Feb. 12, 1789. His parents removed to Cornwall, and afterwards to Salisbury. Four of his brothers emigrated in 1772 to the territory west of the Green Mountains, where Ethan had preceded them in 1766, and where they became conspicuous in the border feuds and in the revolutionary conflict. This territory called 'The New-Hampshire Grants,' was claimed by New York; but the settlers under the leadership of Allen, repulsed their sheriffs and constables, until the Revolution turned their attention in another direction. New York state declared A. an outlaw, and offered a reward of $750 for his capture. After the battle of Lexington, a plan for the capture of Ticonderoga was devised in Hartford; and A. was given command of the expedition. He set out at once at the head of his 'Green Mountain Boys.' They arrived at the lake opposite the fortress, on the evening of May 9; and at daybreak, A., with 83 men, surprised Ticonderaga, summoning Captain Delaplace, who commanded the post, to surrender 'in the name of the great Jehovah and the continental congress.' In this manner 2 officers, 48 rank and file, and 120 pieces of artillery were captured. The capture of Crown Point by Col. Warner the same day, and of a sloop-of-war soon after, gave them the mastery of Lake Champlain. A.'s success as a partisan, occasioned his being twice despatched into Canada, during the fall of 1776, to win over the Canadians to the American cause. In the last of these expeditions, he undertook, with Col. Brown, the capture of Montreal. Crossing the river with 110 men on the morning of Sept. 25, he was attacked by a large force, before Col. Brown could come to his assistance, and made prisoner. He was put in irons, and treated with great severity by Gen. Prescott; he was then sent to England. After three weeks' confinement in Pendennis Castle, he was, in Jan. 1776, sent to Halifax; and, five months later, was removed to New York. He was treated with great kindness by the captain; and, while on the passage, he refused to join in an attempt to seize the vessel, which prevented the execution of the plan. In May 1778, he was exchanged for Col. Campbell, returned to Vermont, where he was received with honors, and accepted the command of the militia. He also received from Congress the commission of lieut.-col. in the Continental Army. A fruitless attempt was made by the British, through Beverley Robinson, to bribe him to lend his support to a union of Vermont, with Canada, the only result of which was, that by feigning negotiations, A. was able to secure the neutrality of the British towards his mountaineers until the close of the war. He was afterwards elected member of the State legislature and a special delegate to Congress, which afforded him the opportunity of carrying out his main object,—the ultimate recognition of Vermont as an independent state. Before the end of the war, he removed to Bennington, later to Arlington, and finally to the vicinity of Onion River, where he died. Two of his sons, graduates of West Point, became captains of artillery. Besides a narrative of his captivity, and several pamphlets on the controversy with New York, he published in 1784 'Allen's Theology or the Oracles of Reason.'

ALLEN, Ira, born in Cornwall, Conn., April 21, 1751, was a younger brother of Ethan Allen. He emigrated in 1772 to Vermont, where he became a prominent citizen. He did good service at the battle of Bennington as colonel of a militia regiment. He bore a conspicuous part in settling the early conflicts of Vermont with the neighboring states. In 1795 he went to France to purchase arms for his state, but was taken prisoner on the voyage home, carried to England, and there, after an eight years' lawsuit on the charge of attempting to supply the Irish with arms, the case was decided in his favor. In 1819 he was imprisoned in France, and returned to America in 1801. He wrote a *Natural and Political History of Vermont*. He died Jan. 7, 1814.

ALLEN, William, D.D., was born in Pittsfield, Mass., on Jan. 16, 1768. He graduated from Harvard in 1802. After being licensed in 1804, he preached in several places in the western part of New York, and then became a regent of Harvard College. He published the first edition of his *American Biographical and Historical Dictionary* in 1809. The second edition of this work appeared in 1832; the third, in 1857. In 1807, he prepared the lives of American ministers for Rev. David Bogue's *History of the Dissenters*. In October, 1810, he was ordained pastor of the church in Pittsfield, as his father's successor. In 1812, he married Maria M., daughter of President John Wheelock. He was made president of Dartmouth College in 1817, and from 1820 to 1839 was president of Bowdoin College. Among his works are contributions of *Words not found in the Dictionaries of the English Language*, to Worcester and Webster; *Baccalaureate Addresses*, 1823–29; *Junius Unmasked*, identifying Lord Sackville as the author of the famous Junius letter; *Accounts of Shipwrecks; Psalms and Hymns*, 1835; *A Discourse at the Close of the Second Century of the Settlement at Northampton, Mass.*, 1854; *Wunnisoo, or the Vale of Housatonnuk*, a poem, 1856; a *Dudleian Lecture* at Cambridge; *Christian Sonnets*, 1860; *Poems of Nazareth and the Cross*, 1866; *Sacred Songs*, 1867.

ALLEN, William, an eminent chemical and experimental professor, who lectured at Guy's Hospital. In his chemical investigations he demonstrated that the diamond was of pure carbon, and in conjunction with Mr. Pepys proved the proportion of carbon in carbonic acid. Mr. Allen, who was the son of a Spitalfields silk manufacturer, and an active member of the Society of Friends, carried on business for many years as a pharmaceutical chemist, in Plough Court, Lombard street. He was actively concerned in establishing the Pharmaceutical Society. Born in London, 1770; died at Lindfield, Sussex, 1843.

ALLEN, William Henry, an American scholar and educator, born at Manchester, Maine, March 27, 1808. He graduated at Bowdoin College in 1833, and became a teacher of the classics in the Academy of Cazenovia, New York, until 1836, when he was appointed Professor of Natural Philosophy and Chemistry in Dickinson College, Carlisle, Pennsylvania; and from 1846 to 1849 he was Professor of Philosophy and English Literature. From 1849 to 1862 he was president of Girard College, Philadelphia, and subsequently president of the Agricultural College of Pennsylvania. In 1867 he was recalled to the presidency of Girard College, a position he held till his death. In 1872 he was chosen president of the American Bible Society. In 1846 he received the degree of M.D. from the Philadelphia College of Medicine, and in 1850 that of LL.D. from Union College, New York, and from Emory and Henry College, Virginia. He has delivered numerous addresses and reports on education, and has contributed to reviews and magazines many articles on philosophical, literary, and educational topics. He died in 1878.

ALLESTRY, or ALLESTREE, Richard, a divine, who, in 1641, took up arms, with many other young men of the university of Oxford, in favor of Charles I. After serving some time in a military capacity, he returned to his studies, but afterwards again entered the army. At the end of the civil war he took orders, and in 1659 visited Charles II. in Flanders, and on his return was seized at Dover, but found means to secure his despatches. At the Restoration he was made canon of Christ church, and served one of the lectureships of Oxford, the salary of which he gave to the poor. In 1660 he took the degree of D.D., became chaplain to the king, and regius professor of divinity. In 1665 he was appointed provost of Eton. He was buried in the chapel of Eton College, where there is a monument to his memory. He erected at his own expense the West side of the outward court of Eton College and the grammar school in Christ Church College. Born at Uppington, Shropshire, 1619; died at Eton, 1681.

ALLIBONE, Samuel Austin, LL.D., born in Philadelphia, April 17, 1816. Early in life he acquired a high reputation for his attainments in English literature, and though engaged in mercantile pursuits, his favorite studies were not neglected. The first volume of his great work, *A Critical Dictionary of English Literature, and British and American Authors*, was published in 1858, and the third (the last) in 1871. The three large volumes contain notices of 46,499 authors, and 40 classified indexes of subjects. He has contributed articles to the *North American Review*, and other periodicals, and has published several tracts and religious essays. He was, for several years, the editor of the publications of the American Sunday School Union, and has published *Alphabetical Index to the New Testament*, 1869; *Union Bible Companion*, 1871; *Poetical Quotations from Chaucer to Tennyson*, 1873; *Prose Quotations from Socrates to Macaulay*, 1876; and *Great Authors of All Ages*, 1879. He is now connected with the Lenox Library, New York.

ALLINGHAM, William, a poet, born about 1828, at Ballyshannon, Ireland, where his father was manager of the Provincial Bank, was educated at a school in Ireland, and from an early age contributed to periodical literature. In 1850 he published his first volume of 'Poems,' dedicated to Leigh Hunt, who encouraged his early literary attempts, and afterwards befriended him in matters of more importance. In 1854 appeared *Day and Night Songs*, and in 1855 an enlarged edition of the same, illustrated by Millais and other artists. *Laurence Bloomfield in Ireland*, a modern poem in twelve chapters, appeared in 1864. Mr. A. holds an appointment in the Customs in England, and obtained a literary pension in 1864. He succeeded Mr. J. A. Froude in the editorship of *Frazer's Magazine* in 1874.

ALLIX, Pierre, divine of the French Reformed Church. Came to London after the revocation of the Edict of Nantes, and opened a church for French exiles. He received the degree of doctor of divinity from both the English universities, and in 1690 was made treasurer and canon of Salisbury cathedral. His works are chiefly of a controversial character. Born at Alençon, 1641; died in London, 1717.

ALLORI, Alessandro, a painter of Florence, who was instructed by his uncle Bronzino. He was in most repute as a portrait painter. Born at Florence, 1535; died 1607.

ALLORI, Christofano, son of the above, a better painter, and most skilful colorist. Some of his copies of the 'Magdalen' of Correggio have been taken to be duplicates of the original by Correggio himself. Born at Florence, 1577; died 1621.

ALLOUEZ, Claude, a Jesuit missionary, who visited Lake Superior in 1665–67, founded a mission at Green Bay in 1669, where he endured many hardships, and in 1687 was at St. Louis. While confined to his bed at that place by illness, he stole away on hearing of the approach of La Salle, whom he had injured. Born 1620; died 1690.

'ALL THE TALENTS,' a name applied externally to the second Grenville Administration, formed in January, 1816, which included several politicians of the very highest ability.

AL'MADEN, a town of Spain, in the province of Ciudad Real, 55 miles from Ciudad Real, with an excellent practical school of mines. It has very productive mines of quicksilver, which have been worked from very remote times. A depth of 1,000 feet has been reached, and the ore increases in richness. The mines belong to the Spanish Government. Pop. about 9,000.

AL'MAMON, caliph of Bagdad, was the son of Haroun-al-Raschid, and succeeded to the throne in 813.—He was a great encourager of learned men, founded an academy at Bagdad, calculated a set of astronomical tables, and caused the works of the most celebrated ancient authors to be translated into Arabic. His reign was much disturbed by revolts and hostilities with the Greek Theophilus. Born 786; died 833.

ALMANAC. The first Almanac in America was published at Cambridge in 1639 by John Day. Mr. Ainsworth R. Spofford, the Librarian of Congress, in his *Brief History of Almanacs*, published in the *American Almanac* for 1878, gives a list of almanacs which have been published in this country as follows: *Father Abraham's Almanac*, by Abraham Weatherwise, Philadelphia, 1759–99; Nathanael Low's *Astronomical Diary or Almanac*, Boston, 1762–1827; Isaiah Thomas's *Massachusetts, Connecticut, Rhode Island, New Hampshire, and Vermont Almanac*, Worcester, Mass., and Boston, 1775—1822; *Poor Will's Almanac*, Philadelphia, from 1770 till 1840; the *Virginia Almanac*, Williamsburg and Richmond, 1751—1829; the *South Carolina and Georgia Almanac*, Charleston, 1760—1800; and the following which are still published: R. B. Thomas's *Farmer's Almanac*, Boston, 1793; the *Massachusetts Register and Almanac*, Boston, 1767; Webster's *Calendar, or the Albany Almanac*, 1783; Bickerstaff's *Boston and New England Almanac*, Exeter and Concord, N. H., 1797; D. Robinson's *Maine Farmer's Almanac*, Hallowell, 1817; and Daboll's *New England Almanac*, New London, Conn., 1777. The *American Nautical Almanac* was founded by Admiral Charles Henry Davis in 1849, its present editor being Prof. Simon Newcomb. Peter Force's *National Calendar*, published at Washington from 1820 to 1836, was an official register of the government, with useful information and abstracts of public documents. The *American Almanac and Repository of Useful Knowledge* was published from 1830 to 1861 at Cambridge and Boston, containing astronomical and meteorological information, a valuable collection of statistics, a chronicle of events, obituary notices, etc.; the *National Almanac and Annual Record*, published at Philadelphia by George W. Childs, 1863—1864, was intended to supersede it. John Downes's *United States Almanac* was first published at Philadelphia in 1843, but only three issues were published. A single volume was published at Hartford, Conn., by David N. Camp in 1869—*The American Year-Book and Annual Register*. Mr. A. R. Spofford's *American Almanac*, begun in 1878, is the best American Almanac. The *Tribune Almanac*, began with the *Whig Almanac* issued by Horace Greeley in 1838. The New York *World Almanac* was issued from 1868—1876. The New York *Herald Almanac* was published from 1872 to 1878. The Albany *Evening Journal Almanac* was first issued in 1857, and the Albany *Argus Almanac*, 1874. The New York *Star* issues an almanac, and before the New York *Evening Express* was incorporated with the *Evening Mail* it published a statistical almanac. Of contemporary newspaper almanacs, those of the Philadelphia *Public Ledger*, first printed in 1870, and the Philadelphia *Times* (1876), are well known. The New York *Clipper Annual* is the representative of the sporting interest. The list of religious or denominational almanacs, and the date when they were first issued, is as follows: The *Church Almanac* (Protestant Episcopal), 1830; *Catholic Almanac and Directory*, 1833; *Methodist Almanac*, 1824; *Universalist Register*, 1836; *Baptist Almanac*, 1842; *American Universalist Register and Year-Book*, 1846; *Presbyterian Historical Almanac*, 1858; *Family Christian Almanac*, 1821. The Protestant Episcopal almanac is known as *Whittaker's Churchman's Almanac*. The *Catholic Almanac* has a large circulation. Among comic almanacs may be mentioned that issued by *Puck*. Vennor's *Weather Almanac*, the *Irish-American Almanac*, the *Farmer's Almanac*, and the *Catholic Family Annual* have an extensive circulation. Almanacs issued by patent-medicine dealers and for various other advertising purposes are not included in the above list.

ALMONDBURY, or ALMONBURY, a town and parish of England, in the West Riding of Yorkshire, situated on the river Calder, near Huddersfield. The town has a good church and a free grammar-school, founded by James I. Area of parish 28,092. Manufactures chiefly cloths for waistcoatings, shawls, fancy goods, and broad and narrow woollen fabrics. Pop. of the town, 11,659.—This place is supposed to be the *Cambodunum* of the Romans, and to have been the residence of some of the Saxon kings.

ALMQVIST, Karl Jonas Ludwig, Swedish author. Educated at the university of Stockholm, and after trying to establish an agricultural colony, devoted himself to literature, writing romances, poetry, philosophical, theological, and mathematical treatises, rapidly obtaining great reputation in almost every department of literature. In 1851, having committed forgery and murder, he fled to America, where, under an assumed name, he became the private secretary of Abraham Lincoln, after whose death he returned to Europe, to avoid the consequences of his malpractices. Born at Stockholm, 1793; died at Bremen, 1866.

ALOIDÆ, or Aloiadæ, the designation of Otus and Ephialtes, sons of Poseidon by Iphimedea, wife of Aloeus. They are celebrated for their extraordinary stature, being 27 cubits in height and 9 in breadth when only 9 years old. The story of their piling Pelion upon Ossa in their war with the Olympian gods is one of the best known of the early Greek myths. According to Homer's account, they were destroyed by Apollo ere their beards began to grow. (*Odyssey*, xi. 305; *Iliad*, v. 385.)

ALOM'PRA, a powerful chief, who, from being the head of a petty Asiatic village, became, by conquest and barbarity, the founder of the reigning dynasty of Burmah. He was a man of remarkable energy and ability, and made himself one of the most powerful monarchs of the East. Born 1711; died, near Martaban, 1760.

ALPI'NI, Prospero, a Venetian physician and botanist. He was first a soldier, but quitted that profession and went to Padua, where he made so great a progress in learning that he became deputy rector and syndic. In 1578 he took his degree of M.D., and in 1580 went to Egypt as a physician to the Venetian consul. He resided there three years, in which time he greatly improved himself in botany. He was the first who discovered the sexes and generation of plants, and published an account of the coffee plant. On his return to Venice, in 1586, Andrew Doria, prince of Melfi, appointed him his physician; and in 1593 he was called to the botanical professorship at Padua, which he held until his death. Born at Marostica, Venice, 1553, died at Padua, 1617.

ALSTED, Johann Heinrich, German divine. Professor of Philosophy and Divinity at Herburn and Weissenburg, and a very voluminous and learned writer. Born 1588; died 1638.

ALSTROEMER, John, an eminent patriotic Swede, who, after visiting England, returned to his own country, and became remarkable for the great improvements he there introduced into arts and manufactures. For his great efforts he was made a knight of the Polar Star, chancellor of Commerce, and a member of the Academy of Science. There is a statue to his honor in the exchange at Stockholm. Born at Alengsoes, 1685; died 1761.

ALTENSTEIN, a castle upon a rocky mountain in Saxe-Meiningen, on the south-western slope of the Thüringer Wald, not far from Eisenach. It is the summer residence of the dukes of Meiningen, and is surrounded by a noble park, which contains, among other objects of interest, a remarkable underground cavern, 500 feet long, through which flows a large and rapid stream. Boniface, the apostle of the Germans, lived and preached at Altenstein in 724; and near the castle is the place from which, in 1521, Luther was seized, to be carried off to the Wartburg. There used to be an old beech called 'Luther's tree,' which association connected with the Reformer, but it was blown down in 1841, and a small monument now stands in its place.

ALT'HEN, Ghan, or Jean, a Persian, who was the first to introduce madder (for dyeing) to France. He was the son of the governor of a Persian province, but with the exception of himself, all his family were massacred when the Persian empire was overthrown by the usurper Thamas-Kouli-Khan. A., during his life, was treated ungratefully, but, by way of atonement, after his death, a tablet was, in 1821, erected to his memory in the museum of Avignon. Born 1711; died at Caumont, in France, 1774.

ALT'KIRCH, a town of France, department of the Upper Rhine. Pop. 3,100. A station on the Eastern Railway of France.

ALVA'REZ, Francisco, a Portuguese divine, sent by Manuel, king of Portugal, on an embassy to Abyssinia, where he remained six years, and on his return a narrative of his mission was published. Born at Coimbra, about 1460; died about 1540.

ALZEY, a walled-town of Hesse-Darmstadt, on the Salzbach, 19 miles from Mainz. Has a trade chiefly in leather. Pop. 5,250.

AMADEUS, PRINCE, AMADEO FERDINANDO MARIA, DUKE OF AOSTA, formerly King of Spain, is the second son of the late Victor Emmanuel, King of Italy, and was born May 30, 1845. Entering the army, he became Captain of a Brigade of Infantry at Aosta, then Lieutenant-General and Chief of a Brigade of Cavalry. In 1869 he was also appointed Vice-Admiral. Marshal Prim, after the revolution of 1868, offered the Spanish crown first to the King of Portugal, next to the Duke of Genoa, and afterwards to the Prince Leopold, all of whom refused it. Finally, he fixed on the young Duke of Aosta, who, on Oct. 19, 1870, formally announced his candidature to the Regent Serrano. On the 16th of the following month the Cortes elected him King of Spain by 191 votes against 120; 64 deputies voting for the Republic, 22 for the Duke de Montpensier, 8 for Marshal Espartero, 2 for the Infant Alfonso, and 1 for the Duke de Montpensier's daughter, while 18 deputies abstained from voting. A deputation immediately proceeded to Florence to convey to the Duke of Aosta the offer of the crown, which he formally accepted Dec. 4, 1870. The young king landed at Cartagena on Dec. 30, the very day Marshal Prim expired from the wounds received at the hands of an assassin a few hours previously. His reign was a brief and troublous one. He was unpopular with the masses of the Spanish people, whose dislike to foreigners is a marked trait in their character; and his position, which had never been secure, became extremely dangerous in the summer of 1872, when a Carlist rising took place in the northern provinces, and an insurrection broke out almost simultaneously among the sailors and the workmen in the arsenal at Ferrol, who hoisted the red flag, and for some time set the government at defiance. On the 10th of July in that year an unsuccessful attempt to assassinate the King and Queen was made by five men, who posted themselves in the Calle Arnal in Madrid, and fired upon the carriage of their Majesties. At length Amadeo prudently resolved to abdicate. On Feb. 11, 1873, he addressed to the Cortes a message, in which he stated that in consequence of the incessant struggles of contending parties his efforts to give peace and prosperity to the country must prove futile, and that therefore he had determined to depose the crown. The very next day the Duke and his consort left Madrid, and proceeded first to Lisbon, and thence to Genoa, where they landed on the 9th of March. The Duke arrived in Florence on the 16th. Immediately on his return from Spain, he resumed the status of an Italian citizen. On March 14, 1873, his Royal Highness was again enrolled in the list of Senators; and in the Chamber of Deputies, Signer Sella, the Minister of Finance, presented a bill for restoring to him his allowance from the civil list, viz., 400,000 lire. The bill passed almost unanimous. At this period, also, King Victor Emmanuel conferred on the Duke of Aosta the rank of lieutenant-general. The Duke married, May 30, 1867, the Princess Mary (born Aug. 9, 1847), daughter of Prince Charles Emmanuel del Pozzo della Cisterna (she died Nov. 7, 1876); and has three sons, Emmanuel Philibert Victor Eugène Albert Genova Joseph Mary, Duke of Apulia, born Jan. 13, 1869; Victor Emmanuel Turin John Mary, Count of Turin, born Nov. 24, 1870; and Louis Amadeus Joseph Mary Ferdinand Francis, born Jan. 31, 1873.

AMAL'ARIC, or AMAURY, king of the Visigoths, was the son of Alaric II. He succeeded his grandfather Theodoric in 526. He married Clotilda, the daughter of Clovis, king of France, whom he used barbarously to make her embrace Arianism. At length she complained to her brother Childebert, king of Paris, who, in 531, marched against him and defeated him in a battle fought in Catalonia. He fled to a church where he was slain. Born 502; died 531.

AMALRIC, or AMAURI, of BENA, founder of a school of Pantheists. He lectured at Paris about 1200; but the university condemned his doctrines, and Pope Innocent III. ordered him to recant his errors, which he did, but shortly afterwards died from humiliation and grief. Ten of his followers were burnt, and his body was exhumed and burnt. The Lateran Council of 1215 formally condemned his doctrines. He died 1209.

AMALTHÆ'A, a daughter of Melissus, king of Crete, who fed Jupiter with goat's milk. Hence she has been called a goat, and some have maintained that Jupiter, to reward her kindness, placed her in heaven as a constellation, and presented one of her horns to the nymphs who had superintended his infant years. This horn was called the Cornucopia, or horn of plenty, and had the power of giving the nymphs whatever they desired.

AMA'TI, an Italian family, eminent as violin-makers. Their instruments are called Cremonas, from their having their residence and carrying on their business in that town. They lived in the 16th and 17th centuries.

AMAU'RI I., king of Jerusalem, succeeded his brother Baldwin III. in 1165. He was a courageous and enterprising prince; but these qualities were sullied by avarice and cruelty. He died 1173.

AMAU'RI II., king of Jerusalem, succeeded his brother Guy de Lusignan in 1194. His title was contested by Isabella, second daughter of Amauri I.; but on her becoming a widow, he married her, and was crowned. The Saracens having taken his capital, he applied for assistance to the European princes; but he died (1205) before they could come to his rescue.

AMAZI'AH, of Judah, succeeded his father Joash at the age of 25. He blended idolatry with the worship of God. With the assistance of the Israelites, he defeated the Edomites in the Valley of Salt; but afterwards commenced war on his allies, by whom he was taken prisoner. Slain by his own subjects, 810 B.C.

AMBALA, a division and district of British India, under the jurisdiction of the lieutenant-governor of the Punjaub The division comprises the districts of Ambala and Loodhiana in the plains, and Simla in the Himalayas. Pop. (1872) 1,652,728. The Ambala district stretches N.E. and S.W. along the lower face of the Himalayas. It consists almost entirely of an alluvial plain between the rivers Jumna and Sutlej. The Scinde, Punjaub, and Delhi Railway passes through the center of the district. Area, 2628 sq. miles. Pop. nearly 1,040,000, of whom about 690,000 are Hindoos, and 287,000 Mohammedans.—AMBALA, the capital of the above district. A large town, with about 51,000 inhabitants. An important railway station.

AMBI'ORIX, a king of the Eburones, in Gaul. He was a great enemy to Rome, and was killed in a battle with Cæsar, in which 60,000 of his countrymen were slain.

AMBLETEUSE, a seaport town of France, in the department of the Pas de Calais, on the English Channel, 6 miles north of Boulogne. From the accumulation of sand in its harbor it has lost its importance as a seaport, and the town is now almost deserted. It possesses an historical interest as the landing-place of James II. after his abdication in 1688; and Napoleon I. in 1804 attempted to improve the harbor for the flat-bottomed boats by means of which he was to invade England. Near Ambleteuse is the column which he erected to the grand army in 1805. Pop., about 700.

AMBRA'CIA, a city of Epirus, near the Acheron, the residence of King Pyrrhus about 295 B.C. The site of the modern Arta.

AMELOT DE LA HOUSSAYE, ABRAHAM NICHOLAS, French political writer. He wrote a history of the Government of Venice, and translated *The Prince* of Machiavelli, Socrates, and other authors. Born at Orleans, 1634, died at Paris 1706.

AMENDMENT. The term amendment is applied to an alteration of the Constitution of the United States. To render an amendment valid it must be first proposed by two-thirds of both houses of Congress, and must be ratified by the legislatures of three-fourths of the several States. A recent change of this character is the Fifteenth Amendment, which ordains that no man shall be disfranchised on account of color or race.

AMERICAN LITERATURE. See UNITED STATES, LITERATURE OF THE.

AMES, EDWARD, D.D., a bishop of the Methodist Episcopal Church in America, born at Amesville, Ohio, May 20, 1806. After studying at the Ohio University, he opened, in 1828, a high school at Lebanon, Illinois, which afterwards grew up into McKendree College. In 1830 he entered the itinerant ministry in the Indiana Conference. In 1840 he was chosen Corresponding Secretary of the Methodist Missionary Society for the South and West. From 1844 to 1852 he was a presiding elder in the Indiana Conference, and was chosen bishop in 1852. He was the first Methodist bishop who visited the Pacific Coast. During the civil war he was a member of several important commissions. Since 1861 he has resided at Baltimore, Maryland.

AMES, FISHER, an eminent American statesman and political writer, son of Nathanial Ames, a physician, was born at Dedham, in Massachusetts, on 9th April 1758. He studied at Harvard College, where he graduated in 1774. After practising the law for some little time, he abandoned that profession for the more congenial pursuit of politics, and in 1788 became a member of the Massachusetts convention for ratifying the constitution. In this assembly he bore a conspicuous part, and in the next year, having passed to the house of representatives in the state legislature, he distinguished himself greatly by his eloquence and sprightliness and readiness in debate. During the eight years of Washington's administration he took a prominent part in the national councils; and on Washington's retirement, he returned to his residence at Dedham to resume the practice of the law, which the state of his health after a few years obliged him to relinquish. He still continued his literary labors, and published numerous essays, chiefly in relation to the contest between Great Britain and revolutionary France, as it might affect the liberty and prosperity of America. Four years before his death he was chosen president of Harvard college, an honor which his broken state of health obliged him to decline. He died on the 4th July 1808, admired and respected by his countrymen from the brilliancy of his talents and his private

virtues. His writings, which abound in sparkling passages, displaying great fertility of imagination, were collected and published, with a memoir of the author, in 1809, by the Rev. Dr. Kirkland, in one large octavo volume. A more complete edition in two volumes was published by his son, Seth Ames, in 1854.

AMES, Joseph, author of a valuable work on the progress of printing in England, called *Typographical Antiquities* (1749), which is often quoted by bibliographers. He was born in 1689, and died in 1759. The best editions of his work are those published with the additions of Herbert (1785–90), and of Dibdin (1810–16). These both include a life of Ames written by Mr. Gough.

AMES, William, a Puritan divine. He was educated at the grammar school of Ipswich and Christ's College, Cambridge, and then went to Franeker, in Holland, where he was chosen professor of divinity. He afterwards settled at Rotterdam as associate with Hugh Peters, who had gathered a congregation of Brownists in that city. He was accounted one of the foremost theologians of his time, and, under the Latinized form of his name, 'Amasius,' gained a great influence by his learned writings.

AM'GA, a river of Siberia, rising in the mountains of Yablonoi Krebet; and after a course of 466 miles falling into the Alden in long. 135° E.

AMHERST, a post township of Hampshire county, Massachusetts, United States. It is the seat of one of the best colleges in America, founded in 1821, chiefly for the purpose of educating for the ministry. There are about 360 students. The town is intersected by the Connecticut River, the water power of which is available for several factories. Pop. about 5,000.

AMHERST, Jeffrey, Lord, a distinguished British general, who was descended from an ancient Kentish family. He entered the army 1731, and in 1741 was aide-de-camp to General Ligonier, under whom he served at the battles of Dettingen, Fontenoy, and Rocoux. In 1756 he was appointed colonel of the 15th regiment of foot; and in 1758 was made major-general, and went to America, commanding at the siege of Louisburg. Forts Duquesne, Ticonderoga, Crown Point, and Niagara, were afterwards reduced, and the British prestige, which had suffered considerable in Canada, was entirely restored. In 1763 he returned to England, having been previously made a Knight of the Bath, received the thanks of Parliament, and was appointed to the governorship of Guernsey, and in 1776 was created Baron Amherst of Holmesdale. In 1778 he was made commander-in-chief of the army in England, and was active but humane, in suppressing the London riots of 1780. A change of the ministry occurring, he lost his military appointments, but received them again, to voluntarily resign them in 1795, and a year afterwards he was made a field-marshal. Born at Sevenoaks, 1717; died 1797.

AMHERST, William Pitt Amherst, Earl, nephew of the above, who, having no child, procured the reversion of his barony for this gentleman. He was a pensioned politician and diplomatist of the Pitt administration, and in 1716 was sent out to Pekin to effect a treaty of commerce with the emperor of China; but as he would not prostrate himself before that sovereign, nothing was effected. On his return home he was wrecked in the Indian Seas, and suffered considerable hardships. He was governor-general of India from 1823 fo 1823, and created an earl in 1826. Born 1773; died 1857.

AMHERST COLLEGE, at Amherst, Mass., is one of the principal colleges in the United States. It was founded 1821 by the Orthodox Congregationalists, especially for the education of young men for the ministry; but its charter was not obtained till 1825. Its first president was the Rev. Zephaniah S. Moore, who in 1823 was succeeded by the Rev. Heman Humphrey, who contributed largely towards the success of the college. He held his office till 1845, when he was succeeded by the Rev. Edward Hitchcock; and, on the resignation of the latter, in 1854, the Rev. William A. Stearns, D.D., was elected president. His administration lasted till 1876, when he died suddenly at the age of 76. Dr. Seelye, the present incumbent, is an alumnus of the college. This institution has been the recipient of very large donations from private persons, and appropriations from the state amounting to upwards of $50,000. The college funds amount in the aggregate to more than $650,000. Its charity fund for the gratuitous education of clergymen amounts to about $70,000; and its fund for free scholarships is at least $100,000. The names of the principal donors to the institution are Dr. William J. Walker, to the extent of $240,000; Samuel A. Hitchcock, $175,000; Samuel Williston, $150,000; and a college church was erected several years ago from funds contributed for the purpose by W. F. Stearns, son of the president. This institution occupies twelve public buildings, besides the president's house, including an edifice for scientific instruction, and the college church. There are also a gallery of art, a cabinet of natural history, containing about 100,000 specimens, and an astronomical observatory. The college has also an extensive and well-appointed gymnasium; and, at a certain hour, each class is required to attend, and engage in exercise under the direction of the professor, who is a thoroughly qualified physician. The faculty includes twenty-three instructors, and there are several endowed professorships. The number of students in 1882 was 352. The college library contains more than 30,000 volumes; and those of the societies, about 10,000. There is a scientific as well as a classical course; also a post-graduate course, established in 1874, in history and political science, with especial reference to a 'science of statesmanship;' while any graduate may arrange to pursue a course of study in any department additional to the college course. The tuition fee is $90 per annum.

AMICI, Giovanni Battista, constructor of optical instruments. His microscopes have a great reputation. Professor of mathematics at Modena, and superintendent of the observatory at Florence. Born at Modena, 1786; died 1863.

AMIOT, Père Joseph, a learned Jesuit missionary, who resided for more than fifty years at Pekin, the author of a Chinese and French dictionary, a Life of Confucius, and an elaborate description of the arts and sciences as known and practised in China. Born at Toulon, 1718; died at Pekin, 1794.

AMMAN, Johann Conrad, a physician, and one of the earliest writers on the subject of instructing the deaf and dumb. Born at Schaffhausen, 1669; died 1730.

AMMAN, Jost, a celebrated designer and engraver of Switzerland. Very little is known of his life. He was a splendid draughtsman, and his productiveness was remarkable. Born at Zurich, 1539; died at Nurenberg, 1591.

AMMEN, Daniel, Capt. U.S.N., born in Ohio, July 7, 1819. He was made midshipman, July 7, 1836; lieutenant, Nov. 4. 1849; captain, July 25, 1866. He was attached to the coast-survey, 1848–62; commander of steamer *Seneca*, at the battle of Port Royal, Nov. 7, 1861; commander of monitor *Patapsco* at Fort McAllister, Mar. 1863. He was at the attack on Fort Sumter, April 7, 1863; suppressed a mutiny while on board the California steamer *Ocean Queen*, bound to Aspinwall, in May, 1864; commander of steam-sloop *Mohican*, in two attacks on Fort Fisher; and was made chief of bureau of yards and docks, 1869. He afterwards was appointed chief of the bureau of navigation.

AMNESTY, an act of oblivion of past misconduct granted by the government to those who have been guilty of some offence. It is usually granted to whole communities or classes of individuals who have taken part, or are supposed to have participated, in some movement against lawful authority; it may be granted either before or after conviction, and its effect is entirely to efface the crime and cause it to be forgotten by the law. In the United States a provision in the fourteenth amendment to the Constitution establishes certain disqualifications as to holding office by persons who have participated in rebellion, and at the same time allowing the removal of these disqualifications by a special vote of Congress, which is in the nature of an act of amnesty.

AMON'TONS, Guillaume, a French philosopher, inventor of a system of telegraphing, who, on becoming deaf, applied himself to the study of mechanics and practical mathematics. In 1687 he presented to the Academy of Sciences a new hygroscope, which was approved. In the following year he became a member of the Academy. In 1695 Amontons published a book on the construction of barometers, thermometers, &c., which is the only production of his in print, except some papers in the Memoirs of the Academy of Sciences. In 1699, on account of the merit of his discoveries, he was admitted a member of that learned body. He invented a method of telegraphing by signals. Born at Paris, 1663; died 1705.

AMORETTI, Carlo, Italian mineralogist and archæologist, at one time professor of Common Law at Pisa. Born at Oneglia, 1741; died at Milan, 1816.

AMPELOP'SIS, in Botany, a genus of plants belonging to the natural order *Vitaceæ*, the Vine family. The species constitute the climbing shrubs called Virginian creepers.

AM'PHIARA'US, a celebrated soothsayer, son of Oicleus, or, according to others, of Apollo, by Hypermnestra, was present at the chase of the Calydonian boar, and accompanied the Argonauts in their expedition. He married Eriphyle, the sister of Adrastus, king of Argos. Amphiaraus received divine honors after death, and had a celebrated temple an oracle at Oropios, in Attica.

AMPHI'ON, son of Jupiter, by Antiope. He was born at the same birth as Zethus, on Mount Cytheron, where Antiope had fled to avoid the resentment of Dirce; and the two children were exposed in the woods, but preserved by a shepherd. When Amphion grew up, he made such progress in music, that he is said to have been the inventor of it, and to have built the walls of Thebes by the sound of his lyre. Mercury taught him the art, and gave him the lyre. The fable of Amphion's moving stones and raising the walls of Thebes by his harmony, has been explained by supposing that he persuaded, by his eloquence, a wild and uncivilized people

to unite together and build a town to protect themselves against the attacks of their enemies.—Another, the son of Jasus, king of Orchomenos, who married Niobe, daughter of Tantalus, by whom he had many children; among whom was Chloris, the wife of Neleus.

AM'PHISBŒ'NA, a genus of animals belonging to the order of lizards, found only in South America and the West Indies, but having the general appearance of snakes or worms. They are about 20 inches long, burrow in the soft earth, and appear to move with equal facility in either direction. Their food consists of ants and other small animals.

AMPHIT'RYON, a Theban prince, son of Alcæus and Hipponome.

AMRAOTI, or AMRAVATI, a district of British India, in the Commissionership of East Berar. It consists chiefly of a plain about 8000 feet above the sea level. The chief towns are Amraoti, Karinja, and Badnera. The district is intersected by the Great India Peninsula Railway. Area, 2566 square miles. Pop. 407,500.—AMRAOTI, the chief town of the above district. Pop. 23,400.

AM'RU-EBN-AL'-AS, a famous Saracen general, at first a great enemy of Mahomet, but afterwards his zealous disciple. He conquered Syria and Egypt, whence he extended his victorious arms to Africa. He conquered and became governor of Egypt, which flourished greatly under his administration. He died 663.

AMRU-AL-KAIS, an Arabian poet of the 7th century, contemporary with Mahomet, and one of the authors of the Moallakat, or 'suspended' poems, in the Kaaba at Mecca. His poem has been translated by Sir William Jones.

AMSDORF, NICHOLAUS VON, Protestant Reformer. One of the first students at the Wittenberg University, where he became Professor of Theology. One of the most steadfast supporters of Luther. He took part in founding the University of Jena. A learned and very vigorous controversialist. Born near Wurzen, 1483; died at Eisenach, 1565.

AMSTERDAM, a post township of the United States, in Montgomery county, New York, 52 miles from Albany. Manufacture scythes, saws, and carpets. Pop. 3,400.—It is a station on the Utica Railway.

A'MURATH I., or MURAD, a sultan of the Turks, who succeeded his father Orchan in 1360. He was the first who led the Turkish armies into Europe, which he overran as far as the Balkan, fixing his residence at Adrianople. He completed the conquest of the Greek empire. He founded the corps of Janissaries, conquered Phrygia, and, on the plains of Cassova, defeated Lazarus, the despot of Servia. In this battle he was wounded by an Albanian soldier, and died the next day. Born 1326; died 1389.

A'MURATH II. succeeded his father, Mahomet I., in 1422. The beginning of his reign was disturbed by pretenders to his throne; but, after suppressing these, he abdicated in favor of his son Mahomet, and retired to a society of dervishes, whence he was soon recalled to engage against the Hungarians, who had invaded the Turkish dominions. He gained a great victory over the Christians at Varna, and, in 1446, quelled a revolt of the Janissaries; and succeeded in resisting the famous Scanderbeg in making advances upon his territories. He then turned his arms against the Hungarians with his wonted good fortune. Finding his son inadequate to the responsibilities of an imperial station, he sent him to govern Asia Minor, and resumed the throne. Born 1404; died 1451.

A'MURATH III. succeeded his father, Selim II., in 1574. He was a weak-minded, frivolous man, and in his reign the formidable Janissaries rose to power. Born 1545; died 1595.

A'MURATH IV. succeeded his uncle Mustapha in 1622. In 1638 he recovered Bagdad from the Persians, after which he put 30,000 of the enemy, who had surrendered at discretion, to the sword.—The excessive cruelty and debauchery of this prince have stamped him with the character of being one of the worst sovereigns that ever reigned over the Ottomans. He died early from the effects of his mode of life. Born 1611; died 1640.

AMYRANT, MOISE, French theologian and metaphysician. Exhibited unusual talent while a student at the university of Poictiers, and afterwards studied theology at Saumur, and became a minister of the French Protestant church, and professor of theology. Chosen by the synod held in 1631 to represent the Protestant grievances to the king, he refused to kneel, thereby claiming equality with the Catholic priests. His oration delivered on that occasion was much admired. He was one of the most eminent of French Protestants, and the author of numerous theological treatises and devotional manuals still very popular. Born in Anjou, 1596; died 1644.

ANACON'DA, an enormous snake, sometimes measuring 30 feet in length, frequenting the swampy districts of South America, and feeding on water animals. It is not venomous, but its great size makes it an object to terror. The color of the body is rich brown, with bright orange rings on each side, and two rows of large black spots along the back. An oil, prized by the natives, is obtained from the carcase.

A'NADYR, or ANADIR, a river of Siberia, rising in Lake Ivachno, and after a course of 600 miles falling into an inlet of the Sea of Anadyr (North Pacific), in longitude 177° E.—There is only one station on its banks, which is called Anadyrsk. Lat. 65° N., long. 167° E.

ANAL'CIME, a silicate of soda and alumina, remarkable for peculiar optical properties possessed by it.

AN'ANI'AS, a hypocrite in the primitive church at Jerusalem, who was struck dead, with his wife Sapphira, for lying.

AN'APA, a fortified town on Sundjik Bay, on the eastern shore of the Black Sea, 47 miles S.E. of Yenikale, built on a projecting crag, at the north-western extremity of the Caucasian mountains. The exports are tallow, butter, hides, honey, wax, &c. Pop. 8000, consisting of Tartars, Circassians, Greeks, Jews, Armenians, and Russians. Lat. 44° 54′ N., long. 37° 18′ E. As a military post it has been greatly prized by Russia. Its fort was built by the Turks in 1784, and taken by the Russians in 1791 and in 1807, and only given up with the greatest reluctance. In May, 1828, it was forced to surrender to the Russians, and at the peace of Adrianople was ceded to Russia, with all the coast towns and forts from the Kouban to Fort St. Nicholas. During the war of 1855, it, with other ports on the Circassian coast, was destroyed by the Russians, but in the following year was again occupied by them.

ANASTASIUS II., raised to the throne of Constantinople by election in 713. He was soon afterwards superseded by Theodosius, and became a monk in Thessalonica. He afterwards headed a revolt against Leo, the successor of Theodosius, but was taken prisoner and (721) put to death.

ANAXARCHUS, a Grecian philosopher, who accompanied Alexander the Great into Asia, and enjoyed his intimate friendship. To him is attributed the saying, 'Kings, like the gods, can do no wrong.' Born at Abdera early in the 4th century B.C.

ANAXIMENES, Greek historian, who accompanied Alexander the Great to Persia, and wrote histories of Philip and Alexander, and of Greece, and probably one of the treatises generally ascribed to Aristotle. Born at Lampsacus, in the 4th century B.C.

ANCHISES, a grandson of the founder of Troy, and father of Anchises.

AN'DELYS, LES, a town of France, in the department of the Eure, properly consisting of two, the Great and the Little Andely, situated on the Seine, 20 miles from Evreux. At Great Andely is a collegiate church, with remarkably beautiful painted windows. Manufactures: artificial pearls, cloths, thread, and leather. Pop. 5400.—The ruins of Château Gaillard, a fortress built by Richard Cœur-de-Lion, are in the neighborhood of Ltitle Andely, and in a neighboring village, called Villiers, the painter Poussin was born, in 1594.

ANDERSON, ALEXANDER, the first wood-engraver in America (1798), born in New York City, 1775; died in Jersey City, Jan. 16, 1870. He was originally a physician, having graduated M.D. at Columbia College, New York. In 1804, he published *A General History of Quadrupeds*, with wood-engravings. Among his best-known works are 40 illustrations of Shakspeare, and those in Webster's Spelling-book. Mr. B. J. Lossing prepared a memorial lecture of this pioneer engraver.

ANDERSON, JAMES, a Scotch antiquary, who edited for publication many of the public records of the kingdom of Scotland. Born at Edinburgh, 1662; died 1728.

ANDERSON, SIR EDMUND, an English judge, who was in the commission for trying Mary, Queen of Scots; and presided at the trial of Secretary Davison, for issuing the warrant by which that unhappy princess was executed. Born in Lincolnshire; died 1605.

ANDERSON, MARY, an American actress, born in Sacramento, Cal., July 28, 1859. Her parents went to Louisville, Ky., while she was an infant, and the death of her father took place when she was but four years old. She was educated at the Ursuline convent in Louisville, and commenced studying for the dramatic stage when she was thirteen years old. Three years afterwards she made her first appearance on the professional stage. This was on November 27, 1875, the theater being Macauley's, Louisville, Kentucky, and the character, Juliet, in Shakspeare's tragedy. Her success in the part was considerable, and, commencing on February, 1876, she played a week's engagement at the same theater, appearing as

Juliet, Bianca in *Fazio*, the heroine in *Fvadne*, and Julia in the *Hunchback*. In March she played Pauline, in *The Lady of Lyons*, at St. Louis, and Meg Merrilees, in *Guy Mannering*, at New Orleans. Her first appearance as Parthenia was made on September 11, 1876, in San Francisco, to the Ingomar of Mr. John McCullough. On January 5, 1877, she appeared as Lady Macbeth at the National Theater, Washington, and on November 11, 1878, she acted the heroine in a translation of *Berte, the Daughter of Roland*, then first produced in America. In the seasons of 1877–78, she made her first appearances in Philadelphia, Boston, and New York. Her first engagement at the latter place commenced on November 16, 1876, and, in consequence of Miss A.'s success, was extended from two into six weeks. In the spring of 1879, Miss A. made her first trip across the Atlantic, and stayed for a few days at Stratford-on-Avon, where she lingered near Shakspeare's home. During this visit she also witnessed some of Mr. Irving's performances at the Lyceum, and made the acquaintance of Sara Bernhardt and Madame Ristori. During the following season she added to her repertory the Countess, in Sheridan Knowles' drama, *Love;* the heroine, in Talfourd's *Ion;* and Galatea, in Mr. Gilbert's *Pygmalion and Galatea*. Miss A. made her first appearance on the English stage, at the Lyceum Theatre, on September 1, 1883, as Parthenia. This performance was followed, on October 27, by Pauline, and, on December 8, by Galatea. She has achieved great success in England both from a financial and artistic point of view.

ANDERSON, ROBERT, brigadier-general United States America, was born near Louisville, Ky., June 14, 1805. West Point, 1824. His father was Col. Joseph of the Revolutionary army, and his mother a cousin of Chief-Justice Marshall. He entered the army, and was appointed an instructor at West Point; was brevet-captain for gallantry in the Florida war, April 2, 1828; captain Oct. 23, 1841; brevet-major Sept. 8, 1847, for gallantry at Molino del Rey, where he was severely wounded; major 1st Artillery, Oct. 5, 1857; colonel May, 1861; and brigadier-general May 15, 1861. When the rebellion broke out, he held Fort Sumter, until April 14, when, after a heavy bombardment of two days, he was obliged to surrender. He was promoted, and assingned to the department of the Cumberland, but ill health caused him to withdraw from active duty. He translated from the French *Instructions for Field Artillery* and *Evoutions for Field Batteries*. Brevet major-general Feb. 3, 1865; retired October 27, 1863. He died at Nice, Oct. 26, 1871.

AN'DERSONVILLE, a town of Ga., on the South-western Railroad, during the civil war the site of a Confederate military prison for Union prisoners. The mortality at this prison was very great, 12,926 prisoners of war having perished here. One Henry Wirz, a Swiss adventurer, was the superintendent of the prison, and after the close of the war he was tried and convicted by a military commission on charge of excessive cruelty to the prisoners, and was executed Nov. 10, 1865. It is but just to state that this inhumanity toward Northern Soldiers was not by any means the pervading spirit of the Confederate authorities, who in two official reports attributed the extraordinary mortality to the mismanagement of the prison.

ANDOCIDES, one of the ten Attic orators whose lives were written by Plutarch. He was banished from Athens with Alcibiades, and three times afterwards; but subsequently filled offices of trust for the state. Born at Athens, 467; died 391 B.C.

ANDRADA, DIEGO PAYVA D', Portuguese theologian. Sent to the Council of Trent by King Sebastian. Wrote in favor of an extension of authority to the pope. In one of his works he discussed the subject of immaculate conception, since adopted as a dogma by the papal church. Born at Coimbra, 1528; died 1575.

ANDRADA E SYLVA, BONIFACIO SOZÉ D', Brazilian statesman and naturalist. Studied at Coimbra, where he became Professor of Geology, and afterwards inspector-general of Portuguese mines, and secretary of the Academy of Brazil. Returning to Brazil, took office in the ministry, but was dismissed on account of his democratic principles, and banished to France. Returned to Brazil in 1829, and passed the rest of his days in retirement. Born near Rio Janeiro, 1765; died at Nietherav, 1858.

ANDRASSY (COUNT), JULIUS, a Hungarian statesman, born at Zemplin, on March 8, 1823, the son of Count Charles Andrassy, whose efforts to promote the scientific and industrial progress of his country are well known. He succeeded his father (who died in 1845) as president of the Society for Regulating the Course of the River Theiss; and was returned by his native town to the Diet of 1847, where he rose to distinction in consequence of his oratorical powers and political tact. To the revolutionary movement of 1848 he lent all his influence; and, after the Hungarian government had fled to Debreczin, in 1849, he was despatched on a mission to the Porte. On the defeat of the revolution he went into exile, and resided in France and England until the general amnesty of 1857 enabled him to return to his native country. Being elected a member of the Hungarian Diet in 1850, he gave a hearty support to the Deack party, and was nominated vice-president. On the reorganization of the Austrian empire, and the constitution of a Hungarian ministry in 1867, he was appointed prime minister of Hungary, and charged with the department of the defence of the country. Among the principal events of his administration were the civil and political emancipation of the Jews, and the raising of a large sum of money to extend and complete the railway system in Hungary. At the general election of 1869 he was unanimously returned by the electors of Pesth to the Hungarian Chamber of Representatives. Count Andrassy succeeded Count Beust as minister for Foreign Affairs, November 14, 1871, when he retired from the post of president to the ministry at Pesth. The emperor of Austria conferred on Count Andrassy the Order of the Golden Fleece, January 1, 1878. He was the first plenipotentiary of Austria at the Congress of Berlin (June-July, 1878). Count Andrassy retired from public life in August 1879.

ANDREA, GIOVANNI, a canonist and professor of civil law at Padua and Bologna. He was a man of great learning, and of very ascetic habits. In stature he was so dwarfish that the pope on one occasion, thought he was kneeling, and bade him stand up. His daughter Movella, in his absence, read lectures to his pupils and a curtain was drawn before her, that the attention of the auditors might not be taken off by her beauty. His affection for her was so great, that he entitled his commentary on the decretals of Gregory X. the *Novellæ*. She married John Calderinus, a famous canonist. Born near Florence, 1275; died at Bologna, 1348.

ANDREANI, ANDREA, a famous engraver on wood, whose works are scarce and valuable. He made some fine copies from Dürer and Titian. Born at Mantua, 1540; died at Rome, 1623.

ANDRES, JUAN, a learned Jesuit, one of the most laborious writers of the 18th century, was born, 1740, at Planes, in Valentia, Spain. On the suppression of his order, he retired to Italy, and devoted himself to literary pursuits. He died January 13, 1817. His chief works are, an essay on Galileo's philosophy; a treatise on the origin, progress, and present state of every literature; and *Cartas familares con la noticia del viage a varias ciudadas de Europa*, 6 vols. quarto, Madrid, 1794.

AN'DREW I., king of Hungary, was the eldest son of Ladislaus the Bald. On the accession of Peter, in 1044, he and his brother Bala were obliged to quit Hungary; but on promising to abolish Christianity and to restore paganism, they were recalled. When Andrew, however, obtained the throne, he broke his engagement, and compelled his subjects to turn Christians. He was defeated and slain by his brother in 1050.

ANDREW, JAMES OSGOOD, D.D., bishop of the M. E. Church, South, was born at Augusta, Ga., May 3, 1794; died at Mobile, March 2, 1871. His father was a Revolutionary soldier and a Methodist minister. He was ordained deacon in 1814, and bishop in 1832 at Philadelphia. His marriage with a lady who owned slaves was one of the causes of the division of the church into two independent bodies in May 1845.

ANDREW, JOHN ALBION, LL.D., an American statesman, born at Windham, Me., May 31, 1818. He graduated at Bowdoin College, studied law, and was admitted to the bar of Boston in 1840. After he had become noted as an opponent of slavery, he was elected governor of Massachusetts by the Republicans in 1860. He was again elected governor in 1861, and was afterwards re-elected three consecutive times. During the civil war he rendered important services to the cause of the North, and gained great popularity by his attention to the welfare of the soldiers. He died October 30, 1867.

ANDREWS, JAMES PETTIT, historian, author of a history of Great Britain, notable as containing a contemporaneous history of Europe. Born near Newbury, 1737; died at Brompton, 1797.

ANDRISCUS, a man of mean birth, who pretended to be the natural son of Perseus, the last king of Macedonia, and for a short time contrived to occupy the throne, his reign being marked by cruelty and extortions. The Romans defeated him and took him captive to Rome, where he was put to death. He died 148 B.C.

AN'DROSCOGG'IN, a river of Maine, U.S., which rises in Umbagog lake, and falls into the Atlantic 20 miles from Portland. Length, 150 miles.

ANECDOTE signifies literally a thing not given out or published; and hence it is a term sometimes applied to *secret histories*. Procopius gives this title to his secret history of the emperor Justinian and his wife Theodora. It is also applied to works of the ancients that have not before been published, as the *Anecdota Græca* of Muratori. In common language, an anecdote is a detached incident or fact of an interesting nature, usually connected with the life of a distinguished individual. Many collections of anecdotes have been published.

ANEL, Dominique, a French surgeon, who attained considerable celebrity by his operations for aneurism and fistula lachrymalis. Born at Toulouse, 1678 or 1679; died about 1730.

ANGARI, a large river of Siberia, rising in lake Baikal, and after a course of 870 miles, falling into the Yenisei. For about 320 miles in the lowest part of its course, it is generally known as the Tunguska. It is navigable, but much obstructed by rapids.

ANGELI. Philip, a painter, native of Rome, but called, from his long residence in Naples, 'the Neapolitan.' In 1612 he was invited to the court of Cosimo, grand duke of Florence. His works are rarely to be met with, and realize high prices. Born 1600; died 1640.

ANGELL, James Burrill, LL.D., was born at Scituate, R. I., January 7, 1829. He graduated at Brown University in 1849, and in 1853 was appointed professor of modern languages and literature in Brown University, but resigned this position in 1860 to take editorial charge of the Providence *Journal*. In 1866 he was chosen president of the University of Vermont, and subsequently became president of the University of Michigan. In 1880 he was appointed minister to China; he resigned his diplomatic position in October, 1881, and returned to resume his post in the University of Michigan. He has written for the *North American Review*, *Bibliotheca Sacra*, and other reviews.

ANGELL, Joseph Kinnicut, was born at Providence, R. I., on April 30, 1794; and died at Boston, May 1, 1857. He was admitted to the bar about 1816; in 1820 he went to England, where he prosecuted unsuccessfully a claim to a large estate. From 1829 to 1831, he edited the *Law Intelligencer and Review;* was for some years reporter to the Supreme Court of R. I., and editor of the earliest volumes of *R. I. Reports*. He published jointly with Samuel Ames a *Treatise on Corporations*. Among his other publications are, the *Law of Watercourses*, *Law of Tidewaters*, *Limitations of Actions at Law and in Equity and Admiralty*, *Law of Carriers*, *Law of Fire and Life Insurance*, *A Practical Summary of the Law of Assignments*, 8 vols. 1837. His *Law of Highways* was completed after his death by Thos. Durfee.

ANGELS (Gr. ἄγγελος, a messenger), the name given by the Church to spiritual beings, superior to man, and created before him. The Council of the Vatican declares, after the Fourth Lateran Council, that God in the beginning created both the angelic and the material world. It does not specify whether the creation of angels preceded that of matter or the contrary. This question was much discussed by the early Greek and Latin Fathers, some of the latter holding that the material heavens were created first, and then the angels, whereas the Greek Fathers held that the angels were first called into being. St. Thomas Aquinas taught that matter was created before spirit, and this opinion has prevailed since in the schools of theology. The Council of Lateran as well as the Vatican Council has abstained from pronouncing on this question, although using the words 'at the same time from the beginning.'

The Lateran decree clearly indicates the purely spiritual nature of these angelic beings, applying to them the epithet 'incorporeal.' This is the present sense and teaching of the Church. But they have the power to assume a bodily form in their intercourse with mankind. The angelic intellect, being nearest to the divine, is most like to it in its power and operations. They know by intuition. Their will is coördinate with their intelligence, not requiring our deliberation and reasoning to make its choice. God also bestowed on them a freedom in harmony with such noble faculties. It is the teaching of Catholic theology before and since St. Augustine, that God in creating them raised them to a supernatural destiny, endowed them with supernatural grace, and put their fidelity, in the beginning, to a trial. What the precise nature of the test was the Church has not defined. Some fell away from grace, and were eternally banished from the supernatural bliss which rewarded their faithful companions. The fallen spirits are those who tempt man and endeavor to frustrate God's loving designs over him. The good angels are God's ministers toward the human race, helping men to reach their eternal destiny. Catholic teaching, based on St. Paul (Col. i. 16; Eph. i. 21) and other passages in Scripture, divide these angelic spirits into three hierarchies, each of which contain three orders, making nine degrees in all. This division has not been approved by any formal definition of the Church. In connection with this division, we may mention the opinion of the great medieval schoolmen that the Creator, not to have the material world surpass the spiritual in the number any more than the excellence of the beings it contains, made the angelic hosts more numerous than all corporeal substances. As to the honor and reverence paid to angels, they are in no wise like to the supreme adoration due to the sole Creator, the Infinite, and Eternal. He is honored in the beings whom he made so good and so great.

ANGILBERT, St., French poet; the secretary and son-in-law of Charlemagne; for a time Abbot of Centule. Charlemagne described him as the Homer of his time. He died 314.

ANGUS, Joseph, D.D., born Jan. 16, 1816, at Bolam, Northumberland, was educated at King's College, Stepney College, and Edinburgh, where he graduated in 1839, taking the first prize in nearly all his classes. He was appointed secretary of the Baptist Missionary Society in 1840, and president of Stepney College in 1849, which college was removed to Regent's Park in 1857. Dr. A., who was for several years English Examiner in the University of London, and to the Indian Civil Service, is the author of the *Handbook of the Bible*, *Handbook of the English Tongue*, *English Literature*, *Christ our Life*, and several other works. He has also edited Butler's *Analogy and Sermons*, with notes, and Dr. Wyland's *Moral Science*. He is a member of the New Testament Company for the Revision of the Scriptures, and was a member of the first London School Board.

ANGUISCIOLA, Sofonisba, a celebrated female portrait painter of Cremona. She was patronized by Philip II. of Spain, and Vandyck said that he was taught more by her conversation than he had learned from the study of the works of the great masters. She was twice married, and became blind in her old days. A portrait of her is said to be at Althorp, Northamptonshire, in which she is represented as playing on the harpsichord. Born at Cremona, 1533; died at Genoa, 1620.

ANIMALS, Cruelty to. In this country there are societies for the prevention of cruelty to animals in 33 of the 38 United States. The first society was chartered by the legislature of New York in 1866, chiefly through the efforts of Henry Bergh, who has been its president since that time. The society met with much opposition until a decision of the highest court affirmed its powers. It has now become the parent of similar societies in all the principal cities of the United States.

ANIMISM, a term used by writers on anthropology, to denote the general doctrine of souls and other spiritual beings.

ANJER, a seaport of Java, 18 miles W. of Batavia. Protected by a fort, and does a trade in Eastern curiosities. Pop. 5000. Lat. 6° 3′ S., long. 105° 57′ E.

ANNE of Britanny, Queen of France, and Duchess of Brittany, was daughter and heiress of duke Francis II. and Margaret de Foix. She was born at Nantes, Jan. 26, 1476. She had been promised to Maximilian of Austria, but the duke, her father, dying, she married Charles VIII., King of France. A. had a large share of sense, beauty, greatness of mind, and piety. She governed with great prudence during the absence of Charles VIII. in Italy. After his death she married Louis XII., who had been in love with her before her marriage to Charles. Died Jan. 9, 1514.

ANNE of Cleves, sister of William, Duke of Cleves, and fourth wife of Henry VIII., King of England. Her portrait, drawn by the flattering hand of Holbein, was not unpleasing to the king, but her ungraceful behavior shocked his delicacy at first sight, and he peevishly asked 'whether they had brought him a Flanders mare.' However, on Jan. 6, 1539–40, he completed his engagement by marrying her at Greenwich. His aversion increasing after marriage, he soon came to the determination of obtaining a divorce. This was proposed to Anne, and her sensibility of mind not being affected by it, an accommodation soon took place. In the following year she retired into privacy, with a pension of £3000 per annum. The reason which the king gave as a ground for the divorce was, that having espoused her against his will, he had not given an inward consent to the marriage. Anne died at Chelsea, July 16, 1557, and was buried in Westminster Abbey.

ANNI'HILATION, the act of destroying or reducing any created being into nothing. It is opposed to creation, which is the making of something out of nothing. Much difference of opinion has existed on the subject of annihilation. Some theological writers have held that this is the punishment implied in such passages of Scripture as that which declared that the wicked shall be punished with everlasting destruction; and such parables as those which compare the wicked to the tares which are utterly burned. Others maintain that the soul is not naturally immortal; that immortality was lost in the fall of man, and brought again to light by Jesus Christ, and that only those who believe in Him receive again the gifts of immortality. Isaac Watts believed that the children of ungodly parents are annihilated if they die in infancy; and Archbishop Whately was disposed to admit annihilation as a probable doctrine. The ancient philosophers, in effect, denied all annihilation, as well as creation, resolving all the changes in the world into new modification, without supposing the production of anything new or the destruction of anything old.

ANNIUS OF VITERBO, whose real name was John Nanni, a famous Dominican, born about 1432, at Viterbo, in the States of the Church. He became master of the holy palace under Alexander VI., and died Nov. 13, 1502. He published commentaries upon the Holy Scriptures, and seventeen books of antiquities, under the title *Antiquitatum variarum volumina seu libri XVII.*, fol., Rome, 1498; 8vo, 1458. This collection professes to contain the works of Berosus, Fabius Pictor, Myrsiles, and other writers of the highest antiquity. At first the learned were taken in by the publication; but it afterwards became known that these works were forgeries, which A. had credulously, though in good faith, inserted in his book.

ANQUETIL, LOUIS PIERRE, was born at Paris, Jan. 21, 1723, and entered, at an early age, the congregation of St. Geneviève. After having professed the belles-lettres, philosophy, and divinity, he applied himself especially to historical studies. He became master of the college of Senlis, and a member of the French Institute, and of the Legion of Honor. Died Sept. 6, 1808. Among his many works are a history of Rheims; *L'Esprit de la Ligue; Abridgment of Universal History; History of France;* and a biography of his brother, Abraham Hyacinthe Anquetil-Duperron.

ANNUN'CIATION (Lat. *annuntiari*, to announce), the name of a festival celebrated March 25th, in commemoration of the announcement made by the angel Gabriel to the Virgin Mary, that she was to become the mother of our Lord. It is also called Lady-day. The earliest authentical references to the festival are in a canon of the council of Toledo (656 A.D.), and another of the council of Tuello (692 A.D.).

ANO'LIS, or ANO'LIUS, a reptile peculiar to America, supplying in many respects the place which the chameleon occupies in the old world. The color of the skin, especially that about its loose baggy throat, assumes an endless succession of ever-varying hues, as the animal is disturbed by love or anger. The anolis, however, is more slenderly built than the chameleon, and more active in its movements. It varies from seven to eight inches to a foot in length, and is extremely tame and harmless. Its food consists of flies and other small insects. The head is long, straight, and flattened; the body and tail slender; and both are covered with small round scales, which give the skin the appearance of fine shagreen.

ANQUETIL, LOUIS PIERRE, a French historian, director of the Academy at Rheims, the Prior of the Abbey de Loc, in Anjou, and afterwards curate of La Villette, near Paris. He suffered imprisonment during the Reign of Terror. He wrote many historical works, but his style is defective. Born at Paris, 1823; died 1808.

ANSBACH, or ANSPACH, originally ONOLZBACH, a town of Bavaria, capital of the circle of Middle Franconia, and formerly of the margraviate of Ansbach, situated on the Rezat, 25 miles S. W. of Nuremberg, and 90 N. of Munich. It is a pleasantly-built place, containing a castle, once the residence of the margraves, and still noted for the gardens that surround it; several churches, the finest of which are those dedicated to St. John and St. Gunibert; a gymnasium; and a picture gallery. The chief manufactures of Ansbach are woollen, cotton, and half-silk stuffs, earthenware, tobacco, cutlery, and playing cards. There is a considerable trade in grain, wool, and flax. In 1791 the last margrave of Ansbach sold his principality to Frederick William II., king of Prussia; it was transferred by Napoleon to Bavaria in 1806, an act which was confirmed by the Congress of Vienna in 1815. Population of the town, 12,635.

ANSCHUTZ, KARL, a German musical director and composer, born at Coblentz, Germany, February, 1813; died New York City, December 30, 1870. He was educated by his father in his musical studies. He became Royal Musical Director at Coblentz; was afterwards a musical conductor in London; came to the United States in 1857; founded the German Opera of New York City in 1862, and established a conservatory of music there.

ANSDELL, RICHARD, R. A., a painter of animals, born in the neighborhood of Liverpool, about 1815, was educated in the Blue-coat-School of that town. He has exhibited at the Royal Academy since 1848, and was chosen A.R.A. about 1851. Among his best productions is *The Hunted Slave*, exhibited in 1863, and given in aid of the fund for the relief of the Lancashire distressed operatives. His more recent exhibits include: *Goatherds—Bay of Gibraltar*, 1874; *The Intruders, Quarrying in the Highlands, Loch Laggan; A Fete Day: Going to a Bull Fight at San Roque, Gibraltar*, 1875; *After a Spate, The Cattle are in the Corn*, 1876; *The Home of the Red Deer*, 1877; *Fifty Years Ago:* before the Salmon Act, 1878; *The Stray Lamb, A Storm in the Glen*, 1879; *The Farm of the Alhambra*, 1881; *Returning from the Fair at Seville, The Vega of Granada: returning from pasture; A Timid Visitor, Collecting Sheep for Clipping in the Highlands, A Warm Corner*, 1882; *The Vega of Granada: the Alhambra in the distance, The Scare, Water-carriers of the Alhambra*, and *Hunting the Boar*, 1883. Mr. Ansdell was elected a Royal Academician in 1870.

ANSELM, of LAON, a famous theologian, was born of very humble parents at Laon before the middle of the 11th century. He is said to have studied under St. Anselm at Bec. About 1076 he taught at Paris with great success, but not long afterwards removed to his native place, where his school for theology rapidly became the most famous in Europe. He died 1117. His greatest work was an interlinear gloss on the Scriptures, which has been frequently reprinted. Other commentaries apparently by him have been ascribed to various writers, principally to the great Anselm. A list of them, with notice of Anselm's life, is contained in the *Histoire Littéraire de la France*, x. 170—189.

ANSTED, DAVID THOMAS, M.A., F.R.S., writer on science; born in London 1814, graduated at Jesus College, Cambridge (B.A. 1836; M.A. 1839), of which he was elected a Fellow. He became Professor of Geology at King's College, London, 1840; Vice-Secretary of the Geological Society, 1844; Lecturer on Geology at the East India Military Seminary at Addiscombe, 1845; Professor of Geology at the College of Civil Engineers, Putney, in the same year; and Examiner in Physical Geography in the Department of Science and Art, 1868. For many year she was chiefly occupied in the application of geology to engineering, mining and other practical departments of science, and practised as a consulting mining engineer. Among his numerous works are—*Geology, Introductory, Descriptive, and Practical; Geologists' Text Book; The Ancient World; Gold-seeker's Manual; Elementary Course of Geology, Mineralogy, and Physical Geography; The Applications of Geology to the Arts and Manufactures; Physical Geography*, (fifth edition, 1871); and *The World we Live In* (twentieth thousand, 1877). Died May 13, 1880.

AN'STER, JOHN, D.C.L., an eminent German scholar, and regius professor of civil law in the university of Dublin. His translations from German literature, especially that of Goethe's *Faust*, have been received with great favor. He was also a large contributor to periodical literature in the leading magazines. Born at Charleville, Cork, 1793; died 1867.

ANSTEY, CHRISTOPHER, an English poet, born Oct. 31, 1724, being son of the Rev. Christopher Anstey, D.D., of Brinkley, Cambridgeshire. He was educated at Eton and King's College, Cambridge, of which he became a Fellow. In 1754 he succeeded to the estates of his maternal grandfather, whereupon he quitted the university and resided alternately at Bath and Trumpington, near Cambridge. He died at Harnage, Wilts, Aug. 3, 1805. His reputation rests upon the humorous poem entitled *The New Bath Guide.*

ANT'AEUS, the son of Neptune and Terra, a famous giant killed by Hercules.

ANT'ANACLA'SIS (Gr. *antanaklao*, I drive back), in Rhetoric, is a term denoting the repetition of a word in a different sense, or as a different part of speech, from that in which it has already been employed, in order to attract attention or give expressiveness to the phrase; as, 'Whilst we *live*, let us *live*.' It is also the returning to a subject after a long parenthesis, by repeating, in the same words, part of what went before.

ANTARC'TIC (Gr., *anti*, against, or opposite to, and *arktos*, the Bear, or northern constellation), an expression applied to the south pole and Southern Ocean, as opposite to the north pole and Northern and Arctic Ocean, and especially to the region which lies around the antarctic or south pole, with a circle distant 23° 28′ from that pole; corresponding to an area similarly circumscribed which surrounds the north or arctic pole.

ANTAR'ES, a bright double star in the constellation Scorpio, marked *a*, and known as *Cor Scorpii*, the Scorpion's heart. It is remarkable for its brilliant red appearance.

ANTE'NOR, a Trojan prince, who is credited with having been a friend of the Greeks. Various legends say he built a new town on the site of Troy, and founded Padua and other towns in Italy.

ANTHELMIN'TICS, a term applied to such medicines as have the effect of destroying worms in the stomach and intestines. They are of various kinds, but may be divided into three classes—those which, by increasing the peristaltic motion of the intestines, tend to displace the worms, and may thus occasion their expulsion—as purgatives of various kinds; those which tend to strengthen the stomach and intestines, and the system generally—as tonics or analeptics; and those which act specially upon the worms, dislodging, weakening, or killing them. These last are anthelmintics, properly so called. Of this class, the oil of turpentine is generally the best medicine that can be employed, and is, perhaps, the only one that unequivocally acts as a direct poison on the worms.

ANTHEMIUS, a Greek architect and mathematician of the 6th century, who designed the church of St. Sophia, Constantinople. He was one of five brothers, all of whom obtained eminence.

ANTHONY, Henry B., a well-known American editor and statesman, was educated at Brown University, graduating in 1833, edited the Providence *Journal*, one of the leading papers of his state, was elected governor of Rhode Island in 1849, and U. S. senator in 1859. Born at Coventry, R. I., April 1, 1815. Died in the fall of 1884.

ANTHONY, Susan Brownell, an eloquent advocate of the temperance, and anti-slavery causes, and also interested in the woman's suffrage movement. Since the termination of the civil war the last named has principally occupied her attention. Born at South Adams, Mass., Feb. 15, 1820.

ANTHROPOMORPHOUS APES, the name applied to the highest division at once of the Catharine monkeys, and of the order *Quadrumana*, including the gibbons (Hylobates), the orangs (Simia), the chimpanzee and gorilla (Troglodytes). These forms are thus denominated from their collectively exhibiting the nearest approach to the man-like or human type of structure.

ANTHROPOLOGY. The following are the leading and most accurate works upon the subject, to which the reader is referred for details: Calvin's *Institutes*, book ii; Usher's *Works*, vol. iii.; Neander's *Church History*, ii, 557—627; Guericke's *Church History*, § 91—93; Muller, *Christian Doctrine of Sin;* Aminins' *Works;* Jeremy Taylor, *On Original Sin;* Edwards, *On Original Sin;* Haggenbach's *History of Doctrine;* Shedd's *History of Doctrine;* Neander's *History of Christian Dogmas*. See Chambers' En.

ANTICHRIST. This term is employed by the apostle John alone, and is defined by him in a manner which leaves no doubt as to its intrinsic meaning. In regard to its application there is less certainty. John (1 John ii. 18) says, 'even now there have been many Antichrists.' Of the speculations as to the exact application of the term, there has been no end. The language of the apostles is intentionally obscure, and this obscurity has been deepened rather than removed by the conflicting interpretations of expositors. All that the dark hints of the apostles teach us is, that they regarded Antichrist as a power, whose influence was beginning to be felt even in their time, but whose full development was reserved till the passing away of the principle which hindered it, and the destruction of the power symbolized by the mystical Babylon. See Antichrist in Chambers' En.

ANTIETAM, Battle of. In the early part of the month of September, 1862, the Confederate forces, under the command of Gen. Robert E. Lee, crossed the Potomac, and occupied Frederick, Md., and the vicinage. On the 12th, by a skilful manœuvre, Gen. McClellan, commanding the Union forces, compelled Lee to leave Frederick, who marched towards Hagerstown. On the 15th, Gen. Jackson of Lee's army, captured Harper's Ferry, taking 12,000 prisoners of war. On the 14th, McClellan threw his army across Lee's way at the heights of South Mountain, thus compelling him to retreat to Sharpsburg. On the 16th, there was hard fighting between Hooker's division and the enemy, and on the morning of the 17th, the battle of Antietam was begun. At the close of the day the Union army had gained several advantages, but not a decisive victory. On the following day, at the request of Lee, an armistice was granted for burying the dead, and on that day and the day following, the Confederates retreated and crossed the Potomac. McClellan's army numbered 87,164, and that of Lee between 70,000 and 97,000. The Union loss was 12,469 killed and wounded, and that of the Confederates about the same.

ANTI-MASONIC PARTY, a political party of the United States, that flourished in the early part of the present century. In the year 1826, a Mason, named William Morgan, living at Batavia, N. Y., who was engaged in preparing a work intended to expose the secrets of Masonry, suddenly disappeared, and it was claimed that he had been abducted by Masons, imprisoned for a short time at Fort Niagara, and then drowned by them in Lake Ontario. This was however denied by the Masons, who claimed that Morgan was afterwards seen alive at several places, among others at Smyrna in Asia. The excitement over this alleged abduction ran so high that it resulted in the formation of a political party, the fundamental principle of which was opposition to Masonry. In the year 1830, it polled 128,000 votes in the State of New York. In the year 1832, William Wirt and Amos Ellmaker, its candidates for President and Vice-President, carried the state of Vermont. But as the excitement over Morgan died out, the party gradually fell to pieces and ceased to exist.

ANTIOCH COLLEGE, a non-sectarian educational institution, under control of the Unitarians, located at Yellow Springs, Ohio, and founded in 1852. The co-education of the sexes is one of its marked features. Hon. Horace Mann, LL.D., was its first president.

ANTI-RENTERS, the name of a party in the state of New York, opposed to paying rents and rendering feudal services to the lord-patrons, who were the owners of large tracts of land in the eastern part of the state. In 1846 a state constitutional convention abolished all feudal tenures, and the party, having accomplished its purpose, ceased to exist.

ANTI-SLAVERY SOCIETY, American, a society organized in Philadelphia, Pa., in the year 1833, for the avowed purpose of opposing slavery and the slave-trade. After the abolition of slavery, and the ratification of the thirteenth, fourteenth, and fifteenth amendments to the constitution, which endowed the negro with the full rights of citizenship, it disbanded, April 9, 1870.

ANT'LIA (Lat. *antlia*, a pump) the name applied to the elongated tube or proboscis forming a chief organ in the month of Lepidopterous insects (butterflies and moths), and by means of which they suck up the flower-jnices on which they subsist. This organ is formed by the modification of the *maxillæ* or lesser pair of jaws, seen in typical form in the biting or masticatory mouths of other insects.

AN'TRUM, a term used in anatomy to denote a space or cavity. The most important is the A. of Highmore in the superior maxillary bone, which communicates with the nose. This space is sometimes the seat of on abscess or of a tumor.

AOUDAD SHEEP (*Ammotragus tragelaphus*), a species of sheep, occupying an intermediate position between sheep and goats, found in the mountainous parts of N. Africa, from Barbary to Abyssinia. It does not possess the lachrymal sinuses of the sheep, but like the latter forms, it is provided with a gland placed between the hoofs. The body-color is reddish-brown, and the front of the body is covered with a quantity of thick hair, which gives to the fore parts a singular and massive appearance. It exists in small herds, and is of fierce disposition. The horns are of large size, and curved outwardly.

APA'CHES, a tribe of Indians, living in Arizona and New Mexico. They are noted for superior horsemanship, and have given the settlers of these sections much trouble by their frequent outbreaks. They are divided into several sub-tribes.

APHANIP'TERA, an order of *Holometabolic* ('complete metamorphosis') insects, in which the wings are of rudimentary nature, and exist in the form of scales or plates on the hinder thoracic segments. The mouth is suctorial in its nature. To this group the fleas (*Pulicidæ*) belong, and of this family the common flea (*Pulex irritans*) is a familiar species. The Chigoe (*Pulex penetrans*) of S. America and the W. Indian Islands burrow beneath the skin of the feet, and causes troublesome and painful sores. These insects live parasitically upon various animals.

APHRODIS'IACS are medicines which excite or increase the sexual powers. Many substances said to have this effect have no specific action on the sexual organs, but merely excite the imagination. Such substances are musk, castoreum, ambergris, the allyl oils, obtained from Cruciferous plants, such as the onion, leek, horse-radish, &c., and opium and Indian hemp. Cantharides and turpentine occasionally excite the genital organs; but the only true sexual stimulants are those which promote the healthy nutrition of the tissues, such as iron, quinine, phosphorns, nnx vomica, and strychnine.

APH'THÆ is the name given in medicine to the disease called *thrush*. It consists of small, round, white specks or elevations scattered over the tongue and mucous membrane of the mouth. The disease occurs specially in infants, but occasionally it may be seen in old persons, when it is usually associated with a grave disorder of the alimentary apparatus terminating in death. In some forms of A. minute filaments and spores of miscroscopic fungi are found—the *Leptothrix buccalis* and *Odium albicans*. The treatment consists of cleanliness, and the application to the lining of the mouth of borax mixed with honey or glycerine.

APLACEN'TAL MAMMA'LIA, a name applied to the two lower orders of mammals (*Monotremata*, represented by the ornithorhynchus and echidna; and *Marsupialia*, represented by the kangaroos, opossums, &c.) on account of the young of these forms being unconnected with the mother before birth, by means of a *Placenta* or 'after-birth.' All mammalia, other than those included in the two above orders, possess such a vascular connection with the mother, and are hence termed *placental* mammals.

APLANA'TIC LENS (Gr. *a*, without; *plane*, deviation) is a lens so constructed as to be quite free from spherical aberration.

APLYS'IA, a genus of Gasteropodous mollusca, popularly known as the 'sea-hares,' and forming the type of the family *Aplysiadæ*. This family belongs to the *Opisthobranchiate* Gasteropoda, or those in which the gills exist towards the rear of the body. In the *Aplysidæ* the animals are slug-like; the shell being rudimentary, and concealed beneath the mantle. The tentacles are very large, and are turned backwards like ears, whence the suggestion of the popular name of sea-hares. These forms feed upon seaweeds, and are common around the coasts of Britain. They emit a fluid, colored purple or violet, from the mantle, when they are irritated. This fluid was formerly thought, but erroneously so, to be poisonous in its nature; the ancients using these

forms in their spells. *A. depilans*, *A. inca*, &c., are familiar species.

APNŒ'A, is the name given to the sensation of want of breath. Its cause is probably due to the presence of an excess of carbonic acid in the blood, which acts on the nervous centers governing respiration. Great difficulty in breathing in disease is called dyspnœa, and if a patient can breathe only when the body is erect, the condition is termed orthopnœa.

AP'ODA, 'footless,' a term applied in zoology to various groups of animals to indicate the absence of the fore or hind limbs, or their homologies. Thus certain cirripedes (barnacles, &c.) among the Crustacea are termed A., from the absence of the cirri, which represent the limbs of other crustaceans. Certain fishes (*e.g.*, sand-eels, eels), in which the ventral fins are absent, are termed A. The blind worms or *Cæciliadæ* (Amphibia), in which feet are undeveloped, were formerly termed A.

APONOGETON, a genus of aquatic plants belonging to the order *Juncaginaceæ*, *A. distachyon*, common at the Cape of Good Hope, and called there water Uintjies, is a very handsome fragrant species. It is a favorite plant in garden-ponds in Britain. When first introduced, it was grown in hot-houses for many years, until the discovery was accidentally made that it could endure the open-air temperature of this country. The spikes of fragrant flowers, and the flat oblong leaves, float on the surface of the water. Its flowering tops are said to be used as a pickle, and as a substitute for asparagus at the Cape, and that its root (corm), which is about the size of a hen's egg, is roasted and eaten.

APOPH'YSIS is a prominent elevation jutting out from the surface of a bone. If such an elevation is slender, it is called a spine; if blunt, a tubercle; if broader at the base, a tuberosity. It is to be distinguished from an epiphysis, which is a prominence having a separate center of ossification.

APPALACH'EE Indians, a once powerful tribe of Florida, which has now ceased to exist.

APPOMAT'TOX COURT HOUSE, a small village in Virginia, and capital of the county of the same name, where Gen. R. E. Lee, on April 9, 1865, surrendered the Confederate army under his command, to Gen. U. S. Grant, commanding the Union army. The surrender of Lee virtually put an end to the civil war.

AP'SLEY, a river of New South Wales, Australia, enters the Pacific 40 miles N.E. of Port Macquarrie. A. is also the name of a strait, 48 miles long, and from 1½ to 4 broad, between Bathurst and Melville Islands, to the N. of Australia.

APTOR'NIS, the name of an extinct bird genus, the fossil remains of which occur in the Recent formations of New Zealand. These birds, like the apteryx, were wingless.

AQUEDUCT. The plans and specifications are now being prepared for a new aqueduct, for the city of New York, which will be the largest in the world. Work will be begun before the end of the present year (1885). It will tap the Croton River at a point near where the present aqueduct is supplied. It is purposed eventually to build a dam further down the river, which will be the largest in the world and will cost $8,000,000. Near Croton dam will be a gate house, 120 ft. × 120 ft., which will cost $500,000. The supply of water will be regulated by 34 iron gates, which can be worked by steam or water. The conduit will be about 14 feet in diameter, in many parts of the way will be 350 feet below the surface, and ninety per cent of the way will be through solid rock. With a velocity of 3 feet per second, this aqueduct will carry 320,000,000 gallons per day. The entire cost is estimated at $35,000,000. See AQUEDUCT in Chambers' En.

ARA, a genus of Scansorial or Climbing birds, popularly known as Macaws. The name *Macrocerus* is more frequently applied to indicate this genus; and the name A. is derived from the Indian name for these birds, which inhabit tropical America and the W. Indies.

ARACAJU', the capital of the Brazilian province of Sergipe, on the river Cotinguiba, about 5 miles from its mouth, and 150 miles N. of Bahia. It is the only port of the province opened to foreign commerce, and has considerable trade, chiefly in cotton and sugar, the latter of which is of superior quality. In 1872 the value of sugar exported was £369,938; and of cotton, £306,532. A bar at the mouth of the river, however, is a great hindrance to shipping, and has caused the transmission of two-thirds of the trade of Sergipe to the port of Bahia. Pop. over 20,000.

ARAUCARIOX'YLON, a genus of fossil trees found in the Carboniferous sandstone. In the neighborhood of Edinburgh specimens have been met with in the Granton, Craigleith, and Redhall quarries. One obtained from Craigleith is exhibited in the Edinburgh Botanic Gardens, which measures 30 feet 8 inches in length, and 6 feet across at the lower end of the trunk. Full details regarding this and other specimens of A. have been given by Sir Robert Christison, Bart., in *Transactions of the Royal Society of Edinburgh*, vol. xxvii. In structure and appearance A. resembles *Araucaria* of the present day.

ARBITRATION. In many of the states of the U. S., this proceeding is regulated by statute, with provisions that the award may be brought into court and a judgment entered thereon. In New York and some other states it is held that the statute does not entirely take away the common-law proceeding. In other states the statutory method is exclusive. In New York and many of the states, married women are now competent parties to an agreement of arbitration. See ARBITRATION in Chambers' En.

ARBORICUL'TURAL SOCI'ETY. The Scottish A. S. is the only society of the kind in Britain. It was instituted in 1854, and has now a membership of about 800, consisting of proprietors, nurserymen, factors, land-stewards, and foresters. The Queen is patron. The object of the society is the promotion of arboriculture in all its branches, by periodical meetings for the reading and discussion of papers, the offering of prizes for essays and reports on the practical operations of forestry, and the publication of these papers. The society has published 7 vols. of transactions.

ARCHÆOLOGY. The science of Archæology has been advanced chiefly through societies organized for that purpose, among which are the following: The Society of Antiquaries of London (1572); the Royal Irish Academy (1786). Both of these have fine museums of antiquities. The leading antiquarian collections of the World are those of the British Museum of London, the Museums of the Louvre and the Hotel de Cluny, in Paris and the Royal Museum at Naples. The reader is referred to the following works, Westropp, *Handbook of Archæology* (1867); Lubbock, *Prehistoric Times*; Baldwin, *Pre-historic Nations* (1869); C. C. Jones, *Antiquities of the Southern Indians* (1873); Foster, *Pre-historic Races of the U. S.* (1873). See ARCHÆOLOGY in Chambers' En.

ARCHIBIO'SIS is a term proposed by Dr. Charlton Bastian to designate the production of living forms from a non-living organizable fluid. It is synonymous with the words heterogenesis and spontaneous generation. Many naturalists deny the possibility of any such mode of origin, and hold that living forms must come from pre-existing living forms.

ARCHITECTURE. To the facts already recited under ARCHITECTURE are added the following, relative to the architecture of the Aborigines of America. Communism in living is a principle that runs through the architecture of this order from the most primitive hut to the palace of Mexican semi-civilization. Communism and hospitality were marked features of Indian life, and these became embodied in their architecture.

The most primitive edifice is a common hut from 10 to 16 feet in diameter and from 7 to 10 feet in height, constructed from splints and bark. The central part of the floor is devoted to the fire and immediately above it is an opening for the escape of smoke. Such a cabin will be occupied by two or three couples with their children. With numerous tribes a covering of skins is substituted for that of bark. The Iroquois Indians lived in long houses of sometimes more than 100 feet, consisting of a strong framework, covered with shingles of elm bark. One of these houses would be divided into numerous apartments, each of which would be occupied by a family. The Mandans and other tribes of the Upper Missouri lived in timber-framed houses of superior design. These houses were circular in form and sometimes as much as 40 feet in diameter. The architecture of the Central Americans was far in advance of that of the other tribes of North America. Next to these perhaps came the Aztecs. The Aztec houses were very large and were constructed of brick and stone, imbedded in mud mortar. In most instances they were 2 stories high and built in terraced form. The roofs were flat. In Central America are found extensive ruins of ancient habitations. The largest of these is at Uxmal. These structures were composed of soft limestone, which had undoubtedly been dressed with flint tools. The governor's house at Uxmal stands upon the upper of three platforms. The lowest of these is 575 feet long, 15 feet broad to the base of the middle platform, and 3 feet high; the second, 545 feet long, 250 feet broad, and 20 feet high; and the third is 360 feet long, 30 feet broad, and 19 feet high. This house is 322 feet long, 39 feet deep, and 30 feet high. It has 11 doorways with other small openings, and is divided into 24 rooms. Near Uxmal are the ruins of Zayi, which present other and interesting features in Central American architecture. See ARCHITECTURE in Chambers' En.

ARCTOSTAPH'YLOS, a genus of plants of the order *Ericaceæ*. There are only two species which properly belong to the genus, and both are natives of Britain. The red bearberry (*A. uvaursi*) is a small trailing evergreen shrub found in the northern parts of Europe, Siberia, and N. America. It ascends to 3000 feet in the Scottish mountains. The plant is astringent, and is occasionally used for tanning, as well as a valuable astringent in cases of excessive secretion in the human body. The black bearberry (*A. alpina*) has black berries about the size of the common sloe, which

have a peculiar taste. The plant, which is the badge of the Clan Ross, has a trailing habit similar to the other species, and is found on some of the Scottish mountains.

ARCTU'RUS, or α Bootes, a star of the first magnitude, in the same direction, and about twice as far from the Pole-star, as the end tail-star of the Great Bear.

ARE'OLAR TISSUE is a variety of connective tissue found in the animal body, by means of which various organs and parts of organs are connected together. A. T. consists of very soft fibres of various degrees of coarseness. These are often so close together as to form laminæ, which frequently cross and recross in all directions, leaving open spaces, or areolæ, between them. A. T. is found underneath the skin, forming a bed in which lie numerous fat-cells, also covering the muscles, blood-vessels, and nerves, and also connecting the lobes and lobules of glands. It is the most widely-distributed tissue of the body, and it may be traced uninterruptedly from one part to another.

ARGANIA, a genus of plants of the order *Sapotaceæ*. The argan-tree of Morocco (*A. sideroxylon*), yields an egg-shaped fruit, used for feeding cattle. From the seeds an oil is extracted of great value. Its wood sinks in water, and is very hard.

ARKANSAS POST, a small village on the Arkansas River, in the state of Arkansas, which was strongly garrisoned by Confederate soldiers during the civil war. It was captured on January 11, 1863 by the combined forces of Gen. McClernand and Admiral Porter, and a seizure made of military stores, and many prisoners taken.

ARMITAGE, Thomas, D.D., born in England, Aug. 2, 1819, came to the United States when a boy, first a Methodist minister, and now one of the leading Baptist ministers in America, and pastor of a church in New York.

ARMY WORM, a dark gray worm, with yellow stripes, from an inch to an inch and three-quarters in length, which has at times appeared in great numbers in the Northern States, and annihilated the crops of some localities. It is the grub of the night-flying moth (*Leucania unipuncta*). It is said, that it can be destroyed by water, slightly impregnated with carbolic acid.

AR'NIM, Harry, Count von, a member of the A. family, was born at Moitzelfitz, in Pomerania, in 1824, entered the service of the Prussian State 1847, and commenced his diplomatic career in 1851, when he was named secretary of legation, in which capacity he resided successively at Rome, Cassel, and Vienna. In 1862 he was appointed minister at Lisbon, created count in 1870, and in 1871, by imperial decree, minister extraordinary to the French Republic, and some time after raised to the rank of ambassador. Here he opposed the ecclesiastical policy of the German chancellor, and involved himself in such antagonism to his chief that his diplomatic career ended in one of the most remarkable state trials of late years. Recalled from Paris, 2d March 1874, he was left unemployed by the government. Irritated, it is supposed, by his humiliation and neglect, he made certain revelations to the public (2d April 1874) in the Vienna press relating to the policy of the Papal court. The discovery was then made that a large number of state papers had been taken from the archives at Paris during A.'s term of office, and failing to give a satisfactory account, of them, he was arrested, 4th October 1874. He was tried by the Tribunal of the city of Berlin (9th to 15th December), found guilty of removing public documents, and sentenced to three months' imprisonment. An appeal was made to the Kammergericht, which on the 25th June 1875 found A. guilty of removing state papers from the Paris Embassy, which he subsequently refused to give up, and sentenced him to nine months' imprisonment. See *Le Procès d'Arnim* by MM. Figurey and Corbier (Paris, 1875).

ARNOLD, Benedict, born at Norwich, Conn., Jan. 3, 1740, noted as a boy for his ungovernable disposition, and while a mere youth ran away from home and enlisted in the army, from which he soon after deserted. In 1775 he entered the service of Massachusetts with the rank of colonel, and marched with Gen. Montgomery against Quebec, where he behaved with gallantry, and was severely wounded in December of that year. In 1777 he was made brigadier-general, at the battle of Bemus Heights, Sept. 19, 1777, quarreled with Gen. Gates, and participated in the battle of Stillwater, Oct. 7, 1777, where he conducted himself with great bravery, and was seriously wounded. In 1778 he was placed in command of Philadelphia, Pa., where he lived extravagantly, contracted numerous debts, and began to plot treason. In April 1780 he became commander of West Point, and opened negotiations with Major John Andre of the British army, who represented Sir Henry Clinton, to betray it into the hands of the English. The plot, however, was thwarted by the capture of Major Andre, who was afterwads hung as a spy. Arnold, however, escaped on the sloop Vulture, and received for his treason £6300 from the British authorities. He afterwards led a British expedition into Virginia, and also one that burned New London, Conn. He spent the last years of his life in England, despised and shunned by all. His very name in America is synonymous with the word traitor. He died in London, June 14, 1801. See Sparks's *Life of Benedict Arnold*.

ARR'OWSMITH, Aaron, a celebrated geographer and constructor of maps, was born at Winston, Durham, July 14, 1750. At an early age he had to face the world, and in 1769 we find him in London in the employment of Cary, for whose large county maps he soon became the principal draughtsman. In 1790–98 he published his large map of the world on Mercator's projection, which greatly surpassed everything else that had yet been produced for clearness, accuracy, and excellence of engraving. He published altogether more than a hundred maps, all of the same admirable quality, the chief of which are the *Germany* (1813, seven sheets), *Turkey in Europe* (1801), *Asia* (1801, four sheets), and *United States of America* (1796, four sheets). He also wrote *A Companion to a Map of the World* (1814), *A Memoir relative to the Construction of a Map of Scotland* (1807), and a work on the *Geometrical Projection of Maps* (1825). Many of A.'s maps were reproduced in Paris by H. Langlois. He died in London, April 23, 1823.

ARR'OWSMITH, John, a Puritan divine, born at Gateshead, Newcastle, March 29, 1602, was educated at St. John's College, Cambridge. After some years' residence as a fellow of Catherine Hall, he settled at Lynn, in Norfolk, and in the great rebellion was appointed a member of the Westminster Assembly of Divines, in which capacity he took an active part in drawing up the 'Catechism.' He was a preacher for some time at St. Martin's, Ironmonger Lane, London, and subsequently held the respective posts of Master of St. John's College, Vice-Chancellor of the University of Cambridge, Regius Professor of Divinity and Master of Trinity College. The principal of his works, which are chiefly polemical, are *Tactica Sacra, sive de Milite Spirituali Pugnante, Vincente, et Triumphante Dissertatio* (Camb. 1665, Amst. 1700); *A Chain of Principles* (1622); *Theanthropos* (1660). He died in February 1658–59.

ARSENAL. At the outbreak of the Revolution there were no arsenals in the United States. Arms were at first gathered from the citizens and at an early period purchased from France. In 1777 Washington selected Springfield, Mass., as a site for a foundry. In the same year brass cannons were cast in Philadelphia and an arsenal founded at Carlisle, Pa. For the war of 1812 arms were provided by the arsenals at Springfield and Harper's Ferry. There were 23 arsenals and armories in the United States in 1860. That at Springfield could complete 1000 muskets per day. See Arsenal in Chambers' En.

ARTHRO'DIA, a term first employed by an anatomist called Winslow, to denote a joint admitting of only a very slight degree of movement.

ARTHROL'OGY is that department of anatomy which treats of the structure and functions of joints or articulations.

ARTHUR, Chester Allan. In 1884 he was a candidate for re-election before the Republican convention held at Chicago, and received strong support, but was defeated by James G. Blaine. See Arthur, Chester A. in Chambers' En.

ARTIFI'CIAL HORI'ZON is obtained by means of a perfectly calm and plane surface of a liquid (such as mercury) whose reflecting power is great. In obtaining the altitude of any object by this means, the sextant is brought as close as possible to the reflecting surface, and the true and *reflected* images of the object are made to coincide, so that the true angle is evidently half the observed angle.

ARTILLERY. The organization of the artillery of the United States army during the civil war was executed by Gen. William F. Barry. The entire number of field-guns employed was about 1500. To transport and work these there were required about 40,000 horses and 48,000 men. In 1873 the artillery of the United States regular army was organized as follows: 5 regiments, each consisting of 12 batteries. One of these batteries is required by law to be mounted. Guns of different calibres are never placed in the same battery. In active service each field-battery carries 400 rounds of ammunition per gun. See Artillery in Chambers' En.

AR'VE, a tributary of the Rhone, which it enters immediately below the Lake of Geneva, rises on Mont Blanc, and flows through the famous valley of Chamouni. It has a course of 50 miles, is a violent Alpine stream (according to Coleridge 'raves ceaselessly'), and is liable to sudden and destructive floods.

AS'BURY, Francis, one of the first bishops of the American M. E. Church, converted at thirteen, became a preacher three years later, and came to America in 1771 as a missionary. He was very active and successful in his work, and was made bishop in 1784. Born Aug. 20, 1745; and died at Spottsylvania, Va., March 21, 1816.

ASCENSION OF CHRIST. The ascension of Christ into Heaven took place on the fortieth day after the Resurrection, on a Thursday, therefore; He ascended from Mount Olivet in presence of His disciples. They, who were to be His witnesses in every part of the Roman Empire, beheld Him leaving our earth for that Heaven, which is the special abode of Blessed men and angels. The faith in His resurrection and the hope in the heavenly bliss into which He was entering, were to be sustaining principles among believers during the ages of persecution and the trials of all time. Hence Christ, in His glorified body, ascended into Heaven in the sight of all, blessing them as He receded from their sight, and drawing their hearts and minds after him. In what part of space, outside of our globe, that Heaven is, which the Almighty Rewarder of all merit has created for a dwelling place worthy of the manifestation of His own being, and of the magnificence of His fatherly love, to the élite of angels and of men, Scripture has not revealed, the Church has not defined, nor have her authorized teachers agreed upon. St. John, in the Apocalypse, unveils some of the splendors of the place itself, and allows us to see the Throne of the uncreated Majesty, and before it, the altar on which the Lamb of God seems to plead unceasingly for the needs of His brethren on earth, while receiving, equally with His Father, the adoration of the hosts of angels and multitudes of blessed men. Thus human nature exalted in him to the right hand of the Father, is evermore occupied with the dearest interests of His own here below. His sacrifice still pleads for us, and the voice of His blood still cries out in Heaven for the redeemed. Angels, when He had disappeared, bade the mourning disciples return to Jerusalem, the field of their labors, assuring them that the separation was not to be for ever. It is also a tradition, based on Scripture, that Christ was accompanied into Heaven not only by angels but by the spirits of the just, who had departed this life since the beginning of the world. Thus, 'ascending on high He led captivity captive,' and bestowed on the Saints of the Old Law the crowning 'gifts' of His justice and love.

ASH'ERA, a goddess referred to in the Old Testament, although the name is always translated 'grove' in the authorized version. In numerous passages 'grove' (i. e., holy wood) means a wooden object, generally close to the altar of Baal (Judges vi. 25; see 'grove' in authorized version); this was undoubtedly the linga or phallic symbol, represented by a tree stripped of its branches, or a tree-stem driven into the ground. But in several other passages it is evidently used as the proper name of a goddess. In Judges iii. 7, e. g., analogy requires it, thus: 'the baals and the groves,' = Baalim and Asheras; Manasseh, as well as the mother of Asa, made an *image* for A. (1 Kings xv. 13; 2 Kings xxi. 7); and in 1 Kings xviii. 19, mention is made of priests of A. along with those of Baal. A. represented the female side of Baal —Baaltis, or Mylitta, and therefore was served along with Baal (Judges vi. 25). She is not to be confounded, however, with Astarte or Ashtoreth (pl. Ashtaroth), notwithstanding Judges ii. 13; x. 6; 1 Sam. vii. 4; xii. 10, where the latter is put in conjunction with Baal. In all the other passages Ashtoreth and A. are kept distinct; and on closer investigation their characters are found to be quite distinct and even antagonistic. Astarte was the moon-goddess, as appears from Ashteroth-Karnaim, the name of a trans-Jordanic city (Gen. xiv. 5, and Deut. i. 4), meaning 'Ashteroth of the two horns,' i. e., of the crescent moon. She was at any rate a severely chaste goddess, probably the same as the 'queen of heaven,' whose worship by the Israelitish women was approved by their husbands (Jer. vii. 18; xliv. 15). The worship of A., on the contrary, was of the most unchaste description; the special service of her priests and priestesses being to prostitute themselves for hire to her worshipers (Deut. xxiii. 17, 18; 2 Kings xxiii. 7).

ASSEMA'NI, Jos. Simon, a celebrated Orientalist, born at Tripoli, in Syria, in 1687. He belonged to a Maronite family of Lebanon. In his travels through Egypt, Syria, &c., he collected numerous Oriental MSS. for the papal library, of which he was keeper. A. died 14th January 1768. His most important works are *Bibliotheca Orientalis Clementino-Vaticana* (4 vols. Rome, 1719–28), an edition of the *Opera Ephraëmi Syri* (6 vols Rome, 1732–46), *Kalendaria Ecclesiæ Universæ* (6 vols. Rome, 1755–57), and *Bibliotheca Juris Orientalis Canonici et Civilis* (4 vols. Rome, 1762–64).

ASSIGNMENT. This term is also employed of the transfer of his property by an insolvent debtor, to an assignee, for the benefit of his creditors. Such assignee is treated by the law as a trustee. The laws of many of our states, not only permit such an assignment, but permit the assignor to prefer certain claims above others. See Bankruptcy and Assignment in Chambers' En.

ASSUMPTION OF THE BLESSED VIRGIN MARY. Although the Church has not decreed by a solemn and definitive sentence, that the Mother of Christ was, after death, taken up into Heaven bodily, the early celebration of the feast commemorating the fact of such "assumption" or taking up, by all the Churches of the East and West, plainly indicates that she would have her children believe it. Our first parents, apart from the power of never dying conferred on them by special grace and attached to their perseverance in original justice, would have died in the course of nature; and then death would not, according to Catholic theology, have been a punishment of sin committed—since they would have lived sinless—but a fulfillment of the ordinary laws of organic nature. Christ, the Second Adam, having tasted of the bitterness of death, His Mother, the Second Eve, died in a good old age; and, never having been stained even by original sin, it was but consonant with the divine plan, that the mortal flesh received from her parents should not be tainted by the corruption of the grave. To her who had given birth to the Redeemer, it was meet that a privilege should be given not inferior to that bestowed on Enoch and Elias. The common tradition has ever been that the Blessed Virgin died in Jerusalem, where her sepulchre is still shown. St. Andrew of Crete, St. John Damascene, and all the earliest martyrologies and missals attest the fact of the reunion of the soul of the Blessed Virgin with her body soon after death, and of her being thus taken up into Heaven in body and soul. The tradition regarding this event is contained in the lessons of the Divine Office selected for Aug. 18, and taken from a homily of St. John Damascene, himself a native of Palestine and intimately acquainted with all the local traditions regarding Christ and His Mother.

ASTOR LIBRARY, founded by John Jacob Astor, who bequeathed $400,000 for that purpose. It is located on La Fayette Place in New York City, was opened in 1854, and contains nearly 200,000 volumes. It was greatly enlarged in the year 1883–4.

ATELEC'TASIS is a peculiar condition of the lungs of infants, in which a portion of the organs does not become filled with air. The lungs appear healthy, but they remain in the fœtal condition. Dr. Jörg of Leipzig, who has investigated this subject, regards the condition as a diseased state of the lungs. He points out that any circumstances likely to weaken the vital powers of the child before birth are liable to be followed by A. A child may live for several days with portions of the lungs in this condition. If the parts are not soon dilated, they become so consolidated that all trace of air-cells is lost. In some cases the ductus arteriosus, which during fœtal life carries blood from the pulmonary artery to the descending aorta, is not quickly closed, so that little blood passes to the lungs even after birth. In these circumstances A. occurs.

ATLAN'TA, the capital of Georgia, and one of the chief railroad centers of the South. It was settled about 1845 and was chartered as a city in 1847. In 1870 its population was 22,789, but it is now much larger. Here are located the Oglethorpe University, the North Georgia Female College, the Atlanta Medical College, the Atlanta University (colored), and other educational institutions. On Sept. 2, 1864, Atlanta was captured by Gen. W. T. Sherman, in command of the Union forces, on his famous 'march to the sea.' Before leaving the city on the 15th, he ordered the citizens to leave their homes, and caused it to be burned. In the fall of 1865 the work of re-building began.

ATTACHMENT, in many of the United States, the plaintiff, can, at the beginning of the action, upon presentation of affidavits, obtain an order from the court for an attachment against defendant's property. If judgment is afterwards obtained, the property so attached, can be sold in satisfaction. Such attachment will be granted however, only in special cases, as when the defendant is a non-resident, or there are allegations of fraud, or the defendant is removing or concealing, or about to remove and conceal his property, for the purpose of defrauding or delaying his creditors. The order of attachment can be served at the same time with the summons and complaint. The opposite party can, at any time, move, at Special Term, to have the attachment vacated upon counter affidavits. See Attachment in Chambers' En.

ATTAINDER. The United States Constitution forbids that attainder of treason shall work corruption of blood or forfeiture except during the lifetime of the person attainted. Otherwise American law is much the same as that of England. See Attainder in Chambers' En.

ATTICISM (Gr. *Attikismos*). Among all the Greek dialects, the Attic was the most finely developed, and as an instrument for the expression of poetic and philosophic thought, was most widely spread in Greece. After the rise of the Macedonian power, it became the language of literature and politics over the greater part of the known world, but its very extension exposed it to the corruption of foreign influences, and it soon began to lose its purity. Against this evil the grammarians strove hard, and sought by every means in their power to preserve the pure Attic of earlier times. This was the A. of the ancients, and those who distinguished themselves by the purity of their Attic style were Atticists. The term is now used to denote any refined and concise mode of expression.

ATTORNEY GENERAL, an officer of the United States and also of each of the states, who is the legal representative and adviser of the state, and whose position is much similar to that of the

Attorney-General in England. See ATTORNEY-GENERAL in Chambers' En.

ATTORNEY, LETTER OR POWER OF. This is a deed requiring legal execution and stamp. It may be either general or special. In the first case it empowers the agent of the granter to transact his entire business during absence, in the second case, the power of the agent is specifically restricted. The deed, until revoked, gives the agent the full power of his constituent.

ATTORNEY, WARRANT OF (English law term). This instrument is sometimes incautiously given by debtors who are pressed by their creditors. A. W. of A., as well as a cognovit authorizes the creditor to enter judgment and levy execution, either instantly or within a certain time specified in the deed. The granter is liable, when the judgment comes into operation, at any moment to have all his property taken from him and sold at a ruinous price. Moreover, the warrant or cognovit must be filed in a public office within twenty one days from its date; and this being done, credit is thereby ruined. The Debtors' Act of 1869 gives some protection to the unwary. It provides that no W. of A. or cognovit shall be effective unless the attorney of the granter be present to inform him of the nature and effect of the deed before execution, which attorney is to subscribe his name as a witness to the execution. A. W. of A. is also void against creditors unless filed in the Queeen's Bench.

ATWISHA, an Indian poison, supposed to be obtained from a species of aconite.

AUBURN THEOLOGICAL SEMINARY, located in the city of Auburn, N. Y., founded in 1820, and controlled by the Presbyterian Church in America.

AUDITOR, in the U. S., a person whose duty it is to examine and pass upon accounts. Under the U. S. government there are several such officers; and nearly every corporation, whether public or private, has its auditor. See AUDITOR in Chambers' En.

AUF'RECHT, THEODOR, one of the first Sanskrit scholars in Europe, was born at Leschnitz, Silesia, in 1822, and was educated at the University of Berlin. He came to England with a high reputation, and was employed at Oxford (1859–62) in compiling the catalogue of the Sanskrit MSS. in the Bodleian Library. In 1862 he was appointed Professor of Sanskrit and Comparative Philology in the University of Edinburgh, and in 1875 returned to Germany to become Professor of Sanskrit and Comparative Science of Langnage at Bonn. A.'s works are, *De Accentu Compositorum Sanscritorum* (Bonn, 1847); *Die Umbrischen Sprachdenkmäler* (Berl. 1850); *Zeitschrift für Vergleichende Sprachforschung* (Berl. 1850); *Ujjvaladatta's Commentary on the Unadisutras* (Bonn, 1859), from a MS. in the India House; *Halayudha's Abhidhanaratnamala: or, A Sanskrit Vocabulary, edited with a Sanskrit-English Glossary* (Lond. 1861); *The Hymns of the Rig-Veda transcribed into English Letters* (Berl. 1861); *A Catalogue raisonné of Sanskrit MSS. in Trinity College, Cambridge* (Camb. 1872); *The Anthology of Sarngadhara* (Leips. 1873); *Blüten aus Hindustan* (Bonn, 1873).

AU'ROCHS (*Bonasus* or *Bos Boison*), or EUROPEAN BISON, an ox or member of the family *Boridæ*, of large size, found at present in the Caucasian forests in a wild state, and also maintained by the Emperor of Russia in a Lithuanian forest—that of Bialoweiza. It formerly abounded wild in all the European forests, and has been regarded by some naturalists as the parent of our domestic breeds of cattle. The head is broad, and forehead arched; the hair of the forehead is long, and that of the chin and breast form a 'beard.' The tail is tufted. The color is a dark or dusky brown. These animals attain their full growth at the fifth year, and the females are smaller than the males.

AUSTIN was made the capital of Texas in 1839, is connected by rail with Houston and Galveston, has numerous fine public buildings, a well-organized fire department, several daily papers, and is the seat of large manufacturing interests. See AUSTIN in Chambers' En.

AUTUM'NAL FEVER, a name given in some parts of America to enteric or typhoid fever. It is sometimes also called *Fall fever*. Both of these terms indicate the fact that this fever is usually most prevalent in autumn, or the fall of the year.

A'VERYSBORO', BATTLE OF. On March 16, 1865, Gen. W. T. Sherman, while marching towards Goldsboro', came upon Gen. Hardee in command of a strong force of Confederates, entrenched before the village of Averysboro'. Gen. Hardee's object was to hold the Union forces in check until the Confederates could concentrate under Gen. Johnston. During the 16th there was hard fighting, and Hardee's men were driven back to a second line of entrenchment; and on the morning of the 17th it was discovered that during the night, the Confederates had evacuated their lines and retreated. The Union loss was 600, and that of the enemy less, although many prisoners were taken by Sherman.

AXILLA is the armpit. When the arm is extended at the shoulder-joint, the A. is a pyramidal space, the apex of which is situated between the clavicle and first rib, while the base is formed by the skin. It contains a large quantity of loose areolar tissue, fat, lymphatic glands, the axillary artery, veins, and numerous nerves. It is frequently the seat of abscesses and tumors.

AYO'RA, a town in Valencia, Spain, 50 miles S.-W. of Valencia, on the river A. Husbandry and the manufacture of oil are the chief industries. The ruins of an old castle crown the summit of a hill in the vicinity. Pop. 5412.

AYRSHIRE CATTLE. The characteristics of these cattle are a plentiful flow of milk, varying from twenty-four to thirty-four quarts daily. The head of a pure Ayrshire should be broad, gradually tapering downwards to the nostrils, which should be expanded, and dark.

AZADIRACH'TA INDICA, an Indian tree belonging to the order *Meliaceæ*. An acrid oil is obtained from its fruit, which is used in India for burning as well as for dyeing cotton. Its bark is a tonic, and its root has been used as a vermifuge.

B.

BAB'BITT, ISAAC, a distinguished goldsmith and manufacturer of the United States. He made the first Britannia ware produced in this country. A well-known alloy bears his name, for which he received a gift of $20,000 from Congress. Born July 26, 1779 at Taunton, Mass. Died May 26, 1862 from insanity.

BABBITT'S METAL, an alloy used in lining axles, and invented by Isaac Babbitt of Boston.

BABB'LERS (*Timalinæ*), a sub-family of Perching or Insessorial birds, included in the Dentirostral section of that order, and distinguished by the long bill with the ridge of the upper mandible curved, by the slightly-notched tip of the bill, by the nostrils being situated in a groove at the base of the upper mandible, by the rounded form of the wings, by the tapering tail, and by the larger size of the claw of the hinder toe. The B. are all of small size, and are confined to India, Australia, and the islands of the Eastern Archipelago. The best-known species are the LAUGHING THRUSH (*Pterocyclus cachinnans*) and LAUGHING CROW (*Garrulax leucolophus*) of India, the Indian BLACKFACED THRUSH (*G. Chinensis*), the Australian *Cinclosoma punctatum*) &c.

BABCOCK, ORVILLE E., born Dec. 25, 1825 at Berkshire, Vt.; graduated from West Point 1861; participated in the civil war; served on the staff of Gen. Banks on the upper Potomac; in 1864 was made aide-de-camp to Gen. Grant, under whom he served in the Wilderness, and until the surrender of the confederate forces under Gen. Lee. When Gen. Grant became President, Babcock became his Secretary.

BABILLARD, the term applied to an Insessorial bird (*Currucagurrula*), better known by the names of *white-breasted fauvette, lesser whitethroat*, and *nettle-creeper*.

BACCIOC'HI, MARIE-ANNE-ELISE BONAPARTE, born at Ajaccio, Corsica, in 1777, was the eldest sister of Napoleon I. At Marseille, when twenty years of age, she married Felicio Pasquale Bacciochi, a Corsican in the service of France, and rising with her brother's good fortune, in 1809 she was made Grand Duchess of Tuscany; but her administration was arbitrary and unpopular. She left Florence in 1814, on the fall of Napoleon, and died at Villa Vicentina, near Trieste, August 7, 1820. Her husband died 28th April 1841. Their daughter, NAPOLÉONE ELISE B. (born 1810), was remarkable for her devotion to Napoleon's son, the Duke of Reichstadt, whom she is said to have nearly carried off from Austrian custody. In June 1825 she married Prince Came-

rata, from whom she was separated in 1830, and died in Normandy, February 3, 1869.

BACHE, ALEXANDER DALLAS, LL.D., a well known scientist and educator, born in Philadelphia July 19, 1806. Having been appointed President of Girard College in 1836, he traveled extensively in Europe, devoting his time to a careful study of educational institutions, and upon his return home made a report that has largely influenced education in America. He also made valuable discoveries in connection with terrestrial magnetism. Dying without issue, he left his property in trust, the income to be devoted to scientific research. Died Feb. 17, 1867 at Newport, R. I.

BACHE, GEORGE M., an American naval officer, born Nov. 12, 1840 in the District of Columbia, and graduated from the Naval Academy in 1860. He commanded the iron-clad *Cincinnati* on the Mississippi until she was sunk at Vicksburg by the fire of the enemy, May 27, 1863. For his bravery in this action he received a letter of thanks from Gideon Welles, at that time Secretary of the Navy. He participated in the attacks on Fort Fisher, and led an assault upon the fort, where he was wounded in the shoulder, June 15, 1865. He became a lieutenant in 1862, and a lieutenant-commander in 1866.

BACHE, HARTMAN, a great-grandson of Dr. Franklin, and a distinguished American officer and engineer, born Sept. 3, 1798, at Philadelphia, graduated from West Point in 1818, and, after serving in various capacities, was made brevet brigadier-general, U.S.A., in 1865. Died Oct. 8, 1872, at Philadelphia.

BACHMAN, JOHN, D.D., L.L.D., a naturalist and Lutheran divine, born in Dutchess Co., N. Y., Feb. 4, 1790. He served as pastor of a church in Charleston, S. C., and assisted Audibon in the preparation of his great work on ornithology. His principal work was *Characteristics of Genera and Species, as applicable to the Doctrine of the Unity of the Human Race*. Died Feb. 25, 1874.

BACKUS, REV. ISAAC, a Baptist minister of large influence, born at Norwich, Conn., Jan. 9. 1724, for many years a trustee of Brown University, and a member of the Massachusetts convention which ratified the Federal Constitution in 1788. He is best known by his work entitled *A History of New England, with especial reference to the Baptists*.

BACON, EZEKIEL, LL.D., born at Stockbridge, Mass., Sept. 1, 1776, was one of the chief-justices of the court of common-pleas in Massachusetts in 1813, first comptroller of the U. S. treasury in 1813, and member of Congress from Mass. (1807—1813). Died Oct. 18, 1870 at Utica, N. Y.

BACON, LEONARD, D.D., LL.D., born at Detroit, Mich., Feb. 19, 1802, graduated from Yale College in 1820, and from the theological seminary at Andover in 1824. In 1825 he was called to the pastorate of the Center Congregational Church, New Haven, Conn., and remained its pastor until 1866, when he became professor of systematic theology in Yale Divinity School. In 1871 he was appointed lecturer on church polity and American church history in the same institution. Among his best known published works are *Select Practical Writings of Richard Baxter*, and *Slavery Discussed*. Died at New Haven, Conn., Dec. 24, 1881.

BACON, NATHANIEL, an Englishman who emigrated to Virginia in colonial times, practised law, gained much influence over the people, and headed what is known as 'Bacon's Rebellion,' in 1676. Under his command the people defeated Governor Berkeley, but Bacon died Oct. 1, of that year, and his followers were soon dispersed.

BAC'TRIAN CAMEL (*Camelus Bactrianus*), a species of camel distinguished from the Arabian camel or dromedary by the possession of two humps on the back. The native regions of this species lie to the S.E. of Arabia, and extend over Central Asia and China even to India. In Asia, its northernmost limit appears to extend to the 60° of latitude. It occurs in the Crimea, and extends from Arabia westwards to the territory between the Caspian and Black Seas.

BADEAU, ADAM, born in New York, entered the Union service as captain and aide-de-camp in 1862, and served on Gen. Sherman's staff. He was wounded at Port Hudson, served as military secretary to Gen. Grant, and was made lieutenant colonel, colonel, and brevet brigadier-general U. S. A. After the war he published a *Military History of General Grant*.

BADGER, OSCAR C., a naval officer who rendered distinguished services during the civil war, born at Windham, Conn., Aug. 12, 1823, entered the navy in 1841, and after various promotions was made captain in 1872. He commanded the iron-clads *Potapsco* and *Montauk* in their engagements with the forts at Charlestown in the year 1863, and was severely wounded in the attack upon Fort Sumter on Sept. 1, of that year.

BAILEY, GAMALIEL, M.D., an American anti-slavery agitator, born in New Jersey Dec. 3. 1807, and founded and edited the *Cincinnati Philantropist* and the *National Era*, both devoted to the anti-slavery cause. In the latter paper first appeared the celebrated anti-slavery novel, *Uncle Tom's Cabin*. Died June 5, 1859.

BAILEY, GUILFORD D., a colonel in the N. Y. volunteers who served gallantly during the civil war and was killed at the battle of Seven Pines, May 31, 1862. Born at New York, 1833, and graduated from West Point, 1856.

BAILEY, JAMES MONTGOMERY, known to the public as the 'Danbury News Man,' since 1865 has edited the *Danbury News* (Danbury, Conn.), in which position he has acquired widespread fame as a humorist. He has also published several humorous works which have been principally compilations of articles that had already appeared in his paper. He was born Sept. 25, 1841, at Albany, N. Y.

BAILEY, JOSEPH, an American officer who served during the civil war on the Union side. By the rapid construction of dams across the Red River, he saved a large part of the Mississippi fleet, which had become immovable owing to a rapid fall of the tide. For these services he received the thanks of Congress and was made a brigadier-general. On March 21, 1867, he was shot, while in Mo.

BAINBRIDGE, WILLIAM, an American naval officer who distinguished himself during the war of 1812. In the war against Tripoli he commanded the *Philadelphia*, with the rank of captain, and when that vessel was captured in Oct. 1803, because a prisoner of war, and was held by the enemy until peace was established in 1805. In 1812 he commanded the *Constitution*, *Essex*, and *Hornet*, and in Dec. of that year, after a severe struggle, captured the British vessel *Java*, a forty-nine-gun frigate. Died July 28, 1833.

BAIRD, ABSOLOM, born Aug. 20, 1824, at Washington, Pa., and graduated from West Point in 1849. He was appointed brigadier-general U. S. volunteers in 1862, and bore an active and gallant part in the civil war, participated in many of its most stubborn battles, such as Blackburn's Ford, Bull Run, Shelbyville, Chickamauga, Missionary Ridge, Pine Mountain, Renesaw, &c., marched with Sherman's army to the sea, and was present at the surrender of Johnston at Durham Station. For his gallant conduct he was brevetted major-general U.S.A. in 1865.

BAIRD, a Scottish family that has acquired extraordinary wealth during the present century. The father, Alexander B. of Lockwood, Old Monkland, began the celebrated mineral enterprises of the family in 1809 : a lease of Gartsherrie was taken in 1826, and the first furnace was put in blast in 1830. Coal and iron were near each other, the new railway system passed conveniently through the field, and skill, talent, and energy did the rest. The works now include Eglinton, Blair, Portland, Lugar, and Muirkirk. The father died in 1833, leaving two daughters and eight sons, William of Elie, Douglas of Closeburn, George of Strichen and Stitchel, David and Alexander of Urie, James of Cambusdoon, Robert of Auchmedden, and John of Lockwood. James of Auchmedden and Cambusdoon was born in 1803, sat as M.P. for Falkirk from 1851 to 1857, and died at Cambusdoon, Ayr, 20th June 1876. He was the munificent founder of the *B. Trust*. Fresh force and energy were imported into the vast business of the Bairds by a nephew, Alexander Whitelaw of Gartsherrie, who was elected M.P. for Glasgow in 1874 in the Conservative interest, but died in 1879. The B. family have become extensive landowners, the total rental of their estates reaching £81,000 a year.

BAIRD TRUST. James Baird of Auchmedden and Cambusdoon, founded, July 24, 1873, this trust, with a fund of £500,000 sterling. Its objects are to help in the work of spreading the gospel in connection with the Church of Scotland, of building churches, endowing parishes, augmenting stipends, spreading sound literature, promoting religious education, assisting divinity students, and maintaining the 'B. Lectnre.' The trustees must be members of the Church of Scotland, only one to be a clergyman; and the general design of the trust is to promote the territorial work of the National Church, and to maintain the great truths of the gospel as declared in the standards of the Church of Scotland.

BAIRD'IA, a genus of crustacea belonging to the order *Ostracoda*, and represented by living as well as by extinct species. The fossil forms occur in the silurian, carboniferous, and permian rocks, and in the mesozoic and cainozoic formations also.

BAIRD, ROBERT, D.D., an American divine and author. His principal work was a *History of the Waldenses, Albigenses, and Vaudois*. Born in Fayette Co., Pa., 1798, and died at Yonkers, N. Y., March 15, 1863.

BAKER, EDWARD D., born in London, England, Feb. 24, 1811, emigrated to the United States, member of Congress in 1848, U. S. senator from Oregon in 1860, entered the Union army as colonel at the outbreak of the civil war, and, while in command of a brigade, was killed at Ball's Bluff, Oct. 21, 1861.

BAKER, Osman, Cleander, one of the bishops of the American Methodist Church, born at Marlow, N. H., July 30, 1812, interested himself in the founding of Methodist theological schools, taught for a time in the Biblical Institute at Concord, in his native state, and was elected bishop in 1852. Died Dec. 20, 1871.

BAL'ANCE-FISH, a name applied to the *Zygæna malleus*, or hammer-headed shark, so named from the shape of the head, the eyes being placed at the extremities of the elongated head.

BALA'NOPHORA'CEÆ, an order of peculiar leafless plants found growing parasitically on the roots and stems of trees, principally in tropical countries, and having a fungus-like appearance. The *Fungus Melitensis* of Malta (*Cynomorium coccineum*) is celebrated for arresting bleeding. The famous Rafflesia of Java belongs to the order. The genus *Balanophora* is the type of the order. *Cytinus hypocistis* is a common parasite on the roots of species of *Cistus* in the S. of Europe, and contains gallic acid. Some authors make B. a sub-order of *Rhizantheæ*.

BALATA GUM, the milky juice which exudes from *Sapota Müllerі*, a large tree which grows in tropical America. The juice quickly hardens on exposure to the air, and, in its solid state, in appearance, properties, and uses it is similar to gutta-percha, for which it can be used as a substitute.

BALBUE'NA, Don Bernardo de, one of the most distinguished epic poets of Spain, was born at Valdepeñas in 1568, sailed for the New World at an early age, and completed his studies for the Church in a college of Mexico. Returning to Spain in 1608, he was soon after appointed provost of Jamaica, and in 1620 Bishop of Puerto Rico, where he died in 1627. Of his works we possess only three—*La Grandeza Mejicana* (Mex. 1609; Madr. 1829), a poetical description of the Mexican capital; *El Siglo de Oro* (Madr. 1608), a pastoral novel in prose and verse; and *El Bernardo, ó la Vittoria de Roncesvalles* (Madr, 1624, best ed. 1808), an epic poem in 24 books, the great merits of which have only recently been recognized. It is full of originality of design and execution; yet amidst all its fire and fancy there is a wonderful simplicity and naturalness.

BALD'WIN (Fr. *Baudouin*), the name borne by nine Counts of Flanders, the first of whom, Baldwin *Bras-de-Fer*, married Judith, daughter of Charles *le Chauve*, and died in 879; and the last, a contemporary of Philippe Auguste, took the cross in 1201. By far the most notable of the nine, however, was Baldwin V., surnamed of Lille, or *le Débonnaire*, who died in 1067. He carried on a bloody strife with the German emperor, Heinrich III., made the famous canal Fosse-Neuf, which separates Artois from Flanders, was Regent of France from 1060, during the minority of the French king, Philippe, and assisted the expedition which placed the crown of England on the head of his kinsman the Duke of Normandy.

BALDWIN, Matthias, W., an American inventor, who made several improvements in locomotives, and who, it is claimed, made the first locomotive constructed in America. Born in New Jersey in 1796, and died at Philadelphia, Pa., Sept. 7, 1866.

BALEEN', the term applied to the horny plates attached to the palate of the *Balænidæ*, or whalebone whales, and which constitute the 'whalebone' of commerce. The baleen-plates are arranged in a double row on the palate, and depend into the cavity of the mouth of the whale. The length of the largest plates averages from 10 to 14 feet; whilst in number about 200 plates exist on each side of the mouth. This huge fringe acts as a kind of sieve or strainer in serving to prevent substances of large bulk from gaining access to the throat, and also in entangling the minute forms upon which the whale feeds.

BALLOU, Hosea, one of the founders of the Universalist Church in America. He was self-educated and began to preach when about 21 years of age. He preached throughout New England, and was settled for a time at Portsmouth, N. H., and subsequently at Salem, Mass. (1815), and Boston, Mass. (1817). He edited *The Universalist Magazine* and published *Notes on the Parables* and an *Examination of the Doctrine of Future Retribution*. Born at Richmond, N. H., April 30, 1771, and died June 7, 1852.

BALLOU, Hosea (second), nephew of Hosea Ballou (first), a prominent Universalist clergyman, editor, and author, edited the *Universalist Magazine* and *Universalist Quarterly*, and published *Ancient History of Universalism* and Universalist hymn-book. Born at Halifax, Vt., Oct. 18, 1796, and died May 27, 1861.

BALL'S BLUFF, BATTLE OF. On the right bank of the Potomac River, about 33 miles from Washington, rises a precipitous bank, 150 feet above the river's level, known as Ball's Bluff, and from which the engagement there fought derives its name. On Oct. 20, 1861 Gen. Stone, commanded that portion of Gen. Mc Clellan's army which was opposite to the above bank and across the Potomac. By order of Gen. Stone, Col. Devens crossed the river with a force of about 650 officers and men. On the following day Col. Deven's command was attacked by the enemy in force, under Gen. Evans, C. S. A., and Col. Baker, with the First California volunteers was sent to their assistance. As senior officer Col. Baker took command, the force at his disposal amounting at this time to about 1900 men. The Confederates, protected by heavy woods, opened a galling fire upon the exposed Union troops, and after a desperate struggle for two hours, the latter began to waver. About 5 o'clock in the afternoon Col. Baker was killed, and the command fell upon Col. Cogswell of New York. Under the hot fire of the enemy the Union soldiers began to retreat, and orderly retreat soon degenerated into wildest rout. The boats in which an attempt was made to cross the river were either upset by the disorderly crowds that overloaded them, or sunk by the Confederate fire. A few escaped by swimming the river through a hail-storm of bullets, while some concealed themselves in the tangled brushwood that lined the river's bank. The Union loss was upwards of 1000, while that of the Confederates was only 155. Col. Baker was undoubtedly to blame for his reckless daring in the matter. Gen. Stone was shortly afterwards arrested and for a long period confined in Fort La Fayette. Eventually he was released and again given a command—who was primarily and principally to blame for this uncalled for disaster, resulting in the butchery of a thousand gallant men, and the loss of as brave an officer as ever donned uniform, is a question that must be left to military experts.

BALLSTON SPA, a village summer resort, and capital of Saratoga Co., N. Y. Its chief attraction lies in its chalybeate springs, which are unexcelled by any in the United States. It is on the Rensselaer and Saratoga R. R., and is about 30 miles north of Albany.

BALTIMORE. The following is additional to the matters contained in the article on the above in Vol. I. The natural advantages of the position of Baltimore were overlooked by the early settlers of the Chesapeake section of Maryland. In 1729 it was cultivated as a farm, and in 1752 it contained only about 25 houses, and only four of these were built of brick. From 1775 it rose rapidly in importance, and in 1780 it became a port of entry and a custom-house was opened. Baltimore contains about 200 churches, and has three universities, several colleges, 122 public schools, a state normal school, a manual labor school, besides numerous private schools and academies, an academy of art and science, an infirmary, hospitals, asylums, dispensaries, &c., three theaters, an opera house, a museum, and many fine public buildings. The most imposing building in the city is the new city hall, one of the finest structures of the kind in the country. It occupies an entire square of ground, an area of about 26,000 square feet, near the center of the city, and contains the various municipal offices. It was begun in 1867, and cost about $2,600,000. Another important building is that of the Peabody Institute, founded by the late George Peabody, Esq., of London, and endowed by him to the amount of $1,400,000. The largest of the monuments, for which the city is famous, is that erected to the memory of Washington. It stands on an eminence of 150 feet, and has, with its base, an altitude of 200 feet, and is constructed of white marble. Baltimore has a number of parks and public squares, chief of which is Druid Hill Park, a tract of 700 acres on the extreme north-west of the city, possessing more natural beauties than any other in the United States. The Abbot Iron-works, in the eastern part of the city, have the largest rolling mills in the United States. There are 26 banks, with a capital (in 1874) of $14,000,000, and seven savings-banks, seventeen fire, and marine, and three life insurance companies. The assessed value of taxable property of all kinds for the year 1875 was $231,242,313.

BANCROFT, Aaron, D.D., a Unitarian clergyman and author, was pastor at Worcester, Mass., for many years, and published a popular *Life of Washington*. Born at Westfield, Mass., Nov. 10, 1755, graduated from Harvard in 1778, and died Aug. 19, 1839.

BANGS, Heman, one of the founders of Wesleyan University, and a powerful Methodist preacher. Born at Fairfield, Conn., 1790, and died Nov. 2, 1869.

BANGWEOLO, or BEMBA, one of the largest lakes of Central Africa, lies about 200 miles S.W. of Lake Tanganyika, in lat. 11°—12° S., and long. 28° 20′—30° 35′ W. It is of somewhat oval shape, and extends in an E. and W. direction, being 150 miles long and 80 broad. Many rivers enter it on the N. and E., the chief of which are the Chambeze, Lopopussi, Luela, and Lolotikira. It also fed by innumerable smaller streams, and by the waters which in the rainy season flood the surrounding country to a distance of 40 miles. This margin of morass or 'sponge' is inhabited by numerous small tribes, and covered by aquatic vegetation, including the papyrus, arnus, lotus, rushes, and ferns. The lake is 3688 feet above the sea-level, and abounds in fish, while its waters are sweet, and of a dark sea-green color, probably due to the reflection of light by the fine white sand forming the bottom. It is drained by the great Luapula or Webb's River.

B. was discovered in 1868 by Dr. Livingstone, who revisited it for the purpose of further exploration, and died on its S. shore at Chitambo's village, May 1, 1873.

BANJALU'KA, a strong fortified town of Bosnia, Turkey, on the left bank of the Verbas, a branch of the Danube, in the N.W. angle of the kingdom. It has a gunpowder factory, several hot springs, and many Roman remains. Pop. 15,000.

BANKING. The first bank of the United States was chartered in 1791, and after its success had become established, as the result of political jealousy and opposition it ceased to exist in 1811. From that time until 1817 bank notes for a circulating medium were furnished by banks organized under state laws. In 1817 the second bank of the United States was established. It proved successful, but became a bone of political contention, and its charter was not renewed. There are now in the United States nearly 2000 national banks with bank bills in circulation to the amount of $354,000,000. These are secured by government bonds deposited at Washington. The principal profits of a bank arise from the non-interest paying funds deposited with it for safe-keeping. The profitableness of banking under the American system is shown by the fact that during the six months ending Sept. 1, 1873, the national banks of the United States paid in dividends upon a capital-stock of $488,100,951, the sum of $24,823,029. See BANKS in Chambers' En.

BANKS, NATHANIEL PRENTISS, an American soldier and statesman, first a mechanic and afterwards a lawyer, a member of the Massachusetts legislature in 1849, speaker of the House of Representatives of Massachusetts in 1851, member of Congress in 1854, and speaker of the House in 1856. In 1852 he separated from the Democratic party, of which he had been a member, on account of his opposition to the extension of slavery. From 1857 to 1859 he was governor of Massachusetts, and in 1861 entered the Union army as major-general of volunteers. After various services with the army of the Potomac, in 1862 he was appointed commander of the Department of the Gulf in place of Gen. Butler, and was in command of the Union forces which captured Port Hudson, July 9, 1863, taking over 6000 prisoners of war. He was elected to Congress in 1864, 1866, 1868, and 1870.

BANKS' PENIN'SULA is situated in the province of Canterbury, on the E. coast of the Middle Island of New Zealand, between 43° 37′ and 43° 55′ S. lat., and 172° 40′ and 173° 9′ E. long. Its area is estimated at 250,000 acres. B. P. is deeply indented with bays, the chief of which is the splendid inlet of Akaroa, on the S. The surface of B. P. consists of sharply defined mountain ranges and peaks, containing abundant evidence of volcanic action, and covered with forests. These ranges end abruptly on the W. in the great Canterbury Plains,and the curious Lake Ellesmere.

BANK'SIAN COCKATOO' (*Calyptorhynchus Banksii*), a species of cockatoo, occurring in Australia, the plumage being black or brown, variegated with spots of red or orange, with which colors the tail-feathers are also banded.

BAPTISTS. This name was given to the denomination generally known by it, about 200 years ago, during the Commonwealth in England. Prior to that time they had been called Anabaptists. The German Anabaptists while admitting only professed believers to baptism, practised pouring more frequently than immersion. The Baptists of the early period of the Reformation were poor and obscure, and were subjected to persecution at the hands of both Protestants and Catholics. From 1525 to 1530 nearly all the leaders had been put to death or banished from Switzerland and Germany, and the membership of the churches dispersed by the persecutor. In the Netherlands the Baptists were called Mennonites from their leader Menno Simons, a Romanist Priest, who had been converted to evangelical doctrines. Early in the settlement of America, Baptists came hither, but soon met with persecution at the hands of the Puritans. Roger Williams, a Baptist, persecuted in Massachusetts, fled with a small company, and founded the state of Rhode Island. During the nineteenth century the Baptists have rapidly increased in numbers, wealth, and influence. See BAPTISTS in Chambers' En.

BARANTE', AMABLE GUILLAUME PROSPER BRUGIERE BARON DE, a French statesman and author, born at Riom, in Auvergne, 10th June 1782, entered the service of the state in 1802, was a prefect under Napoleon, opposed the reactionary policy of the restoration, and zealously supported the government of Louis Philippe. He was French ambassador at Turin and at St. Petersburg, but withdrew from public life after the revolution of 1848, and died in Paris, 23d November, 1866. His chief literary performance, *Histoire des Ducs de Bourgogne de la Maison de Valois* (1824–26, 8th ed. 1858), is a learned and pictorial, but not very critical work. Other writings of B.'s are *Histoire de la Convention Nationale* (1851–53); *Histoire du Directoire de la République Française* (1855); *Le Parlement et la Fronde* (1859). He also translated Schiller's dramas into French.

BARBERI'NI, a princely Roman family, originally called Tafani, but which took the name of B. from the Tuscany village from which it sprung. The noted poet and philosoper FRANCESCO DA B., who wrote in the first half of the fourteenth century *Documenti d'Amore*, is supposed to have belonged to this family, which at an early period removed to Florence. ANTONIO B. (died at Florence 1571) had three sons, CARLO, MAFFEO (born 1568), who became pope under the title of Urban VIII., and ANTONIO (born 1569, died 1646), cardinal-librarian of the Church. The greatness and splendor of the house of B. dates from the time of Urban, who during his long pontificate of twenty-one years lost no opportunity of advancing the interests of his kinsmen. Of the three sons of his brother Carlo, the eldest, FRANCESCO (born 1597), was elected a cardinal in 1623, possessed great influence with his uncle, and died, 1679, dean of the Sacred College. The second, TADDEO, married Anna Colonna of Paliano, great-grand-daughter of the hero of Lepanto, and purchased from the elder Roman line of the Colonna the principality of Palestrina (anc. Prænestе), along with other possessions of the Colonna family. The growing power and influence of the B. excited the jealousy of the Medici, Este, and Farnese families, and during the pontificate of Urban's successor, Innocent X., Taddeo and his brothers were forced to seek refuge in France, where the former died in 1647. ANTONIO, the third son (born 1608), was a restless character, fond of tournaments and display, but at the same time a patron of Latin and Italian poetry. In 1631 he too was made a cardinal, and after his retreat to France received from Louis XIII. the bishopric of Poitiers, and in 1657 the archbishopric of Rheims. Subsequently he was reconciled to the Pope, and returned to Italy, were he died at Remi in 1671. Through him the property of the Frangipani family came to the B. About a century after the death of Urban VIII., the male line of the B. became extinct. CORNELIA, the grand-daughter of Taddeo and Anna, married in 1728 Giulio Cesare Colonna Prince of Carbognano and Duke of Bassanello (died 1787).

BARCELO'NA, earlier *Neueva Barcelona*, a seaport of Venezuela, at the mouth of the Aragua, on an open bay of the Caribbean Sea, 165 miles E. of Caracas. It has considerable trade, chiefly in maize, coffee, and indigo. Pop. (1873) 7674. B. was founded in 1671, thirty-three years after the establishment of the first town of this name at the foot of the Cerro-Santo mountains, and first rose into importance about the close of the 18th c., through a smuggling trade carried on with the W. Indies.

BAR'GAIN, in law, usually signifies a contract which may be completed without writing, such as a sale of goods. In mercantile affairs, a B. of great importance may be proved by letters of correspondence, or even by less formal writings.

BARKER, FORDYCE, M.D., an eminent physician of New York City, who has published numerous valuable papers upon obstetrical subjects. He has been professor of obstetrics and midwifery in the New York Medical College and in Bellevue Hospital, N. Y. Born at Wilton, Me., May 2, 1819, and educated at Bowdoin College.

BAR'LEYCORN, an old measure of length, equal to about the third of an inch.

BARNARD, FREDERICK AUGUSTUS PORTER, S.T.D., LL.D., L.H.D., a distinguished American scholar and educator, born at Sheffield, Mass., May 5, 1809, and graduated from Yale College, 1828. From 1830 to 1861 he was engaged in teaching in the South, and in 1864 was made president of Columbia College, New York. Among his publications are the following: *Letters on College Government* (1854), *Art Culture* (1854), *History of the American Coast Survey*, *Undulatory Theory of Light* (1862), and *Metric System of Weights and Measures* (1871).

BAR OF DOWER, a widow's right to Dower may be barred or defeated by certain delinquencies on her own part, or substitution of jointure. In Scotch law the corresponding term to dower is Terce. It may be similarly barred or excluded.

BARR, a town of Alsace-Lorraine, Germany, 18 miles S.W. of Strasburg, at the foot of the Vosges, and at the entrance of the picturesque valley of Ulricht. It carries on a trade in wine, brandy, timber, cattle, and iron, and has some woollen and cotton manufactures. B. is much resorted to on account of the beauty of its neighborhood. Over the town rises the Odilienberg to a height of 2450 feet, with its once famous cloister, built, it is said, by a Saint Odilia, daughter of a Duke of Alsace, in the latter part of the 7th c. Pop. (1873) 5655, with the suburb La Vallée.

BARRA DO RIO NEGRO, capital of the province of Amazonas, Brazil, on the river Amazon, not far from the mouth of the Rio Negro, is a flonrishing place of trade, with a pop. of 6000.

BARRAMUN'DA the native name of the *Ceratodus Fosteri*, a curious fish which occurs in the rivers of Queensland in Australia, and which appears to be most nearly related to the singular mudfishes or *Lepidosirens* of American and African rivers. It varies from 3 to 6 feet in length, and possesses a covering of cycloid

scales. The skeleton is cartilaginous. The operculum or gill-cover is well developed. The tail is homocercal. The heart consists of a single auricle and ventricle, with a contractile *arterial bulb*. The intestine has a spiral valve. No pyloric cæca are developed. The swimming-bladder communicates with the mouth by a pneumatic duct and glottis, and is of cellular or lung-like structure internally. The B. is the 'native salmon' of the Queensland rivers. It appears to be a slowly-moving fish, and feeds on the decaying vegetation of rivers.

BARRETO DE RESENDE, Pedro, a Portuguese historian, born towards the close of the 16th c., died at Lisbon in 1651. He has left a splendid work on India, which has never been published, and of which the *Bibliothèque Republicaine* of Paris contains what is probably the original MS. The work gives colored plans of all the Portuguese fortresses in India and Africa, with portraits of all the governors and viceroys, from Vasco de Gama to Linhares.

BARTHOLOMEW'S (St.) DAY. The literature upon the subject, to which the student is referred for details, is as follows: Sismondi, *History of France;* H. Martin, *History of France;* and Henry White, *The Massacre of St. Bartholomew*. See Bartholomew's (St.) Day in Chambers' En.

BASCOM, John, LL.D., born at Genoa, N. Y., May 1, 1827, and graduated from Williams College in 1849. In 1855 he became professor of rhetoric in Williams College, and was made president of Wisconsin University in 1873. His principal works are, *Political Economy* (1861), *Rhetoric* (1865), *Science, Philosophy, and Religion* (1871), and *The Philosophy of Religion*.

BASOCHES' (a corruption of *Basilica*, the palace of the king), a corporation of law-clerks connected with the procurers who attended the Parliament of Paris after it had ceased to be the King's Council. Created by Philip the Fair about 1303, the B. had many privileges: a king, wearing a cap like that of the French king, a blue and yellow standard, many officers, a legal jurisdiction in disputes of members, a right to issue currency, the curious right of 'plantation d'arbre,' &c. Every July they held a grand review, followed by a dramatic representation. This last was a species of morality, farce, or *sotie*, half-way between the *Religious Mysteries* (played by the Brotherhood of the Passion), and the *Feasts of Fools*, and the modern drama. The B. began with abstract moralities, in which the characters had names, such as *Honte-de-dire-ses Péchés, Espérance-de-longue-vie*, &c. They soon introduced allusions to passing events, and being found politically troublesome in the early disputes of the 15th c., these farces or satires were suppressed till the reign of Louis XII., who licensed their performance in the grand saloon of the Palais. They were again suppressed in 1540, but it is said the B. received about the same time a royal grant of the Préaux-clercs. *L'avocat Patelin*, although sometimes described as a *sotie* of the *Enfans Sans Souci*, was probably a favorite farce of the B. The B. undoubtedly represent an original and fertile tendency of the French mind, which did not get fair play under the Rénaissance.

BASS'A, Great, a port of the Liberian Republic, Upper Guinea, Africa, with a considerable export trade in pepper, coffee, cotton, and cocoa. The vicinity is rich in tropical fruits, such as lemons, bananas, and oranges. Pop. about 5000.—Little B., 20 miles N.W., is a maritime village of some size.

BAS'TIAN, Henry Charlton, M.D., F.R.S., a distinguished English Scientist, born at Truro, England, April 26, 1837. He is an ardent advocate of the doctrine of the spontaneous generation of living organisms.—His published works are, *Modes of Origin of Lowest Organisms* (1871), and *The Beginnings of Life* (1872).

BATH, a city of Main, on the west bank of the Kennebec River, and connected by steam-boat lines with Portland and Boston. Its chief enterprise is ship-building. Pop. 7371.

BATH-BRICK, a yellow, friable brick of siliceons material, largely used for metal polishing, especially in domestic economy. It is manufactured at Bridgewater from a very fine siliceous sand.

BAT-HORSES (Fr. *bât*, a pack-saddle) are horses used in military service for carrying the regimental baggage, such as books, tents, stores, medicine-chests, &c. Those who manage the horses are termed bât-men, and the money set aside for providing this commodity is known as bât-money.

BATHYB'IUS, the name applied to undefined masses of protoplasm existing in the beds of the oceans, and having imbedded in their substance minute calcareous bodies known as coccoliths. These coccoliths are frequently found associated together in the form of spherical masses termed *coccospheres*. The living protoplasmic B. has been assumed to be a Foraminiferous or animal organism allied to those which inhabit the sea-beds, whilst the coccoliths are presumed to be unicellular *Algæ* or low sea-weeds, the coccospheres being the sporangia or seed-cases of these Algæ. Their presence in B. would in this view be of an accidental kind. It has recently been asserted that B. has no real existence as an organism; the protoplasmic appearance being probably derived from the decomposing sarcode matter of other organisms.

BAT'IDES, a division of *Elasmobranchiate* fishes, represented by the *Skates* and *Rays*, in which the mouth and gill-openings are situated on the under surface of the body, which is generally greatly flattened and broadened. This broad appearance is given to those forms by the large size of the pectoral or breast fins, which are concealed beneath the skin, and thus add to the breadth of the body. The upper surface of the body bears the eyes and *spiracles* or apertures of tubes by which water may be admitted to the gills.

BATSCH, August Johann Georg Karl, a German naturalist, born at Jena, 28th October 1761, studied medicine under Gruner, Loder, and others, established himself as a physician at Weimar in 1781, and devoted his leisure to researches in natural history. After 1787 he successively filled at the University of Jena the functions of interim professor of natural history and medicine, titular professor of philosophy, and director of the society for the advancement of natural science. He died 29th September 1802. B.'s works are numerous and valuable. The principal are *Elenchus Fungorum* (Halle, 1783); *Versuch einer Anleitung zur Kenntniss und Geschichte der Pflanzen* (Halle, 1787–88); *Versuch einer Historischen Naturlehre* (Halle, 1789–91); *Blumenzergliederung aus verschiedenen Gattungen der Pflanzen* (Halle, 1790), a work remarkable for its new and original observations; and *Tabulæ Affinitatum Regni Vegetabilis* (Weim. 1802), in which one finds the first attempts at classification by natural families.

BAUMGARTNER, Gallus Jakob, a Swiss statesman, born 18th October 1797 at Altstätten, in the canton of St. Gall, and died in July 1870. He was noted among his countrymen for his devotion during the greater part of his career to the *parti prêtre*, vindicated the Jesuits, opposed the armed suppression of the *Sonderbund*, and displayed in a variety of political offices great oratorical and much administrative power.

BAUMGÄRTNER, Karl Heinrich, a distinguished physiologist of Germany, was born at Pforzheim, 21st October 1798, and in 1824 was made Professor of Clinical Therapeutics at Freiberg. He may be considered the originator of the cell-theory, subsequently worked out and expounded by Schwan. Among his writings are *Über die Natur und die Behandlung der Fieber* (Freib. 1827); *Handbuch der speziellen Krankheits- und Heilungslehre* (2 vols. 1835, 4th ed. 1840); *Dualistisches System der Medicin* (Stuttg. 1835–37); *Lehrbuch der Allgem. Pathologie und Therapie* (1837, 3d ed. 1854); *Schöpfungsgedanken* (1856–59).

BAYLOR UNIVERSITY, an educational institution of Texas, situated at Independence. It was chartered in 1845 by the Republic of Texas. It has an endowment of over $60,000, buildings valued at $30,000, a library of about 4000 volumes, and 700 acres of land. It has collegiate, law, and medical departments.

BAY RUM, a spirit prepared in the West Indies from the berries of *Eugenia acris*, used for toilet purposes and as a liniment in rheumatic affections.

BEALE, Lionel Smith, F.R.S., an eminent English scientist, and opponent of the Darwinian hypothesis, born in 1828, and graduated from the University of London in 1851. His best known works are, *How to work with the Microscope* (1858), and *Protoplasm* (1870).

BEATIFIC VISION,—the state of the Blessed in Heaven, which enables them to see God clearly as He is in Himself. This immediate and unclouded knowledge of the Infinitely Perfect Being, corresponds to the trial of Faith by which both Angels and men had to believe in God without seeing Him in His essence, and to be satisfied, during their period of probation, with knowing Him imperfectly and mediately through His creatures. Vision, therefore, corresponds to Faith, as the reward to the trial; and the Beatific Vision with its possession and fruition of the Supremely True and Fair and Good, is the goal toward which all rational creatures tend, and in which is their everlasting beatitude. The Council of Florence (1439—1442), in which the Emperor of Constantinople with his prelates was present, decreed that 'the souls of those who have incurred no stain of sin after their baptism, or who, having sinned have been cleansed of the stain in the body or out of the body, are forthwith admitted into Heaven, and clearly see God Himself as He is, in the Three Persons and the one substance, some, however, more perfectly than others, according to the diversity of their merits.' The bliss of a rational nature is in the possession by the will of the Highest Truth and in the enjoyment by the intellect of the Supreme Good. This knowledge and fruition is, in each spirit, proportionate to its capacity. And in the life to come the justice of God requires that the joy and bliss derived from the Beatific Vision by two different persons should be in a measure proportioned to the depth of their faith and the intensity of their charity, respectively, while laboring in this life. St. Paul contrasts both stages of our existence by saying: 'We see now through a glass in a dark manner; but

then face to face. Now I know in part; but then I shall know even as I am known. And now there remain faith, hope, charity, these three; but the greater of these is charity' (1 Cor. xiii. 12, 13). St. John declares the supernatural rank and duties of Christians together with their supernatural reward: 'Dearly beloved, we are now the sons of God; and it hath not yet appeared what we shall be. We know that when He shall appear, we shall be like to Him; because we shall see Him as He is. And every one that hath this hope in him, sanctifieth himself, as He also is holy' (1 John iii. 2, 3). Catholic theologians teach that the Creator, in order to fit the created spirit for this clear knowledge of the Divine Essence as it is in itself, adds to it a new power, which the schoolmen call 'the light of glory.' This expression, which was adopted by the Œcumenical council of Vienne, must not be understood of a material light, or of any substance outside of the intellect itself, but of a superadded degree of energy enabling the created faculty to penetrate the dazzling depths of the Infinite Being. St. Gregory the Great compares the privilege of just souls in the Old Law with that enjoyed by those under the New. The former, after death, had to wait for the coming of the Redeemer and the accomplishment of His atonement before they could see God, whereas the latter, when 'their earthly house of this habitation is dissolved' are put in possession of 'a house not made with hands, eternal in the heavens.'

BECHE, Sir Henry Thomas de la, an English geologist, born in London, 10th February 1796, educated at the military schools of Great Marlow and Sandhurst, entered the army in 1814, founded the Geological Survey of Great Britain, which was afterwards taken up by Government, and of which he was appointed director-general, and subsequently became director of the Metropolitan School of Science. He died 13th April 1855. B. was the author of a treatise *On the Discovery of a New Fossil Animal*, the Pleiosauros (1823), *Geology of Jamaica* (1826), *Classification of European Rocks* (1828), a *Geological Manual* (1831), *Researches in Theoretical Geology* (1834), *The Geology of Cornwall, Devon, and West Somerset* (1839), and *The Geological Observer* (1851, 2d ed. 1853).

BECK, the name of several eminent Germans, of whom the following are the most important:—1. Christian Daniel B., historian and philologer, born at Leipsic, 22d January 1757; became professor of Greek and Latin in the university of his native city, and died there, 13th December 1832. Among his numerous editions of the classics may be mentioned his Pindar, Aristophanes, Euripides, Apollonius Rhodius, Plato, Cicero, and Calpurnius. Besides these, B. wrote an *Anleitung zur Kenntniss der allgemeinen Welt- und Völkergeschichte* (4 vols. Leips. 1787–1805); *Grundriss der Archäologie zur Kenntniss der Geschichte der alten Kunst* (Leips. 1816), &c.—2. Johann Tobias B., an able Protestant theologian, born at Bahlingen, in Würtemberg, 22d February 1804; studied at Tübingen, became professor at Basel in 1836, whence he was called to Tübingen in 1843, and acquired a great reputation as a preacher and teacher. B. was one of the first to oppose, on the basis of independent scholarship, the conclusions of the critico-speculative school of Baur, and endeavored to introduce a more exact study of the New Testament literature. His chief works are, *Einleitung in das System der Christl. Lehre* (Stuttg. 1838; *Die Christl. Lehrwissenschaft nach den Biblischen Urkunden* (Stuttg. 1841); *Die Geburt des Christl. Lebens* (Basel, 1840); *Umriss der Biblischen Seelenlehre* (Stuttg. 1853, 2d ed. 1862); *Gedanken aus und nach der Schrift* (Frankf. 1859, new ed. 1868); *Christliche Reden* (six collections since 1834).—3. Karl B., a lively, picturesque, and musical poet, born 1st May 1817, at Baja, in Hungary, was the son of a Jewish merchant converted to the Protestant religion; studied at Vienna, and after some time settled in the Austrian capital. He has written *Nächte. Gepanzerte Lieder* (Leips. 1838); *Der fahrende Poet* (Leips. 1838); *Stille Lieder* (Leips. 1839); *Saul*, a drama (Leips. 1841); and *Janko, der Ungar. Rosshirt* (Leips. 1842, 3d ed. 1853), a metrical romance. His *Gesammelten Gedichte* appeared in 1844, and again in 1854. Since then B. has written, among other things, *Lieder vom armen Manne* (Berl. 1846, 4th ed. 1861); *Aus der Heimat* (Dresd. 1852, 4th ed. 1862); *Mater Dolorosa* (Berl. 1853); *Jadwiga* (Leips. 1863); and *Still und Bewegt* (1870).

BECKER, Nikolaus, the author of the famous German Rheinlied, was born 15th January, 1810, at Geilenkirchen, in Rhenish Prussia, and in 1840, when the war-party in France threatened the seizure of the left bank of the sacred river, set the patriotism of his countrymen on fire by his *Sie sollen ihn nicht haben*, which, though not a wonderful poem, was everywhere sung with enthusiasm. The French were stirred into a jealous rage, and Alfred de Musset wrote a witty but rather ignoble answer, *Nous l'avons eu votre Rhin Allemand*. B. died after a lingering illness, 28th August 1845. A collection of his Gedichte was published at Cologne in 1841.

BED-BUG (*Cimex lectularius*), an offensive insect, infesting beds, houses, certain kinds of birds, and particularly bats. Their vitality is great, and it is said that one has been kept alive for more than a year without food of any kind. There are several compounds and insect powders that will destroy them, but it is to be borne in mind, that they will seldom invade a thoroughly clean house.

BEDD'A NUTS, the fruit of a species of myrobalan, *Terminalia Bellerica*, largely imported into this country from the E. Indies for the use of the tanner and to produce a very permanent black dye employed by calico printers. They are also called *bastard* and *belleric myrobalans*. The seeds are eaten by the natives in some parts of the E. Indies, but they possess narcotic poisonous qualities. The fruits of *T. Chebula*, under the name of *Chebulic myrobalans*, are also used in dyeing. The flowers are used in Travancore as a dye, and the fruits are purgative.

BEDFORD, Gunning S., M.D., an eminent American physician, was professor at Charleston, S. C., and in the Albany Medical College, and removed to New York in 1863, where he became professor of midwifery in the University of New York. Among his publications are, a work on Obsteterics and *Lectures on the Diseases of Women*. Born at Baltimore, Md., 1806; and died in New York, Sept. 5, 1870.

BEE, Barnard E., an American general, who served during the Mexican war with gallantry, and was wounded at Cerro Gordo. At the ontbreak of the rebellion he joined the Confederate forces, and was killed at the first battle of Bull Run, July 21, 1861. He was born in South Carolina in 1824, and graduated from West Point in 1845.

BEECHER, Charles, a son of Rev. Lyman B., was born at Litchfield, Conn., 1815. He was a minister in Newark, N. J., and afterwards in Georgetown, Mass. He traveled in Europe with his sister, Mrs. Stowe, wrote part of her *Sunny Memories*, edited a *Life* of his father, and wrote several other works.

BEECHER, Henry Ward. In his theology B. is of the most liberal school, denying much that is held by the more orthodox of Congregationalists, and holding out as the aim of true religion the building up of moral character after the pattern of Jesus Christ. His preaching has been devoted very largely to practical themes and the discussion of the topics of the day. After the failure of the jury to agree in the famous case of Tilton vs. Beecher (an action for *crim. con.*), a council of Congregational churches was called, which met in Plymouth Church, and, after a careful investigation, pronounced B. innocent of the charges preferred against him by Theodore Tilton. Shortly after this the Pilgrim Church of Brooklyn (R. S. Storrs, D.D., pastor) and the Clinton Avenue Church (W. J. Buddington, D.D., pastor) withdrew their fellowship from Plymouth Church. The result of this was a division of the Congregational churches of New York, Brooklyn, and vicinity into two parties, some of the churches remaining with Plymouth Church in the New York and Brooklyn Association, and others, with the two above named, organizing the Manhattan Association. This division continues down to the present time (1885). Besides his pulpit duties and numerous lectures on various themes, B. has actively engaged in politics. At first an ardent opponent of slavery, he became a member of the Republican Party, at the time of its organization in 1856. He has not only spoken frequently at political meetings, but has often discussed political matters in the pulpit. In 1884 he refused to support James G. Blaine, the candidate of his own party for the presidency, and strongly advocated the election of Grover Cleveland, in whose election he was largely instrumental. Although now (1885) in his seventy-second year, B. is as vigorous and eloquent as at any period of his life, and Plymouth Church continues to be overcrowded with its vast congregation of fashionable and thoughtful people. See Beecher in Chambers' En.

BEECHER, Thomas Kennicutt, son of Lyman and brother of Henry Ward, has been for many years pastor of the Congregational Church of Elmira, N. Y., and is one of the leading ministers of that denomination. Born Feb. 10, 1824.

BEECH'WORTH, a town in Victoria, 185 miles N.E. of Melbourne. It is the chief center of population on the Ovens goldfield, and is a thriving place. Pop. 3167; of the shire, 6222. The mining plant in the B. district was valued in January 1874 at £50,160. Oxide of tin is found throughout the district, and is worked to some extent.

BEE-PAR'ASITE, the name given to the *Stylops*, a curious insect, distinguished by possessing twisted filaments in place of the front pair of wings, and forming of itself the sole example of the order *Strepsiptera*. The males alone are winged as above described, the females existing as soft maggot-like creatures, which live within the bodies of bees and wasps, and protrude their heads from between the abdominal segments of the infested animals. The young or larvæ are hatched within the body of the female, the young males developing wings and living a free existence, whilst the females pass from the body of their parent, and seek fresh hosts wherein to reside. *Stylops Dalii* and *S. Spencii* are familiar species.

BEHAIM, MICHAEL, a German meister-singer of the 14th c., was born at Sülzbach, near Weinsberg, in 1416, and died in 1475. By none of his contemporaries was he excelled in fertility. His chief works are his *Buch von den Wienern*, on the insurrection of the Viennese against Friedrich III., in 1462 (Karajar., Vien. 1843); *Leben des Pfalzgrafen Friedrich 1. bei Rhein* (1459. unpublished); *Gedicht von der Liebhabung Gottes; Geistliche Gedichte*, &c.

BEJET'LAN, LANGSAT, LANSEH, or AYER AYER, the edible fruits of the genus *Lansium* (natural order *Meliaceæ*, natives of the E. Indian Archipelago.

BELFAST, a city of Maine, on Penobscot Bay; has an excellent harbor, and is largely engaged in commerce, shipbuilding, and fisheries. Pop. 5278.

BELGIOJOSO, CRISTINA, PRINCESS OF, an Italian lady distinguished for her patriotism, the daughter of the Marchese Geronimo Isidoro of Trivulzio, was born 28th June 1808, married in 1824 to Prince Emilio of Barbiano and B. She took an active part in the revolutionary movement of 1830, and raised a corps of volunteers at her own expense in 1848. After the occupation of Rome by the French, she went first to Athens, and afterwards to Constantinople, but returned to Italy on the proclamation of the amnesty of May 1856; received back her property, and, abandoning the extreme views of the Mazzinists, worked for Cavour's policy after 1858. She died at Milan, 5th July 1871. The Princess was also an authoress of some merit.

BELL ANIMAL'CULES, the popular name of a genus of Infusorian animalcules, scientifically known as *Vorticellæ*. Each animalcule consists of a bell-shaped body or *calyx*, borne on a stalk, which is rendered contractile by the presence of a spiral fibre. By aid of this structure the Vorticella can quickly contract itself upon its stem when alarmed or irritated. These animalcules occur in groups, and are generally found attached to aquatic plants. The margin of the bell or calyx is fringed with vibratile filaments termed *cilia*. These animalcules reproduce themselves by *fission*, by *gemmation* or *budding*, and by a process of *encystation*, allied in many points to the sexual generation of higher animals.

BELLAMY, JOSEPH, D.D., a renowned American theologian, and eloquent Congregational preacher. His works are numerous, and were published in three volumes in 1811. Born at North Cheshire, Conn., 1719, graduated from Yale College in 1735, and died March 6, 1790.

BELL, BENJAMIN, author of *A System of Surgery*, born at Dumfries, 1749, studied medicine at Edinburgh, where, after visiting the medical schools of Paris and London in 1770, he established himself in 1772,, and entered upon an extensive practice. B. died April 4, 1806. His *System of Surgery* has passed through seven editions.

BELL, JOHN, an American politician and statesman, educated at Nashville University, elected to Congress in 1827, and remained in that body for fourteen years. In 1833 he joined the Whig party, and became a strenuous advocate of protection. He was elected U. S. senator in 1847 and again in 1853, and in 1860 was nominated for president by the Constitutional Union party, but received only thirty-nine electoral votes. Born near Nashville, Tenn., Feb. 15, 1797; and died Sept. 10, 1869.

BELLEISLE, CHARLES LOUIS AUGUSTE FOUQUET COMTE, afterwards Duc de, a French marshal and diplomatist, was born at Villefranche (Rouergne), 22d September 1684. He entered the army at an early age, distinguished himself at the siege of Lille (1708), took part in the Spanish campaign of 1719, and in 1732 had risen to the rank of Lieutenant General. Under Marshal Berwick he captured Treves and Trarbach in 1734, and signalized himself at the siege of Philippsburg. The peace of 1735, by which Lothringen fell to France, was mainly B.'s work. Cardinal Fleury had boundless confidence in his capacity. Before the outbreak of the Austrian war of succession, B. visited the chief courts in Germany in the interest of the Bavarian elector, whom France desired to succeed to the imperial throne instead of Maria Theresa. Along with Broglie, at the head of a French army he invaded the Austrian territories, captured Prague 26th November 1741, but, owing to the policy of Prussia, was forced to retreat to the Eger, 17th December 1742. In 1744, while on a diplomatic journey to Berlin, he was made prisoner at Elbingerode in Hanover, and sent to England, where he was detained for a year. Appointed commander-in-chief of the French army of Italy in 1746, he successfully defended the French frontier against the Austrians and Sardinians, and was in consequence made a Duke and Peer of France. In 1755 he was placed at the head of the war administration, and remained there till his death, 26th January 1761. B. was certainly a man of considerable gifts, but his reputation was more shining than his merit. Carlyle, in his *Friedrich* (vols. iii. and iv.), is grimly sarcastic upon this 'sun-god' with his 'effulgences' and 'wide-winged plans,' &c., but his estimate is in the main just.

BELLENDEN (BALLENDEN, BALLANTYNE, or BANNATYNE. SIR JOHN, of Auchinvole, was secretary to the Earl of Angus, and alone stood by that noble when tried in 1528 for high treason. The Earl was banished, but restored in 1543, when B. was knighted, and became Lord of Session, Director of Chancery, and Justice-Clerk of Scotland. Unlike his cotemporary, the Archdeacon, B. attached himself to the Reformation party. He was mixed up in the intrigues of Queen Mary, Darnley, and Bothwell; but the belief that he was concerned in the Rizzio murder seems to have been unfounded. B. died in the year 1577.

BELLEVILLE, capital of St. Clair county, Illinois, fourteen miles S.-E. of St. Louis, possesses many manufactories and several good public buildings. Pop. (1880) 10,642.

BELL'MANN, KARL MIKAEL, a popular Swedish lyrist, born at Stockholm, 24th February 1741, became court-secretary in 1775, and died 10th February 1795. The first effusions of his muse were religious, but he was soon drawn away into a dissolute career, and his later and more brilliant pieces are chiefly bacchanalian, idyllic, or humorous songs, for which he also furnished original melodies. The best specimens of his genius, which is of a rare order, are to be found in the collections prepared by himself: *Bachanaliske Ordenskapitlets Handbibliothek* (1783), *Fredman's Epistlar* (1790), and *Fredman's Sanger* (1791). Numerous editions of his *Samlade Skrifter* have been published in Sweden, of which the most splendid is that by Carlen (4 vols. Stock. 1861). A monument was erected to his memory at Stockholm, 26th July 1829, and ever since the anniversary of its erection has been kept as a popular holiday. B.'s German translator, Winterfeld (1856), has happily described him as 'The Swedish Anacreon.'

BELLOWS-FISH. A popular name applied to those *Acanthopterous* fishes known as sea-snipes, &c., from the extended pipelike form of the jaw-bones. The sea-snipe (*Centriscus scolopax*) exemplifies this group; this species being found in the Mediterranean Sea.

BELLOWS, HENRY WHITNEY, S.T.D,, LL.D,, a prominent Unitarian clergyman, became pastor of the leading church of that denomination in New York in 1838, and remained its pastor until his death. He was the first president of the U. S. Sanitary Commission, established in 1862. He published *Lectures on the Treatment of Social Diseases* (1857). and *The Old World in its New Face* (1868), &c. Born at Walpole, N. H., June 10, 1814, graduated from Harvard in 1832, and died at New York, 1882.

BELL-PEPPER. the fruit of *Capsicum grossum*, a native of India.

BELMONT, AUGUST, an American financier and politician, born at Alzey, Germany, 1816, came to America in 1837, representing the Rothschilds, and took up his residence in New York. He has been for many years actively identified with the Democratic party. From 1853 to 1857, he represented the U. S. as Minister to the Netherlands. He has amassed a large fortune, and is one of the most brilliant financiers of the New World.

BELOIT COLLEGE, an educational institution, located at Beloit, Wis., and chartered in 1846. Its finest building is Memorial Hall, erected in honor of its alumni who fell during the civil war.

BENCH-MARK, a mark of any kind (in the Ordnance Survey an arrow) made upon a stone, a wall, or in any other suitable situation, to indicate the position of a station in a survey.

BENEDETT'I, VINCENZIO, a French diplomatist, was born at Bastia, Corsica, April 29, 1817. He was first chancellor of the French consulate in Alexandria; in 1848 consul at Palermo; on the establishment of the empire, secretary to the French embassy at Constantinople; and, after the Crimean war, director in the office of the Minister of Foreign Affairs. In 1861 he went as ambassador to Turin, and in 1866 arranged the armistice of Nikolsburg between the Austrians and Prussians. From this date he remained at Berlin as extraordinary ambassador till the outbreak of the Franco-Prussian war of 1870. During these years he carried on frequent conversations (if not negotiations) with Count von Bismark, concerning the rectification of the frontiers of their respective countries, in which the subtle Italian was completely outwitted by the crafty Teuton, who got him to put upon paper proposals of a highly unscrupulous character. At Ems, in July 1870, B. demanded of the Prussian king, in the name of his master, not only the withdrawal of Prince von Hohenzollern from his candidature for the Spanish throne, but also a promise that this German candidature would never again be supported. King Wilhelm held it beneath his dignity to bind himself for the future. His refusal led to a declaration of war by the Emperor in less than a week, and before two months had passed France was utterly crushed, the Napoleonic dynasty overthrown, and a republic proclaimed. B. has written a vindication of his Prussian diplomacy, *Ma Mission en Prusse* (1871), which has not added to his reputation either for ability or honesty.

BEN'FEY. THEODOR, one of the ablest philologists of Germany, was born at Nörten, 28th January 1809. He attended the

gymnasium of Göttingen from 1816 to 1824, studied classical philology first at the university of the same city under the direction of Ottfried Müller and Dissen, and afterwards at Munich under Ast and Thiersch. From 1830 to 1834 he devoted himself at Frankfurt and Heidelberg to Sanscrit. In the latter of these years he was appointed a professor at Göttingen, where he has since remainded. Excellent as are his *Ueber die Monatsnamen einiger alten Völker* (Berl. 1836). *Griechisches Wurzellexikon* (2 vols. Berl. 1839–42). *Uber das Verhältniss der Ægypt. Sprache zum Semit. Sprachstamm* (Leips. 1844), what has given him celebrity in the learned circles of Europe is his profound series of works on the Sanscrit language and literature: *e. g.*, his edition of the Hymns of the *Samaveda* (with translation and glossary, Leips. 1848); the *Vollständige Grammatik der Sanskritsprache* (Leips. 1852); a *Chrestomathie* (with glossary, Leips. 1853–54); a *Kurze Grammatik der Sanskritsprache* (Leips. 1855); a *Practical Grammar of the Sanscrit Language* (in Eng. Berl. 1863; 2d ed. 1869; a translation of the *Pantschatantra* (2 vols. Leips. 1859), the original of the 'Seven Wise Masters,' famous during the middle ages in Western Europe; a *Sanscrit English Dictionary* (1866); and a *Geschichte der Sprachwissenschaft* (Berl. 1869).

BENGAL HEMP, the fibre of *Crotalaria juncea*, called also Sunn, Sun, Shuntun, Taag, &c., used in Bombay and Madras along with jute for making gunny bags. Jubbhulpore hemp is obtained from *C. tenuifolia*, a variety probably of *C. juncea*.

BENGAL KINO, or BUTEA GUM, an astringent substance obtained from *Butea frondosa*, and resembling Kino in its properties. In India it is used in tanning, in diarrhœa and similar diseases, &c.

BENJAMIN, Park, an American journalist and poet, born at Demarara, Guiana, Aug. 14, 1809, and graduated from Trinity College, Hartford, Conn., 1829. For many years B. was associated in the editorship of the New York *World*, and was the author of many lyrical poems. Died Sept. 12, 1864.

BENNETT, James Gordon, one of the most successful journalists in the United States, and founder of the *New York Herald*, was born at Newmill, Keith, Scotland, about the year 1800. He studied with a view to the priesthood at a Roman Catholic seminary at Aberdeen, but gave up this aim, and came to America in the year 1819. B. first went to Halifax, N. S., where he taught a school; and afterwards became a proof-reader in Boston. In 1822 he was engaged on a newspaper in Charlestown, S. C. He soon returned to the North, engaged in newspaper-work in New York, and sometimes lectured. His earlier attempts were not always successful, but at length he found his career when he started the *New York Herald*, the first number of which appeared May 5, 1835. The paper soon attracted notice by its lively reports of the money and stock market, its startling personalities, sensational descriptions, and fresh news; and it ultimately yielded a large fortune to its adventurous editor and owner, who died June 2, 1872. The *Herald* is now (1885) owned and conducted by James Gordon B., son of the elder B., and still maintains its reputation as one of the leading journals of America.

BENNINGTON, Battle of, an important revolutionary battle, fought near the village of Bennington, Vt., Aug. 16, 1777. In this village were valuable public stores belonging to the American army. Colonel Baum, in command of a force of Hessians, was sent by Gen. Burgoyne to seize these stores. He was met by a detachment of 'Green Mountain Boys' under Gen. Stark and after a severe struggle entirely routed. Six hundred British prisoners were taken by Stark's men. Coming at a time when the revolutionary cause was very much depressed it contributed to revive the spirits of the people, and dispel the gloom of the hour.

BEN'TINCK, the name of an historical family, which, as early as the 14th c., was settled in Gelderland, and was afterwards transplanted to England and Oldenburg. The *elder* or *English* branch was founded by Jan Willem van B. (born 1648), third son of Hendrik B. of Diessenhan, in Overyssel. From his boyhood Johann was a friend and favorite of William of Orange, was repeatedly employed by him in affairs of state, and in 1689 was raised to the English peerage as Baron of Cirencester, Viscount Woodstock, and Earl of Portland. His eldest son, Henry B., obtained in 1716 the title of Duke of Portland and Marquis of Litchfield, and in 1721 was appointed Governor of Jamaica, where he died, 14th July 1726. His son and heir, William B., born 1st March 1708, married Margaret Cavendish, sole daughter of the Earl of Oxford, and heiress of the Duke of Newcastle.—William Henry Cavendish B., eldest son of the preceding, born 4th April 1738, succeeded to the dukedom 1st May 1762. During the North American war he steadily adhered to the opposition. In 1783 he became first Lord of the Treasury, but on the 27th December of the same year had to give way to the Pitt administration, and remained in opposition till 1792, when he began to support the Government against the French Revolution. In 1794 he was appointed Home Secretary, and held this office till Pitt's resignation in 1801. On the dissolution of the Whig ministry in 1807, he was again placed, in spite of his great age and mediocre abilities, at the head of the Government, and died prime minister, 30th October 1809.—William Henry Cavendish Scott B., fourth Duke of Portland, born 24th June 1768, was made president of the Privy Council in 1827, and died 27th March 1854. By his marriage with a daughter of General Scott, a sister-in-law of George Canning, he had four sons, of whom, owing to the death of the eldest in 1824, the second, William John Cavendish Scott B., born 17th September 1800, succeeded to the ducal dignity.

BENTON, Thomas Hart, a distinguished American lawyer and statesman, born in North Carolina, March 14, 1782. In early life he removed to Tennessee and began the practice of law at Nashville. During the war of 1812 he served under Jackson, with the rank of colonel. Having taken up his residence in Missouri, in 1820 he was elected U. S. senator from that state and for thirty years was a prominent member of the Senate. In 1856 he was nominated for governor of Missouri, but was defeated by that wing of the Democracy which favored the doctrine of States' Rights. In the years 1854–56 he published a *Thirty Years' View, or a History of the Working of the American Government for Thirty Years*, 1820–50, devoted very largely to reminiscences of his public life. Died April 10, 1858.

BERGH, Henry, an American philanthropist, born in New York in 1823. In his early life he wrote several books and sketches, but is best known to the world by his earnest and successful endeavors to ameliorate the condition of dumb animals. In 1866 he, with others, incorporated the 'American Society for the Prevention of Cruelty to Animals,' since which kindred societies have been organized in nearly every state, territory, and considerable city of the Union. The work effected by these societies in relieving dumb animals from cruelty and abuse, can scarcely be estimated. In this work Mr. Bergh has been the leader. His efforts have been unceasing and courageous.

BERGK, Theodor, a German philologist, was born at Leipsic, 22d May 1812, studied under Beck, Hermann, and Dindorff, and after many changes of residence, finally settled as professor at Bonn in 1869. B.'s services to the criticism and elucidation of the Greek poets are of great value. His chief works are the *Poetæ Lyrici Græci* (Leips. 1843; new ed. 3 vols. 1853–67); *Commentationes de Reliquiis Comœdiæ Atticæ Antiquæ* (Leips. 1838); his edition of *Aristophanes* (2 vols. Leips. 1852; 2d ed. 1857), and of *Sophocles* (Leips. 1857); but he has also executed numerous smaller works displaying fine scholarship and familiarity with all contemporary research.

BERIBERI, or BAD SICKNESS OF CEYLON, is a name given to a serious disease, unknown in this country, but not unfrequent in Ceylon and India. The name B. is a reduplication of a word signifying *weakness*, and means great weakness. B. is characterized by great prostration, poverty of the blood, numbness of the surface of the body, and general dropsy, not only in the limbs, but into most cavities of the body. The disease often breaks out among troops and convicts. It is generally a fatal disease. Treatment consists in warm clothing, good diet, purgatives, and diuretics. It is stated that a residence of eight or twelve months is necessary before the disease manifests itself.

BERTHLO'TIA (*B. lanceolata* or *indica*), a genus of Composite plants, natives of India and Senegambia, the leaves of which are aperient, and used as substitutes for senna.

BESS'EMER, Henry, engineer and inventor, was born in Hertfordshire in 1813, and is chiefly known in connection with the celebrated process for making steel which bears his name—a process which has effected an entire revolution in the steel trade. Mr. B. has distinguished himself by many other inventions and scientific improvements. In 1875 considerable attention was attracted by what was known as the B.-saloon steamer, which was designed to counteract the unpleasant motion of the sea by means of a swinging cabin, to be kept in position by an ingenious arrangement of machinery. But after several experiments in the English Channel with a large steamer built for the purpose, the invention has apparently failed. In 1871 Mr. B. was appointed president of the Iron and Steel Institute.

BE'TELGEUSE, a star of the first magnitude in the right shoulder of Orion, forming with Procyon and Sirius a magnificent subequilateral triangle.

BETHEL COLLEGE, an American educational institution, located at McKenzie, Tenn., and founded in 1850. It is controlled by the Cumberland Presbyterian Church.

BETHLEHEM, a town of Pa., on the left bank of the Lehigh River, fifty miles north of Philadelphia, founded by the Moravians in 1741. It contains several excellent schools, and is the seat of large manufacturing interests. Pop., 2230.

BETH ROOT, or BIRTH ROOT, the root of the purple *Trillium erectum*, used in the United States as an astringent, tonic, and antiseptic. It is used especially in menorrhagia.

BEVEL-WHEEL, a wheel (generally furnished with teeth), of which the 'pitch surface' is the frustrum of a cone. B.-wheels are used to communicate rotation between shafts which lie in the same plane, but are not parallel.

BHAD'LEE, a name applied in India to a species of millet (*Panicum pilosum*).

BHEWN'DY, or BHIWAN'DI, a town in the district of Tanna, province of Bombay, British India. Pop. (1872) 11,970.

BIEL, BEL, BIA'LO, are forms of a Slavonic word signifying 'white,' and entering into the composition of innumerable names of persons and places in the various Slavonic regions of Europe, such as Eastern Germany, Poland, Austria, Russia, Servia, &c. We may recall two conspicuous examples—*Beli-Tsar* (Gr. *Belizarios*), 'the white prince,' and *Belgrade*, 'the white fortress.'

BIE'LA'S COMET, discovered by Biela, an Austrian officer, February 28, 1826, has a period of 6·61 years. It appeared, according to prediction, in the years 1832, 1839, 1845, and 1852. In the years 1859 and 1866 it was not observed as expected, but reappeared in 1872 at a time of meteoric display.

BIER'STADT, ALBERT, a distinguished modern painter, born in Germany in 1829, and came to the U. S. in childhood with his parent. His reputation is based very largely upon his magnificent Rocky Mountain scenes, the most notable of which is *The Domes of the Yosemite*.

BIG BETHEL, BATTLE OF, a battle fought between Confederate forces under Gen. Magruder and Union forces under Gen. Butler, near Big Bethel, Va. The Confederates who were strongly entrenched compelled the Union troops to retreat. The losses, which were slight, were principally on the Union side.

BIG SANDY CREEK, a navigable river of the United States, rises in the Pallachians, and flows N. for some distance in two branches, forming the boundary between Kentucky and Virginia, and joining the Ohio after a course of 150 miles.

BILBER'GIA (*B. tinctoria*), a beautifully-flowered genus of *Bromeliaceæ*, from the roots of which a coloring material is got in Brazil.

BILL'ING, a noble family of Old Saxony, and from 961 to 1106 the ruling dynasty in the Duchy of Saxony, which under it attained great territorial strength and independence. The first Duke was HERMANN B., originally perhaps a simple gentleman, but raised by the Emperor, Otho I., through a succession of dignities to the governorship of Saxony. B. was celebrated in his time for his valor, boldness, sense of justice, and loyalty. He died at Quedlingburg, 27th March 973. His successors in regular order were Bernhard I., died 9th February 1011; Bernhard II., died 29th June 1059; Ordulf, died 28th March 1071; and Magnus, died 23d August 1106, with whom the male line became extinct, when the Duchy reverted to the emperors. The first traditions of the Billings are mythical rather than historical, but it is not improbable that the name was originally that of an old Teutonic clan or tribe, some of whose members may have been among the Low German adventurers who conquered Britain and made it England. The conjecture, if accepted, would historically explain such names as Billingsgate, Billingshurst, Billington, Billingley, &c.—viz., the homes or settlements of the Billings.

BINNEY, HORACE, an eloquent American lawyer, born at Philadelphia, Pa., Jan. 4, 1780, and graduated from Harvard College in 1797. He rapidly rose to distinction in his chosen profession, and was elected to Congress during Jackson's administration, where he produced a marked impression by his oratorical abilities.

BI'OPLASM, a term originated by Dr. Lionel Beale, which has been used synonymously with *Protoplasm* to indicate the albuminous substance of which the bodies of all living beings are principally composed, and which exists in its simplest and most primary form in the Protozoa or lowest animals, and *Protophyta* or lowest plants. The name *Sarcode* is also used to indicate this substance.

BI'ON, a Greek idyllic poet, who flourished in the 3d c. before Christ, was a native of Smyrna, and a contemporary of Theocritus. From the elegy written on his death by his friend and brother bard Moschus, we learn that he spent the last part of his life in Sicily, and perished by poison. The most important of his extant writings is a *Lament for Adonis* (edited by Ahrens, Leips. 1854). His other pieces are merely fragments, but are distinguished by delicacy of expression, purity of feeling, and a simple and natural delineation of pastoral life. They have often been printed and translated with the poems of Theocritus. Separate editions of B. in modern times have been published by Jacobs (Gotha, 1795), Wakefield (Lond. 1795), and, along with Moschus, by Hermann (Leips. 1848). Good translations into German have been executed by Voss (1808) and Mörike (1869).

BIRD-LICE, the name applied to the insects of the order *Mallophaga*, a group of lower or apterous insects undergoing no metamorphosis, and which are destitute of wings. These forms are chiefly parasitic upon birds, and eat the feathers of their hosts by means of their strong masticatory mouths. They frequently destroy the entire plumage, and otherwise affect the health of the bird. They are classified in two families—the *Philopteridæ* and *Liotheidæ*.

BIRD-PEPPER is made from the powdered fruits of *Capsicum baccatum* of the West Indies.

BIRNEY, JAMES G., an eminent American opponent of slavery, born at Danville, Ky., Feb. 4, 1792, and entered the law, after his graduation from Princeton College in 1812. Becoming convinced of the injustice of slavery as an institution, he liberated his own slaves, and established *The Philanthropist*, an anti-slavery journal, at Cincinnati. Here he was mobbed, and his press destroyed and thrown into the Ohio River. In 1836 he became secretary of the American Anti-Slavery Society and removed to New York. Died Nov. 24, 1857.

BI'RON, a title assumed by an ancient and distinguished French family, DE GONTAUT, of which the following are the most conspicuous members: 1. ARMAND DE GONTAUT, BARON, afterwards DUC DE B., born about 1524, secretly favored the Huguenots, but took part against them in the religious wars of the times, and was one of the negotiators of the peace of St. Germain in 1570. On the night of the massacre of St. Bartholomew, B. was in the arsenal of Paris, and protected the Hugnenots who were with him. Charles IX. appointed him to the command of La Rochelle, but the inhabitants successfully resisted the appointment. He was made a marshal of France in 1577; and at the death of Henri III., in 1589, was one of the first to welcome Henri of Navarre, under whom he distinguished himself at the first siege of Paris, and at the battle of Ivry. He was killed at the siege of Epernay, July 26, 1592.—2. CHARLES DE GONTAUT, DUC DE B., son of the former, was born in 1562; at the death of his father was made an admiral, and two years later a marshal of France. He stood high in the esteem of Henri IV., who heaped favors upon him. Daring and brave in battle, he was at the same time indifferent to both sides of the religious struggles of the time, vain, presumptuous, and always in want of money. This last circumstance induced him to intrigue against the king, who twice spared him, but at last was forced to send him to the Bastille. He was tried and condemned to death, a sentence which was put in execution, July 31, 1602.—3. ARMAND LOUIS first DUC DE LAUZUN, and subsequently DUC DE B., born April 15, 1747, brought himself into notice by a tract *Sur l'Etat de Défense de l'Angleterre et de toutes les Possessions dans les Quatre Parties du Monde*, owing to which he was put in command of an expedition against the British possessions on the W. coast of Africa. Arriving at Cape Blanco, he took the fort there, January 30, 1779, and sent a portion of his fleet towards the Gambia, which was successful in seizing some of the British possessions on the coast. After returning to France, B. crossed the Atlantic, and took part in the American War of Independence in 1780. Coming back to France, he was sent to the States-General as a deputy of the nobles; was appointed in 1791 to the command of the army of the north; in 1792, commander-in-chief of the army of the Rhine; in 1793, commander-in-chief of the army of the *Côtes de la Rochelle*, distinguishing himself greatly in all these positions. But he had the misfortune to excite the suspicions of the Committee of Public Safety, and after what was called a 'trial,' was guillotined, December 31, 1793. See *Mémoires de M. le Duc de Lauzun*, (Par. 1822).

BISANAGAR', a town in the Gaikwar's territories, India, situated on the route from Mhow to Deesa, 44 miles S.E. of Deesa. It has considerable trade with Marwar in iron and other heavy goods, and also a considerable manufacture of cotton cloths. Pop. 18,000.

BISH, a celebrated Indian drug and poison, obtained from the dried roots of various species of aconite (*Aconitum ferox*, *A. luridum*, *A. Napellus*, and *A. palmatum*).

BISMARK, or BIS'MARCK (as some branches spell the word), the name of an ancient and noble family of Brandenburg, believed to be of Wendish or Bohemian origin. At a very early period it appears to have founded the village of Burgstall and the petty town of B., in the circle of Stendal, district of Magdeburg, Prussia. In the 12th and 13th c. several members of the family figure as burghers at Stendal and Prenzlow. In 1494 the town of B. was acquired by the lords of Alvensleben, but in 1562 Burgstall was exchanged by Friedrich von B., *Landhauptmann* in the Altmark, for Schönhausen, Fischbeck, Crevese, Briest, &c., belonging to the Brandenburg Elector, Joachim II., and, on account of this barter, is called in the family history *Permutator* (the 'Exchanger'). Friedrich von B. became through his two sons the ancestor of the

two still flourishing houses of B., that of Schönhausen in the Magdeburg region, and that of Crevese in the Altmark. Both lines have produced men notable in their day as statesmen and soldiers. CHRISTOPH FRIEDRICH VON B. (died 1704), lord of Schönhausen, was a Prussian general and commandant of Küstrin. LEVIN FRIEDRICH VON B. (died 1774) was a privy-councilor and minister of justice under Friedrich the Great from 1746 to 1764. His son, AUGUST WILHELM VON B. (died 1783), was also a Prussian privy-councilor, minister of war, president of the Board of Trade and Manufactures, and head of the Excise Department. To a Rhenish branch of the Schönhausen line belonged FRIEDRICH WILHELM VON B., who in 1816 was raised to the rank of count in the peerage of Würtemberg. His elder brother, Freiherr LUDWIG VON B., died 31st March 1816, *Oberhofmarschall* and lieutenant in the service of the Duke of Nassau, and left four sons, all of whom received the rank of count in the Würtemberg peerage, 13th September 1831. To the Schönhausen line also belongs the world-famous statesman Karl Otto von B.-Schönhausen.

BISS'UNPUR, or BISH'ANPUR, a town of British India, in the district of Bankora, division of Burdwan, province of Bengal, on the left bank of the river Bankora, 45 miles W. of Burdwan, and 83 N.W. of Calcutta. It has considerable manufactures of silk and indigo, and an active trade in metal wares, cotton, jute, and fibres. Pop. (1872) 18,047.

BITES OF RABID ANIMALS. These are very dangerous, not only on account of the local effects, but more especially on account of the constitutional effects which may arise afterwards, as Hydrophobia. The treatment consists in tying, where that is possible, a ligature above the seat of injury, or applying compression. This to some extent prevents absorption of the poison. The parts around the wound should be excised as soon as possible; the wound should now be well washed, and afterwards some caustic freely applied. Attention must be paid to the general health until the wound heals. It is only when the animal is really *rabid* that such severe treatment is necessary. Bites from animals not rabid are best treated by soothing applications, as poultices.

BITES OF VENOMOUS REPTILES. The general arrangement of their poisonous fangs will be described in connection with the serpents possessing them. The bite of the common adder is seldom fatal in man. The bites of some foreign species are fatal in a few minutes. Among the most deadly serpents of the United States is the rattlesnake, which is common in nearly all our mountain ranges, and in many parts of our western territory. Its bite is almost invariably fatal. Treatment consists in *sucking* the wound freely. This is quite safe if there be no broken skin in the mouth. This may be done by the person bitten, or by a friend. At the same time a ligature is to be tied above the injured part where that is possible. The part may be cut out, and some strong caustic applied to the wound. Internally, stimulants are to be given freely, such as ammonia or brandy.

BITTER CUCUMBER, or BITTER APPLE (*Citrullus* [*Cucumis*] *Colocynthis*), supposed to be the *wild vine* or *wild gourd* of the Old Testament (2 Kings iv. 39). The fruit furnishes the drastic hydragogne cathartic known as Colocynth. Two kinds are known —*Peeled Colocynth*, from Smyrna, Constantinople, Alexandretta, Italy, France, and Spain; and *Mogadore or Unpeeled Colocynth*, which is obtained from Mogadore. The first is the best, and the kind generally employed in medicine (Bentley).

BJÖRN'SON, BJÖRN'STERNE, a distinguished Norwegian novelist and dramatist, was born at Kvikne, Oesterdal, December 8, 1832, entered the university of Christiania in 1852, and produced his first drama, *Valburg*, while still a student. Dissatisfied with the state of the theater at Christiania, he withdrew his play from the managers before they put it on the stage, and devoted himself for a time to vigorous dramatic criticism, by which he did a great deal to improve the national stage of Norway. In 1856 B. went to Copenhagen, where he wrote the greatest part of *Synnöve Solbakken*, a novel which placed him in the foremost rank of Scandinavian writers, and may be said to have begun a new era in the literary life of Norway. From Copenhagen he returned to his native country, where he was for some years manager of the theater at Bergen, and later of that in Christiania. He edited for a short time, at Christiania, the *Aftenbladet*, one of the leading Norwegian journals. Other novels, each of striking merit, published by B., are *Arne* (1858, translated into English 1866), *A Blithe Boy* (1860), *The Fisher Girl* (1868). They are all vivid pictures of peasant life in Norway. Among B.'s dramas are *Between the Battles*, *Hulda*, *King Sigurd*, and *Mary Stuart in England*.

BLACK-BOY GUM, or the red resin of New Holland, is obtained from a Grass Tree—*Xanthorrhœa Hastile*. The yellow or Botany Bay resin is probably the product of *X. arborea*. Both resins exude spontaneously from the trunks of the trees, and have a fragrant balsamic odor.

BLACK BULLY, or BALLY-TREE WOOD (*Achras sapota*), a S. American tree, belonging to the natural order *Sapotaceæ*, the wood of which is greenish and very hard, and is used for shipbuilding, &c. Its bark is febrifugal, and its seeds diuretic and aperient.

BLACK CUMMIN of the Scriptures (Isa. xxvii. 25–27), believed to be the seeds of *Nigella sativa*, natural order *Dilleniaceæ*, or of a closely allied species, the seeds of which are used by the Afghans for flavoring curries.

BLACK'WOOD, one of the commercial names for E. Indian rosewood (*Dalbergia latifolia*, natural order *Leguminosæ*).

BLADD'ERLOCKS, HENWARE or HONEYWARE, a local name applied to *Alaria esculenta*, a species of seaweed found abundantly on the shores of Great Britain. It is sometimes eaten.

BLAINE, JAMES GILLESPIE, an eminent American statesman, born in Washington Co., Pa., Jan. 31, 1830, sent to school in Lancaster, Pa., in 1841, and graduated from Washington College in 1847, with first honors in a class of thirty-three. From 1847 to 1850 he taught in the Western Military Institute, at Blue Lick Springs, Ky., and in 1851, married Miss Harriet Stanwood of Augusta, Me. He taught in the Pennsylvania Institution for the Instruction of the Blind, at Philadelphia, 1852–54, and, in the latter year, removed to Augusta, Me., where he began his career as an editor. From 1854 to 1857 he edited the *Kennebec Journal*, in 1856 was a delegate to the National Republican Convention, and edited the *Portland Daily Advertiser*, 1857–58. In 1859–62 he was a member of the Maine Legislature, where he made a strong speech in opposition to the annexation of Cuba, which was sought by the Democratic Party, in the interests of slavery; was a delegate to the National Republican Convention of 1860, where he actively supported Mr. Lincoln, and was made speaker of the Maine House of Representatives in 1861. In 1862 he was elected to Congress and continued a member of that body until 1876. While in Congress Mr. Blaine strongly supported Mr. Lincoln, and was an earnest advocate of active war measures. From 1869 to 1875 he was Speaker of the House of Representatives, and in 1876 was a candidate for the Republican presidential nomination, but was defeated by R. B. Hayes, a compromise candidate, and was U. S. senator from Maine 1876–81. In 1881 he was appointed Secretary of State by President Garfield, but resigned the position upon the accession of Vice-President C. A. Arthur to the presidency, after the death of Garfield. In 1884 Mr. Blaine was nominated for the presidency by the Republican Party, having as his opponents Grover Cleveland of the Democratic Party and B. F. Butler of the People's Party. In this contest B. was defeated, Mr. Cleveland being the successful candidate. Mr. Blaine is universally recognized as a man of remarkable ability, but as to the wisdom of his statesmanship, there are wide differences of opinion.

BLAIR, ROBERT, a noted Presbyterian divine, was the son of John B. of Windyedge in Ayrshire, and was born at Irvine in 1593. He studied at Glasgow, was licensed to preach in 1616, and, after several vicissitudes, was settled at St. Andrews. In 1640 he accompanied the Scottish army to England, was conspicuous in the prosecution of the adherents of Montrose after Philiphaugh, was appointed one of the divines who were sent (1645) to Newcastle to reason King Charles out of Episcopacy, and in 1648 was employed by the Church to treat with Cromwell for uniformity of religion throughout the island. At the Restoration he was deprived of his parish, and forbidden to preach. B. died at Meikle Couston, near Aberdour, 27th August 1666. He was a man of considerable force, but altogether too narrow to be remembered with much pleasure.—Robert B., the author of the *Grave*, was his grandson, and Hugh B. was a great-grandson.

BLAST, HOT. In 1828, Mr. James Beaumont Neilson, then manager of the Glasgow Gasworks, discovered that great benefit would arise from heating the air used to support the combustion in Blast Furnaces, and he took out a patent for his discovery. The ironmasters ridiculed it at first, then adopted it everywhere, and then in some cases made a discreditable attempt to evade payment of any royalty to the inventor. The action against Messrs. Baird of Gartsherrie, in 1843, has become almost historical. That firm admitted to have made a profit of £260,000 in ten years on H.-B. iron, but refused to pay his royalties to the man through whose invention they had been able to make this money. After a ten days' trial, in which the defendants' conduct was severely censured by the judge, the validity of Mr. Neilson's patent was fully established. As an instance of the value of the H.-B., it may be noted that by its use the Clyde Ironworks, which in 1829 were using 8 tons 1 cwt. of coal made in coke for the manufacture of 1 ton of iron, were enabled in 1831 to double their turn-out, and use only 2 tons 5 cwt. of coal in its raw state per ton of iron. The temperature of the blast is from 500° to 800° Fahr., or even more, and its pressure about 3 or 4 lbs. per sq. in.

BLASTOI'DEA, an order of extinct *Echinodermata*, the fossil remains of which are exclusively confined to rocks of the oldest or palæozoic period of geology. They are most commonly found in the Carboniferous rocks, and the typical genus is *Pentremites*. *P. pyriformis* and *P. conoideus* are familiar species. The body was fixed to the sea-bed by a short, slender, and jointed stalk or column, and was of oval or globular shape. It was composed of limy plates, united together, and arranged in five *ambulacral* and five *inter-ambulacral areas*. No distinct *arms*, as seen in the *Crinoids*, appear to have been developed in the *Blastoidea*.

BLEEK, FRIEDRICH, one of the most learned of modern German theologians, was born at Arensbök, in Holstein, 4th July 1793, studied first at Kiel and afterwards at Berlin under De Wette, Schleiermacher, and Neander. After holding several minor appointments, he was appointed Professor of Theology at Bonn in 1829, where he labored till his death, 27th February 1859. B., whose writings embrace the whole field of biblical exegesis, is notable alike for his clear and acute criticism, his exegetic skill, and his warm enthusiasm for Christianity. His masterpiece is *Der Brief an die Hebräer* (Berl. 1828–40). In his *Beiträge zur Evangelienkritik* (Berl. 1846) he sought, among other things, to vindicate the genuineness of the Gospel of St. John against the destructive criticism of the Tübingen school. After B.'s death appeared his *Einleitung in das alte Testament* (Berl. 1860). and *Einleitung in das Neue Testament* (Berl. 1862), both of which display in a high degree his fine intellectual scholarship, reverence, and love of truth. The same qualities are visible in his *Synoptische Erklärung der drei ersten Evangelien* (Leips. 1862) and *Vorlesungen über die Apocalypse* (Berl. 1862).

BLEEK, WILHELM HEINRICH IMMANUEL, son of the foregoing, an able linguist, was born 8th March 1827, studied at Bonn and Berlin, and at an early period chose for his specialty the S. African languages. His thesis, when he took his degree, was *De Hominum Generibus Linguarum Africæ Australis* (Bonn, 1851), in which he sought to prove the N. African origin of the Hottentot tongue. In 1855 he went out to Natal along with the newly-appointed Bishop Colenso, and in the course of extensive journeys into the interior and the neighboring Caffre lands, made himself acquainted with the languages, manners, and customs of the natives. In 1856 he obtained an appointment at Cape Town, which gave him an opportunity of prosecuting further his lingnistic studies, especially in reference to the languages of S. Africa, Australia, and Polynesia. B. is the chief author of the *Handbook of African, Australian, and Polynesian Philology* (Cape Town and Lond. 1858–63), a work which not only embraces all the literature extant in these tongues, but attempts also a classification and characterization. Of his other productions, besides a *Vocabulary of the Mozambique Languages* (Lond. 1856), may be mentioned his *Comparative Grammar of South African Languages* (Cape Town, 1862); *Reynard the Fox in S. Africa, or Hottentot Fables and Tales* (Lond. 1864, Ger. ed. 1870); *Über den Ursprung der Sprache* (1868), &c. He died 17th August 1875.

BLET'TING, from the Fr. *blessé*, a term applied by Lindley to that intermediate stage between the maturity and decay of a fruit. It is the first change after the sugar in the ripe fruit has commenced to oxidise. Accordingly, if fruits like pears and apples be kept in close vessels free of oxygen, they will preserve for a much longer period than they would otherwise do.

BLIMBING, the acid fruits of *Averrhöa Bilimbi* and *A. carambola*, two plants belonging to the natural order *Balsaminaceæ*. They are eaten by the natives of India, and are used as pickles by the Europeans.

BLIND, KARL, was born at Mannheim, September 4, 1820, studied at Heidelberg and Bonn, and early became known as an impetuous advocate of German freedom and unity. He played a leading part in Hecker's rising in Baden in 1848, for which he was subsequently exiled. Later he headed the second republican insurrection in the Black Forest, when he was captured, tried and sentenced to eight years' imprisonment. Liberated by the people, he was sent by the Provisional Government on a diplomatic mission to Paris, where he was arrested on a charge of implication in Ledru Rollin's movement in favor of the Roman Republic. After much public discussion, B. was finally banished from France. He has since resided in Belgium and England, actively engaged in a democratic propaganda. B. is an honest enthusiast, who is ready to turn the world upside down in the interests of humanity. Politically he belongs to the order of 'Irreconcilables.'

BLOOM (Old Eng. *bloma*), originally a mass of malleable iron obtained by direct reduction of the ore in a hearth or bloomery. The word is now used in ironworks for the spongy mass of iron taken from the puddling-furnace.

BLOOM'INGTON, a flourishing city and railroad center of McLean Co., Ill. It has large manufactories, fine educational institutions, and is one of the most beautiful cities of the state. Pop. 14,590.

BLUE GRASS, a species of grass very common in Central Kentucky, and especially adapted to stock-raising. The reputation of Kentucky stock is very largely due to the abundance of this grass within its borders.

BLUE-JOHN', the name given by miners to a rich violet-blue variety of Fluor-spar, found abundantly in Derbyshire, and manufactured into vases, &c.

BLUE SHARK (*Carcharias glaucus*), a genus of true sharks common in the Mediterranean, but sometimes occurring on the southern coasts of Britain. The head is pointed and flattened, the teeth being sharp and notched at the edges. No spiracles or breathing-holes, placed on the top of the head, exist in this form. These sharks attain a length of eight feet or more, and are of voracious disposition, feeding chiefly upon fish. The B. S. is said to manifest a close attachment to their young. The common or white shark (*C. vulgaris*) is a nearly allied form.

BLU'MENTHAL, LEONHARDT VON, a distinguished Prussian general, was born at Schwedt on the Oder, July 30, 1810, educated in the military academies of Culm and Berlin 1820–26, and received the appointment of lieutenant in 1827. After holding various minor posts, he was raised (1849) to the general staff, and appointed to the command of the Slesvig-Holstein army. He was twice subsequently employed to convey to England special military propositions. In the Danish war of 1864, however, came his first great military success, when his strategical ability was so decidedly shown in the taking of Missunde, the storming of the trenches at Duppel, and in the passage to the island of Alsen. In acknowledgment of these services, he was raised to the rank of major-general. B. afterwards greatly distinguished himself in the Austro-Prussian war of 1866, and on the outbreak of the Franco-Prussian war was appointed chief of the general staff of the army of the Crown Prince. To the skillful operations of B. in the latter campaign were in great part due the catastrophe of Sedan and the capture of Paris.

BLUNT'SCHLI, JOHANN KASPAR, a distinguished Professor of Political Science in Germany, was born at Zürich 7th March 1808. He studied at Berlin (1827) under Savigny, and afterwards at Bonn under Hasse and Niebuhr. In 1833 he was appointed a professor in the newly-founded university of his native town, went to Münich in 1847, and accepted a call to Heidelberg in 1861, where he has since remained. B.'s career has been active and patriotic. Averse to the narrow and schismatical Radicalism of the German democrats, he has labored unwearyedly to create a national party which should be at once liberal in politics and conservative in spirit. Of his numerous writings we may mention *Staats- und- Rechtsgeschichte der Stadt und Landschaft Zürich* (Zür. 1838, 1839; new ed. 1856); *Geschichte des Schweizer. Bundesrechts* (Zür. 1846–52); *Allgemeines Staatsrecht* (Mün. 1852; 4th ed. 1869); *Deutsches Privatrecht* (Mün. 1853; 3d ed. 1864); *Die neuen Rechtschulen der Juristen* (2d ed. Zür. 1862); *Geschichte des Allgemeinen. Staatsrechts und der Politik* (Mün. 1864); *Das moderne Kiregsrecht* (1866); *Das moderne Völkerrecht als Rechtsbuch* (1868).

BOAT'-TAILS, a name applied to the Insessorial birds forming the family *Quiscalinæ*, represented by American birds allied to the starlings. Of these birds the *Quiscalus ferrugineus*, and the *Q. versicolor*, or 'Crow Blackbird,' are good examples. The tail is long and tapering, and the edges are curved upwards like the sides of a boat, this conformation suggesting the above familiar name. *Q. versicolor* is about 12 inches in length, and is colored entirely black, with metallic tints and lustres. These birds feed on insects, but they also damage the crops of Indian corn.

BOCH'UM, a town of Prussia, province of Westphalia, 5 miles E.N.E. of Essen by railway. It has large manufactures of cloths, iron, and steel wares (notably coffee-mills), tobacco, and tapestry. There is a chamber of commerce, a royal technical school, a municipal high school, and various other public institutions. Pop. (1872) 21,192.

BOGONG', a mountain range in the N.E. of Victoria. Several of its peaks exceed 6000 feet in height. The loftiest are Mount B. (6588 feet), and Mount Feathertop (6303 feet). The range derives its name from a large moth found in elevated regions, and highly relished as food by the blacks.

BOIELDIEU, FRANÇOIS ADRIEN, 'the French Mozart,' born at Rouen, 15th December 1775, received his first instructions in the cathedral of his native city, and was, with Auber, a pupil of Cherubini. After a busy and prolific career, he died, 8th October 1834. His opera of *La Dame Blanche* (the 'White Lady of Avenel,' in Sir Walter Scott's *Monastery*) has been extremely popular in France, but none of his works have become well known in America. His principal operas are *Le Calife de Bagdad* (1799), *Jean de Paris* (1812). *Le Nouveau Seigneur* (1813) and *Le Chaperon Rouge* (1817). His son, ADRIEN B. (born 1816), is also a composer, and produced the opera *La Halte du Roi* at Rouen on his father's centenary in 1875.

BOIS-TAN, the name applied to the fruits of *Byrsonima spicata*, a tree of the natural order *Malpighiaceæ*, which are used in dysentery. In Brazil the bark is also used for tanning.

BOL'DO, or BOL'DU, a small tree, *Boldoa fragrans*, growing in Chili, the leaves of which yield an essential oil, and an alkaloid termed *boldine*. They are employed for medicinal use in liver complaints. The bark of B. is available for tanning.

BOMBARD'ON, a bass brass instrument of the Bugle class used in military bands.

BONE BEDS, the name applied in geology to deposits or formations of varying age, which contain organic remains of various kinds. Thus in the Upper Silurian rocks and in the Tilestones strata, one of the bands, containing the remains of fishes and Crustacea, have received the name of B. B.; whilst in the Triassic system, and beneath the White Lias strata, the Phœtic B. B. occur. These contain scales, teeth, and coprolites or excreta of fishes and reptilia. The name B. B. thus appears to be applied to formations more from the general appearance of their contained fossils, than from these consisting always of definite osseous structures.

BON'GO, a people of Central Africa, inhabiting a country in the Upper Nile district, to the S.W. of the basin of the Bahrel-Ghazal, between 6°–8° N. lat. and 27°–28° E. long. Estimated area, 9000 sq. miles; pop. 10,000. The country is flat and ferruginous, and is abundantly watered by five large tributaries of the Gazelle, and by many smaller streams. The chief natural products are sorghum, maize, beans, bamia, tobacco, and various tubers. *Parkia terminalia*, the butter-tree, and funguses abound, while there have been collected as many as 700 flowering plants. The rainy season extends from April to November. Formerly a great field for elephant-hunting, Bongoland has now only antelopes, ichneumons, civets, genets, wild-cats, and caracals. Its domestic animals are poultry, goats, and dogs. The B., who believe in witchcraft, and speak a harmonious language of simple structure (Dr. Schweinfurth, *Linguistische Ergebnisse einer Reise nach Central Afrika*, Berl. 1873), live by agriculture, and occasional hunting and fishing. They have a red-brown complexion, not unlike the color of the soil, and are muscular and compact in limb, with an average height of 5 feet 7 inches. Almost without tools, they produce beautiful ironwork, besides rude musical instruments, and a variety of wooden articles. About the year 1853 the Nubian slave-dealers began their raids upon the B., whom they found living in petty communities, and therefore incapable of combined defence. The B. soon became much prized as slaves, being docile and industrious, and within ten years there were eighty slave seribas or forts scattered over the country, while half the natives had been kidnapped, and great numbers had taken to flight. The country is still under vassalage to the Khartoom slave-dealers, and forms a convenient base for further slave operations in the lands of the Niam-Niam, Mittoo, &c. See Dr. Schweinfurth's *Heart of Africa* (2 vols. Lond. 1873).

BONNER, ROBERT, an American editor, born in Ireland, April 28, 1824, came to America when young, and bought the New York *Ledger* in 1844, which he has succeeded in making one of the leading papers of its kind in the U. S. Mr. Bonner has accumulated a large fortune, and has made munificent gifts for religious and charitable objects.

BOOK-TRADE. It is to be borne in mind that the book-trade of America is scarcely a century old. The primitive life of the early settlers was not adapted to the cultivation of literary pursuits. But with an increase in wealth, and the multiplication of higher educational institutions, literature and book-making received a marked impetus. Now (1885) there are not only large publishing-houses in the eastern sea-board cities, but also in all the larger western cities, such as Chicago, Cincinnati, St. Louis, and San Francisco. If the progress of the next fifty years is as rapid as that of the past fifty, America bids fair to lead the world in book-making. See BOOK-TRADE in Chambers' En., and PUBLISHERS, AMERICAN, in AM. SUPP.

BOOTH, JOHN WILKES, an American actor, and the assassin of Abraham Lincoln, born in Maryland in 1838. During the civil war, his sympathies were with the South, and early in the year 1865, he formed a conspiracy with others, to murder Mr. Lincoln and the principal officers of the government. On the evening of the 14th of April, he entered Ford's Theater at Washington, where Mr. Lincoln was sitting in a private box, and shot him. He shouted '*Sic semper tyrannis*,' leaped upon the stage below, breaking his leg by the fall, and in the confusion escaped through a back door, mounted a horse that was held in waiting for him, and fled to Virginia. Here he was concealed for a time by rebel sympathizers, but on April 26 was discovered in a barn near Bowling Green, and refusing to surrender, was shot.

BO'RER, the name given to certain beetles of the genus *Anobium*, to which genus the familiar 'Death-watch' belongs. The latter insect, indeed, in its caterpillar or larval state, bores into wood, and thus destroys furniture of all kinds. They belong to the tribe *Pentamera*, the members of which possess five joints in their tarsi. The jaws in these larval insects are of strong make, and constitute the boring organs; and the larvæ reside in the burrows thus formed during their pupa state, emerging therefrom as the perfect beetle or *imago*. One species, *Lymexylon navale*, burrows into and destroys oak timber, and thus does great damage in dockyards. It is chiefly found in N. Europe.

The name 'B.' is also applied to certain *Lamellibranchiate* shell-fish or *Mollusca*, which bore into rocks by means of their shells. Of these latter forms, the *Pholas* or Piddock, the *Teredo* or Ship-worm, &c., are familiar examples.

BORT, or BOART, dark-grey or black lusterless diamonds found in the Brazilian mines. They are also called *carbonado* or anthracitic diamonds, and possessing the hardness of the precious mineral, they are used for diamond rock-boring drills, for machines used to dress millstones, and other stone-cutting apparatus.

BOSTON. Among the many public buildings of Boston, the following are worthy of special note: Faneuil Hall was presented to the city by Peter Faneuil in 1742. It is one hundred feet long, and eighty feet wide, is known as the 'cradle of liberty,' and is a building of large historic interest. The new custom-house was erected at a cost of more than $1,000,000. It is surmounted by a stately dome, and rests upon a foundation of 3000 piles. In 1866 a new city hall was erected of granite. Music Hall is one of the finest and largest concert halls in the U. S. Its organ cost $60,000, and has 6000 pipes. The Free Library is one of the largest and finest in America. It cost $363,633 and contains nearly 300,000 volumes. In 1872 there occurred in Boston one of the largest conflagrations ever known in the U. S. It broke out on the night of Nov. 9th. It raged with increasing violence until morning, when an attempt was made to check its progress by blowing up buildings with gunpowder, but it was not until 2 P.M. of that day that it was brought under control. Seven hundred and seventy-six buildings were consumed, and property was destroyed to the amount of more than $70,000,000. Boston is celebrated for its culture, and is sometimes called the Athens of America. See BOSTON in Chambers' En.

BOTH'Y, the name given to houses on a farm in which unmarried men are lodged throughout the year, and to outhouses in certain counties of Scotland where women are accommodated during the time of potato-hoeing. Mr. Stephens, in his *Book of the Farm*, makes the sweeping assertion that the B. system is a bad one, and that in his opinion 'it ought to be entirely abolished.' Mr. Robb, in his little book entitled *The Cottage, the B., and the Kitchen*, while from personal experience declaring that occasionally bothies are not fit for habitation, asserts that many of them are healthy and comfortable. He adduces various instances in Fife, Forfar, and Perth, where he found bothies with a general feeding-room, and with separate apartments for the various individuals. But there can be little doubt, that where the utmost care is not taken to secure cleanliness and comfort, the B. system is exceptionally pernicious to the moral habits of the peasantry.

BOTTLE-TIT, a name given to the long-tailed titmouse (*Parus caudatus*), a familiar species of *Dentirostral Insessores*, or Perching Birds, forming the sub-family *Parinæ*. The color is gray on the head, throat, and cheeks, a band of black passing over the eye, extending over the shoulders and back; whilst the central tail-feathers are black. The wings are black, and the shoulders and lower back are reddish. The average length is 5½ inches. The eggs are usually very numerous, raging from eight to sixteen in number.

BOTTS, JOHN MINOR, an American statesman, born in Prince William Co., Va., September 16, 1802. He was several times elected to Congress, opposed the repeal of the Missouri Compromise, and supported the Union during the Civil War. In 1866 he published *The Great Rebellion*. Died January 8, 1869.

BOUNTY, MUTINY OF THE, one of the most remarkable mutinies on record, took place 28th April 1789, on board H.M.S. *Bounty*, 215 tons, under Captain Bligh, bound from Otaheite to the W. Indies, with some 1015 bread-fruit trees. It arose seemingly out of discontent on the part of the crew with the strict discipline of the ship after a long and delightful stay at Otaheite. When fourteen days out from the island, according to a concerted scheme, twenty-five of the men, headed by Fletcher Christian, mutinied, cast Bligh and eighteen others adrift in the ship's launch, and returned to Otaheite. Here sixteen of the men took up permanent residence, while the others, fearing pursuit, sailed to Pitcairn Island, where, after a period of mad debauch, they founded a flourishing colony. Meantime, Bligh and his comrades, after a dreadful voyage of 3600 nautical miles, reached the island of Timor, to the east of Java. On his return to England, Bligh published a *Narrative*, which roused a storm of excited feeling. The frigate *Pandora* was sent in search of the recreants, and succeeded in capturing ten of the number, who were brought

to England and tried by court-martial, seven being acquitted and three being hanged, October 1792. See Sir J. Barrow, *The M. of the B.* (Lond. 1835); Lady Belcher, *The Mutineers of the B., and their Descendants in Pitcairn and Norfolk Islands* (Lond. 1870).

BOUR'BON TEA, or FAHAM, the dried leaves of the *Angræcum fragrans*, an orchid so called from being used as a substitute for tea in the Mauritius or Isle of Bourbon. It produces a soothing effect without causing sleeplessness, but is not much esteemed in London and Paris, into which it has been introduced.

BOUTWELL, GEORGE SEWALL, LL.D., an American lawyer and prominent politician, born at Brookline, Mass., Jan. 28, 1818, was elected Governor of Massachusetts in 1852, member of Congress 1863–69, Secretary of the Treasury under Grant 1869–73, and U. S. senator 1873.

BOUVIER, JOHN, an American law writer, born in France in 1787, came to the U. S. in 1802, and began to practice law in Philadelphia, Pa. He is best known by his *Law Dictionary*, published in 1839, and everywhere recognized as a standard authority. Died Nov. 18, 1851.

BOWDOIN COLLEGE, located at Brunswick, Cumberland Co., Me., and founded in 1802. The college was named after Governor Bowdoin of Massachusetts, whose son James bestowed upon it a valuable endowment in both land and money, besides a valuable library. It has also been assisted by the state, and is now a most flourishing institution. A Medical College was established in connection with it in 1820.

BOWLES, SAMUEL, a distinguished American journalist, was born at Springfield, Massachusetts, February 9, 1826, and since 1844 has been sole editor of the *Springfield Republican*, founded by his father. Under his management the paper has become one of the foremost journals in the country, and is noted for its extensive news, its literary taste, and its intelligent views of public affairs. In recent years it has labored to free the press from the bias of political party. B. is author of *Across the Continent* (1865), *Our New West* (1867), and *The Switzerland of America* (1869). Died 1879.

BOYD, ROBERT, of Trochrig, an eminent Scotch divine, was the son of James B., *tulchan* Archbishop of Glasgow, and was born in that city in 1598. Educated in Edinburgh and France, he commenced teaching in the latter country at Tours, was ordained pastor at Verteuil in 1604, professor at Saumur in 1606, and was afterwards called by King James to the Principalship of Glasgow University, where he taught Hebrew, Syriac, and theology, and also preached every Sunday in Govan. He died 5th January, 1627. Of B.'s works, the least unknown is his *Prælectiones in Epistolam ad Ephesios*. He was a fine Latin scholar of the old type, and had a genius for Latin verse which he did not sufficiently cultivate.

BOYLE'S LAW, also known as Marriott's Law, expresses that at constant temperature the volume of a gas is inversely proportional to the pressure. It was first proved experimentally by Robert Boyle.

BRACHIA'LIS AN'TICUS is a broad muscle covering the front of the elbow-joint and lower half of the Humerus. It arises from the middle of the humerus, and is inserted into the Ulna. Its chief action is to flex the elbow-joint, which it does in conjunction with the biceps muscle. The B. A. helps also to protect the elbow-joint.

BRACHYU'RA ('short tailed'), a division of the *Decapodous* order of Crustacea, represented by the various kinds of crabs. These forms possess a rudimentary abdomen, which is tucked up beneath the broad body or *cephalothorax*, consisting of the united head and chest. The rudimentary abdomen is not provided with appendages, and is used, in the case of the female animals, to carry the ova or eggs. The B. generally undergo a metamorphosis —the common crab first appearing as a tailed form (*Zoea*), next as a *Megalopa*, and lastly as the perfect crab, with a rudimentary abdomen.

BRADBURY, WILLIAM B., an American composer of sacred music, born at York, Maine, 1816, but resided during the greater part of his life in New York. He published numerous works for church choirs and Sunday-schools, which met with enormous sales. Died Jan. 7, 1868.

BRAD'FORD, WILLIAM, second governor of Plymouth Colony, was born at Austerfield, Yorkshire, 1588. He had a good patrimony, and is one of the few early pilgrims who can be clearly shown to have had a gentle ancestry in England. B. came with the first colonists in the *Mayflower*, 1620, was the second governor of Plymouth Colony, New England, and died May 9, 1657. He is the author of a *History of the Colony*.

BRADLAUGH, CHARLES, an eminent English atheist, and demagogue, born in London, Sept. 26, 1833. He attended school but little, owing to the extreme poverty of his parents, and very early in life became a skeptic. He edited and published the *Investigator*, which failed from lack of support, but met with greater success with the *National Reformer*. In 1873, he came to the U. S., and delivered addresses at numerous places and invariably to large audiences. He is a Radical of the most advanced type, and seeks in England the establishment of a Commonwealth similar to that of the United States. Mr. Bradlaugh has been elected to Parliament several times, but has never been permitted to take his seat, owing to his refusal to take the required oath.

BRAGG, BRAXTON, an American officer, born in North Carolina in 1817 and graduated from West Point in 1837. He served with gallantry during the Mexican war, and upon its termination became a sugar planter in La. Upon the outbreak of the civil war, he entered the confederate service, was promoted to general in 1862, was defeated by Buell at Perrysville, commanded the confederate forces at Chickamauga, and was removed from his command after his defeat at Mission Ridge. At the close of the war he resumed sugar planting in La. Died at Galveston, Texas, Sept. 27, 1876.

BRAHMS, JOH., a distinguished living pianist and composer, born at Hamburg, 7th May 1833, where his father was contrabassist at the theater. On a professional journey in 1853, he met Schumann at Düsseldorf, became his enthusiastic admirer, and is now his greatest living follower. In 1863 B. became Director of the Sing-Akademie at Vienna, in which city he has since lived. His compositions are numerous in all departments except the dramatic, but they are more popular in N. than in S. Germany. B.'s greatest work is probably his *Ein Deutsches Requiem*, by which also he is best known in this country.

BRAILS, a nautical term, meaning small ropes for gathering up a yard to the bottom and skirts of its sail, preparatory to furling. The sail is 'brailed up' when the brails are hauled taut.

BRAINARD, JOHN GARDINER CALKINS, an American poet, born at New London, Conn., Oct. 21, 1796, and graduated from Yale College in 1814. An edition of his poems was published in 1825. Died Sept. 26, 1828.

BRAKE, an apparatus by which the energy of a moving body may be absorbed by friction, in order either to stop or retard its motion, as in the B. upon a train, or to use up surplus energy, as in the testing of engines 'on a B.'

BRANCH'IAL ARCHES, the name applied to the bony arches of fishes, which exist on each side of the throat, and are attached superiorly to the under surface of the skull. They support the gills or *Branchiæ*, and each arch is composed of two distinct pieces, known as the *cerato-branchial* and *epi-branchial* bones. The B. A. grow successively smaller as they recede from the mouth, and in many fishes may support teeth.

BRANCH'IAL HEART, the name applied to the heart in fishes, for the reason that its sole function consists in driving the venous or impure blood to the *branchiæ* or gills for purification. This name is used in contradistinction to the name *systemic heart*, which (as in Gasteropodous Molluscs) drives the *pure* blood through the sytem. In *Cephalopoda* or cuttlefishes, a B. H. exists at the base of each gill in addition to the systemic heart; and by means of these branchial hearts the venous blood is propelled to the gills to be ærated.

BRANCH'IAL SAC, the term applied to the breathing chamber of the *Tunicate* molluscs or 'sea-squirts,' which consists of a sac, the walls of which are composed of a network of blood-vessels, in which the venous blood is exposed to the oxygen contained in the water admitted to the sac.

The name is also applied to the pharyngeal dilatation or sac seen in the *Amphioxus* or Lancelet—the lowest member of the fish-class —and which is also used for respiration.

BRANCHIA'TA, the name given to various groups of animals from the fact of their possessing *branchiæ* or *gills*. Thus the *fishes* and *amphibians* (as frogs, &c.) together form the *Branchiate Vertebrata* from the fact that they possess gills at some period of life— the fishes during the whole of life, and the amphibia always in *early* life; the breathing, in the latter case, being afterwards carried on partly or entirely by lungs. The *Branchiate Gasteropodous* mollusca include the whelks, &c., which breathe by gills, as distinguished from the snails or land gasteropods, which respire by means of pulmonary or lung-sacs. The name *Abranchiate* is used in opposition to the foregoing term.

BRANT, JOSEPH THAYENDANEGA, a distinguished Indian chief of the Mohawk tribe, born in 1842. During the Revolutionary war he assisted the British armies in several enterprises.— Brant was well educated, an eloquent orator, and a man of considerable literary attainments. He published the Gospel of Mark in the language of his people. Died Nov. 24, 1807.

BRAY, EDWARD ATKYNS, B.D., F.S.A., was a poet and theological literateur, and was born at Tavistock, Devonshire, 18th December 1788. He studied at Cambridge, and was called to the bar in 1806. But law not proving congenial, he took

orders, and obtained the vicarage of Tavistock, where, after an industrious literary career, he died, 17th July 1857. B. wrote *Arcadian Idylls, Lyric Hymns, Discourses on Protestantism,* and published a variety of selections from eminent divines. His *Poetical Remains, Social, Sacred, and Miscellaneous,* with a memoir, were edited by his widow (2 vols. Lond. 1859).

BREAKING JOINT is an arrangement used in construction in iron and other materials, analogous to bonding in brickwork and masonry. The phrase implies that the joints in contiguous strakes, or layers of plates, should not be in line with, or over each other, in order that the structure may be as little weakened by them as possible.

BREAKING OF PRISON is the crime of escape by one lawfully imprisoned, whether effected by violence or by corruption.

BREAKSTONE, an old name for the *lady's mantle* (*Alchemilla vulgaris*), derived from the popular belief in regard to its action in stone and gravel. It is somewhat tonic and astringent.

BREAST-WHEEL, a vertical water-wheel in which the water enters the buckets at some little distance below the highest part of the periphery, and which is fitted with a casing, or *breast*, extending downwards from the point where the water enters to the tail-race, nearly fitting the outside of the wheel, and so preventing the water leaving the buckets too soon.

BRECKENRIDGE, John Cabell, an American statesman and soldier, born in Kentucky, Jan. 21, 1821, began to practice law at Lexington, Ky., and was elected to Congress in 1851. He was elected Vice-President, 1856, with James Buchanan as President, and was nominated for the presidency in 1860 by the pro-slavery wing of the Democratic party. His competitors were Abraham Lincoln (Republican), John Bell (Constitutional Union), and Stephen A. Douglas (Democrat). Mr. B. carried nearly all the southern states, and received seventy-two electoral votes. Mr. Lincoln was the successful candidate. Mr. B. was elected to the U. S. Senate in 1861, but soon after resigned that position and entered the Confederate army, in which he served until Jan. 1865, when he was made secretary of war of the Confederacy. Died May 17, 1875.

BRE'DOW, Gabriel Gottfried, a German historian, born at Berlin, 14th December 1773, educated at the Joachimsthal Gymnasium and at Halle, and in 1796 became schoolmaster at Cutin. Here he devoted himself with great earnestness to a study of the geography and astronomy of the ancients. The fruits of this labor were his *Handbuch der alten Geschichte, Geographie und Chronologie* (Alt. 1803; 6th ed, 1837), and his *Untersuchungen über einzelne Gegenstände der alten Geschichte, Geographie und Chronologie* (Alt. 1800–2). In 1804, B. was appointed Professor of History at Helmstedt, where he published for some years the *Chronik des 19. Jahrh.*, but afterwards returned to his favorite studies, and planned a great work on the history of all systems or conceptions of geography, from Homer down to the middle ages, only a small part of which he executed. In 1809 he was called to the University of Frankfurt-on-the-Oder, and in 1811 to Breslau, where he died, 5th September 1814. B.'s schoolbooks are very widely used in Germany; as his *Merkwürdige Begebenheiten aus der Allgemeinen Weltgeschichte* (Alt. 1810; 26th ed.), and his *Umständliche Erzählung der merkwürdigsten Begebenheiten aus der Allgemeinen Weltgeschichte* (Alt. 1810; 13th. ed. 1852). See Kunisch, *B.'s Leben und Schriften* (Berl. 1816).

BREVILING'UIA, the name applied to those *Lacertilia*, or Lizards, in which the tongue is thick, fleshy, and protrusible, or capable of being protruded only when the mouth is open. This name is used in opposition to the term *Fissilinguia*, which denotes those lizards in which the tongue is bifid or cleft or sheathed, and capable of protrusion through a notch in front of the jaws, even when the mouth is closed. The B. (or *Pachyglossa*) are represented by the geckos, iguanas, &c.

BREWSTER, William, the leader of the *Mayflower* Pilgrims, was born at Scrooby, 1566, and educated at Cambridge. He left the Established Church, and founded a separate society in his house. In 1608 he went to Holland, and opened a school at Leyden. He was made ruling elder, and conducted the Pilgrims in the *Mayflower* to Plymouth, Mass., in 1620. B. was their only spiritual teacher for some years, but he did not administer the sacraments. He died April 16, 1644, and is venerated as the ruling spirit in the earliest New England colony.

BRIDGE. The following are among some of the more remarkable bridges of the U. S. The Niagara bridge, spanning the Niagara River, just below the falls of the same name, has a span of 821 feet, 4 inches, and is one of the most remarkable structures of its kind. The Cincinnati and Covington bridge over the Ohio River, has a total length, including approaches of 2252 feet. The bridge over the Missouri at Omaha, is divided into 11 spans, and is 2800 feet in length; and that over the Hudson, at Albany, has 15 spans, and is 1740 feet long. One of the most remarkable structures of this kind is the Brooklyn bridge, joining that city and New York. The description of this bridge and its construction may be briefly given as follows:

Construction commenced Jan. 3, 1870; length of river span 1995 feet, 6 inches; length of land spans 930 and 1860 feet; length of Brooklyn approach 971 feet; length of New York approach 1562 feet, 6 inches; total length of bridge 5989 feet; width of bridge 85 feet; depth of tower foundation below water, Brooklyn 45 feet; depth of tower foundation below water, New York 78 feet; height of towers above high water 278 feet; clear height of bridge in center of river span, above high water 136 feet.

The cost of this bridge was about $15,000,000, and it was opened to the public in May 1883. See Bridge in Chambers' En.

BRIEVE, or BREVE, is in Scotch law a writing issuing from chancery in the name of the sovereign, addressed to a judge, ordering trial to be made by a jury of certain points stated in the B. These writs seem at one time to have been the foundation of almost all civil actions in Scotland; but it is in the appointment of tutors to minors, in inquiries as to lunacy, in ascertainment of widow's terce, and in dividing property among heirs-portioners, that brieves are now chiefly in use. There was also the B. of Inquest, the object of which was judicially to ascertain the heir of a deceased person; but for this purpose the form of procedure is now by petition of service.

BRISTOL-BOARD is a kind of card-board used in sketching, and formed by pasting together two or more thicknesses of white paper.

BRITT'LESTAR, a genus of starfishes (*Echinodermata*) included in the order *Ophiuroidea* of that class. They are distinguished from common starfishes by the fact that the viscera or organs of the body are confined to the central disc or body, and do not extend into the rays; whilst the ambulacral or 'walking' system of tube feet is rudimentary, and not adapted for locomotion. The brittlestars form the genus *Ophiocoma*, and the familiar species are the common B. (*O. rosula*), *O. neglecta* (the 'grey B.'), *O. punctata*, and *O. filiformis*. They derive their popular name from their curious habit of breaking off their rays when irritated or touched; and, from this peculiarity, it is a rare occurrence to secure a perfect specimen. The arms are five in number, and of simple form.

BRODIE, William, born at Banff, 22d January 1815, commenced modeling in Aberdeen in 1840, went to Edinburgh in 1846, and studied at the art schools there. He exhibited first in 1847, was elected Associate in 1852, and Academician in 1859. In his statues, busts, and imaginative subjects he has shown fine fancy and delicacy of treatment. Among his ideal statues are 'Corinna,' in the possession of Mrs. Baird of Stitchell; 'Œnone,' belonging to Lady Ashburton; 'Hecamede,' executed for Lord Taunton; 'Summer and Winter,' for J. Young, Esq. of Kelly, &c. Among his public statues are those of the late Prince Consort at Perth, Sir David Brewster and Sir James Y. Simpson at Edinburgh, the late Master of the Mint (Dr. Graham) at Glasgow, &c.; while among his busts and portrait-statues are those of Her Majesty the Queen, Lady Kinnaird, Lord Barcaple, Sir Robert Christison, Dr. Guthrie, and Principal Candlish.

BROGL'IE, an ancient French family, originally from Quiers in Piedmont. It has produced many distinguished men, among whom may be reckoned several archbishops, bishops, governors and three marshals of France. It was composed of four branches.—Alberic de Broglio, a famous captain of his time, after having captured the city of Assisi, left Turin, and fixed himself at Rimini, where he founded the first branch.—Simon de Broglio (dead before 1394) is the father of the three other branches, of which the first established itself in Provence, the second in Paris, and the third in Piedmont. To the last belongs the present Duc de B., though his family has been settled in France for some centuries.—Albert, Duc de B., son of Achille Léonce Victor Charles, Duc de B., a politician of note in the reign of Louis Philippe, and grandson of Claude Victor, Prince de B., who was guillotined in 1794, was born at Paris, 13th June 1821, and at an early age made a name for himself as a political writer. He commenced as a contributor to the *Revue des Deux Mondes*, and was afterwards one of the chief writers in the *Correspondant*. Equally opposed to the one-sided doctrines of mediæval papistry and modern rationalism, autocracy, and democracy, he has been an able defender of Catholic interests and of moderate constitutional liberalism. His principal literary work is *L'Église et l'Empire Romain au 4me Siècle* (2 vols. Par. 1856). Two other works may be regarded as continuations of it, *Julien l'Apostate* and *Theodose le Grand*. He became the head of the family on the death of his father, January 25, 1870, and a political career was opened to him by the fall of Napoleon III. In 1872 he was appointed by M. Thiers French ambassador to London during the negotiations on the treaty of commerce, a post which he held only for two months.

BROKER. In America there are brokers engaged in nearly every branch of trade. Their transactions are practically regulated by the same laws as in England. Where there are not special laws or customs, they are governed by the laws relating to Principal and Agent. In many of the larger American cities, are great corporations composed entirely or largely of brokers. As examples may be mentioned the 'New York Stock Exchange' and the 'New York Mining Exchange.' See BROKER in Chambers' En.

BROOKLYN. The population of Brooklyn (then Brenckelen) was 509 in 1698; in 1800, 3298; in 1830, 15,292; in 1840, 36,233; in 1850, 96,850; in 1860, 266,661; in 1870, 396,350; and is now (1884) probably nearly 700,000. Brooklyn has a fine system of public schools and a Central Grammar School under the control of a Board of Education, appointed by the mayor. Besides these there are the Packer Collegiate Institute for young ladies, the Brooklyn Collegiate and Polytechnic Institute for young men, and the Adelphi Academy for both sexes. There is a flourishing medical college connected with the Long Island College Hospital. The largest library of the city is the Mercantile, with more than 50,000 volumes, which number is rapidly being increased. The Long Island Historical Society has a fine library of 30,000 volumes. The principal buildings of the city are the Mercantile Library building (cost $219,932), the Williamsburg Savings Bank (cost $450,000), the King's County Court House (cost $550.000), and the Academy of Music (cost $200,000). The principal park of Brooklyn is Prospect Park, which contains 522 acres, and for natural beauty is unsurpassed by any in the U. S. See BROOKLYN in Chambers' En.

BROOKS, REV. PHILLIPS, an American clergyman of the Episcopal church, born at Boston, Dec. 13, 1835, and graduated from Harvard College in 1855. He was ordained in 1859, was for several years rector of the Church of the Advent in Philadelphia, Pa., and in 1862 was called to the Church of the Holy Trinity in Boston, where he still is (1885). He has attained high rank as a thoughtful, eloquent preacher.

BROTHERS OF THE CHRISTIAN SCHOOLS (*Frères des Ecoles Chrétiennes*), a religious congregation founded at Rouen, France, in 1684, by Abbé John Baptist de la Salle. A great movement in favor of educating the sons of the laboring poor was started in France about 1680. In this a number of zealous priests and laymen took a leading part, foremost among whom was a M. Nyel of Rouen, who, devoting himself entirely to this good work, succeeded in organizing a band of lay teachers, whom he trained himself, and sent to labor wherever the generosity of the municipal authorities or that of private individuals provided school edifices and salaries. The fact, however, that the teachers were bound together by no permanent tie, that their methods were imperfect, and their future uncertain, detracted greatly from the efficiency of M. Nyel's efforts. Fortunately, when the most critical moment came for him, he found in the Abbé de la Salle, then a prebendary of Rheims, a trusty friend, counselor, and fellow-worker. The latter, resolving to devote himself exclusively to the apostleship of education, and to bind his associates to himself and together by the example of perfect self-sacrifice, gave up his prebend, sold his patrimonial estates and distributed the proceeds to the poor. Bent on laboring exclusively for God in educating the sons of the poor and the laboring classes, he threw himself and those who joined him in his purpose on the bounty of Divine Providence and the generous support of the people. He and his associates bound themselves together by the ordinary monastic vows, the founder infusing into the rule which he drew up for their common guidance a spirit of lofty abnegation and self-sacrifice. The teaching of Christian Doctrine and the inculcating by word and example the love and practice of Christian morality were to be foremost in their endeavors. Latin ceased to be obligatory in the schools of the new society, the native language, with such branches as fitted boys for skilled labor and business habits in every walk of life, becoming the subject-matters taught in the schools of the Christian Brothers. They thus aimed at revolutionizing and christianizing national primary education. Their success was extraordinary, the principal cities of France vieing with each other in founding schools for the associates of John Baptist de la Salle. —They bound themselves by vow to make such teaching their life-work. Hence, from the beginning the saintly and far-seeing founder took every possible means to perfect his methods and the training of his masters. A normal-school, the first known in the history of modern education, was established, and in it the novices, after their first period of religious probation was over, were thoroughly formed and their education completed. It was a strong moulding of the moral and mental faculties, such as a life of indefatigable labor and austere self-restraint require. The Brothers of the Christian Schools were favored by the first Napoleon and by all succeeding governments down to the anti-christian regime inaugurated in 1880 by triumphant Freemasonry, the atheistical Freemasonry of Jules Ferry and Paul Bert. At the close of that year the Brothers had still under their care 2048 schools, with 325,558 pupils, of whom 286,004 were educated gratuitously. Of this grand total of 325,558 France and her colonies claimed 261,000, Belgium about 19,000, America (North and South) 36,000, and England upward of 2000. The staff of active teachers numbered 17,000 assisted by 2500 novices. Unhappily the avowed purpose of the French government is to secularize thoroughly both primary and secondary education, and to eliminate from the national schools all religious teaching and religious teachers, so that, unless some unforeseen change occurs, the work of John Baptist de la Salle in France is doomed to perish. This holy man died in 1719. In 1725 Benedict XIII. gave the Brotherhood the rank of an approved Congregation. Long before his death—in 1699—the Abbé de la Salle followed the example given in Milan, even before the sixteenth century, and opened in the Church of Saint Sulpice, Paris, a Sunday School (*une école dominicale*) for the purpose of secular instruction.

BROUGHAM, JOHN, a distinguished actor and play-writer, born at Dublin, Ireland, in 1810. He wrote many plays, some of which met with great success. Mr. Brougham won his greatest successes on the stage in comedy. He was a man of genial temperament and kindly heart. Died at New York, June 7, 1880.

BROUSONET'IA, a genus of plants belonging to the natural order *Moraceæ*. *B. papyrifera* (the paper mulberry) is used in China, Japan, &c., for the manufacture of paper. From its inner bark the South Sea Islanders make a kind of cloth.

BROWNE. WILLIAM, a pastoral poet, was born at Tavistock, Devonshire, in 1590. He studied at Oxford and at the Temple, became tutor to the Earl of Carnarvon, and died at Ottery-St.-Mary, Devonshire, in 1645. His works consist of *Britannia's Pastorals* (1613 and 1616), *The Shepherd's Pipe*, from which Milton is said to have borrowed in *Lycidas*, and *The Inner Temple Masque* (1620). B. was a follower of Spenser, whom he resembles in sensuous richness of description and diffuseness of style. In *Britannia's Pastorals*, which are written in heroic couplets, B. excels nearly all his contemporaries as a pleasing and truthful painter of English scenery. His works were edited by Davies (Lond. 1772), and are found in Anderson's *English Poets*. For a critical estimate of B., see Leigh Hunt's *Jar of Honey from Mount Hybla*.

BROWN, FORD MADOX, an English painter, at one time an ally of the pre-Raphaelites, born at Calais in 1821, was educated on the Continent, and exhibited two cartoons at Westminster Hall in 1844. His 'King Lear,' a work of wonderful power, feeling, and technical dexterity (1849), was followed by 'Chaucer at the Court of Edward III.' (1851), and 'Christ Washing Peter's Feet' (1852), both of which received the Liverpool prize of £50. An exhibition of B.'s works, which was opened in London in 1865, included, among many other pictures, 'The Last of England' (a work of fine pathos and humor, representing character and incident on board an emigrant ship passing the Dover cliffs), 'The Autumn Afternoon,' 'Work,' and 'Wilhelmus Conquæstor;' and since that time his chief works have been 'The Coat of many Colors,' 'Romeo and Juliet,' 'Cordelia's Portion,' 'Don Juan,' and 'Jacopo Foscari.' His son OLIVER MADOX B., author of *Gabriel Denver* (1873), and a painter and *litterateur* of great talent and promise, died in 1874. His *Literary Remains* were published, with an accompanying memoir, by William Rossetti (2 vols. Lond. 1876).

BROWN UNIVERSITY, an educational institution, principally patronized by Baptists, located at Providence, R. I. It was originally established at Warren, R. I. (1764), but in 1770 was removed to its present place. It took its name from Nicholas Brown, who gave liberally towards its endowment. It has a fine library and property valued at more than $1,200,000, besides invested funds of more than half a million.

BRUMM'EL, BEAU, a consummate dandy, who took society by storm in the early part of the present century, was born in 1778. He resolved to be the best-dressed man in London, devoted the most assiduous care to his toilet, and saw the fashionable world bow before his creaseless coat and artistic arrangement of cravat. For a time he rivaled in celebrity Lord Byron, who sarcastically pronounced him to be a very great man. He was intimate with the Regent, and was courted as an authority on matters peculiar to polite society; but, after ten years of social success, was ruined by gambling, and died in poverty and imbecility at Caen, 29th March 1840. He fully realized Carlyle's description of a dandy—'a man whose trade, office, and existence consists in the wearing of clothes.' His life was written by Captain Jesse (1844), and is a valuable satire on his times.

BRU'SA, BRUSA, or BURSA, capital of the vilayet of the same name, at the base of the Mysian Olympus. It is a clean town, with channels of water running through many of its streets. A mountain stream divides the Turkish from the Armenian quarter, while a ravine separates the latter from the Greek quarter. There are good bazaars, well stocked with Manchester and other European goods. Many of the houses are of wood, but there are

several handsome buildings, the most remarkable of which is the great mosque. The environs are beautiful, the city standing on a slope facing a plain, variegated with mulberry plantations, gardens, clumps of cypress, kiosks, baths, &c. Its hot springs, famous in antiquity, are still used. Pop. estimated at 60,000, mostly Turks, though there are many Armenians, besides Greeks, Jews, and Franks. B. has an extensive trade in raw silk, and a striped satin is manufactured here, from which the under-garments of the Easterns is made. There is an important trade in corn, opium, and meerschaum clay, and its commerce is increasing. Its port is Gemlik. B. is the ancient *Prusa*, and is said by Strabo to have been built by Prusias, who carried on a war against Crœsus; but according to Pliny it was built by Hannibal. Its importance commenced after its capture, in 1326, by Orcan, son of Osman I., who made it the capital of the empire of the Osmanlis, which it remained for fully a century. The vilayet of B. has an area of 28,870 sq. miles; and a pop. of upwards of 1,000,000.

BUCKNER, Simon Bolivar, an American officer, born in Kentucky, in 1823, and gradnated from West Point in 1844. He served gallantly during the Mexican war, participating in the battles of Vera Cruz, Cerro Gordo, Cherubusco, Molino del Rey, and Chapultepec, in the last two being wounded. At the outbreak of the civil war, he entered the Confederate service, and as commander of Fort Donelson, surrendered to Gen. U. S. Grant, Feb. 16, 1862, with 16,000 men and a large quantity of stores. With the rank of major-general, he commanded the third grand division of the Confederate army, and was engaged at the battles of Murfreesboro' and Chickamauga.

BUDDING, or GEMMA'TION, in zoology, a name applied to the asexual process of reproduction, whereby new animals are produced by a process analogous to that of B. in plants. B. in animals may be *continuous* or *discontinuous*. In the former case (seen in *Hydrozoa* or zoophytes, sea-mats, or *Polyzoa*, &c.), a complicated and connected animal colony, made up of numerous separate animals or zooids, is produced. In the latter case, buds are detached, and form the beginnings of new colonies, or live a separate and single existence. B. occurs in *Protozoa*, *Cœlenterata*, *Echinozoa*, in a few *Annulosa*, and in lower *Mollusca*.

BUELL, Don Carlos, an American officer, born near Marietta, O., March 23, 1818, and gradnated from West Point in 1841. He participated in the war with Mexico, and was present at the battles of Palo Alto, Resaca de la Palma, Monterey, Vera Cruz, Cerro Gordo, and Cherubusco, where he was severely wounded, and for gallantry promoted brevet-major. In the year 1862 he commanded the Union army of the Ohio, was present at the battle of Shiloh, and at the siege of Corinth, and drove the army of Braxton Bragg out of Kentucky. He resigned from the army June 1, 1864.

BUENA VISTA, Battle of, a severe battle fought between the U. S. forces under the command of Gen. Zachary Taylor and the Mexican army under Gen. Santa Anna, Feb. 22–23, 1847, near the hamlet of Buena Vista from which the battle takes its name. Gen. Taylor being convinced that the enemy was before him in force, on Feb. 21st, fell back from Agua Nueva, and occupied a strong position before Buena Vista. On the morning of the 23d Santa Anna summoned him to unconditionally surrender, which he declined to do. On the 22d there was sharp skirmishing, and on the 23d a fierce attack was made upon Gen. Taylor's lines which was continued with slight intermissions during the entire day, with the continued repulse of the Mexican forces from the assailed lines. During the following night Santa Anna retreated and left the field in possession of his foe. Gen. Taylor's army numbered 5200, and that of the Mexicans 20,000. The loss of the former was 746 and that of Santa Anna 2000.

BU'GLE, a wind instrument, similar in principle to the trumpet, cornet, &c. Its special peculiarity is that the tube increases in diameter very gradually through a great part of its length, while in the trumpet the tube is nearly parallel throughout, swelling suddenly at the bell. The form of the tube modifies the quality (or klang) of the notes produced, making them (in this case) more mellow and round, and less brilliant and piercing than in the trumpet.

BULAK', a town of Egypt, on the right bank of the Nile, in the neighborhood of Cairo, of which it is the port. It is connected by railways with Suez and Alexandria, and has a custom-house, a bazaar, a central college of dervishes, a medical school, a military hospital, an engineering college, and some silk and cotton manufactures. It has also a Government printing-house, the first ever introduced into the East by a native ruler. This was founded by Mehemet Ali in 1829–30, and still flourishes, the Khedive taking a deep interest in its prosperity. Books are issued from it in Arabic, Turkish, Persian, French, and English. There are at present (1875) 300 persons employed in it and in the paper-mills adjoining, which supply paper for the press. Pop. of B. about 20,000.

BULL, the name given to the males of the Bovidae or oxen which are distinguished from the female animals by their usually larger size and more ferocious disposition. The bulls of some varieties of oxen possess horns, whilst the females are hornless.

BULL RUN, or BULL'S RUN, a stream in Virginia, U.S., on the banks of which the Confederates gained two well-known victories during the civil war, the first under Generals Beauregard and Johnston, July 16–19, 1861, and the second under Generals Lee, Longstreet, and 'Stonewall' Jackson, August 30, 1863.

BÜLOW, Hans Guido von, the greatest, with perhaps one exception, of living pianists. He was born at Dresden in 1830, but did not show any aptitude or liking for music until after recovery from a long illness which he had as a child. Although intended for the law, he fortunately received early musical instruction, and as a young man embraced heartily the ideas (political as well as musical) of the Romantic school. His first hearing of Wagner's *Lohengrin* (under Liszt, at Weimar), in 1850, decided him to leave law and take to music as his profession. Since that time he has been one of the foremost in the great movement with which the name of Wagner is more intimately associated. Two of Wagner's operas—*Tristan and Isolde* (in 1865) and *Die Meistersinger* (in 1868)—were brought out under his baton, for he is as great a conductor as performer. B.'s memory is of astonishing power; he plays invariably without music before him, and on one occasion actually conducted *Die Neistersinger*, which occupies over four hours in performance, by heart. His compositions, which are not very numerous, are not known in this country, as he does not play them himself.

BULRUSH OF THE NILE (*Papyrus antiquorum*), is famous on account of the soft cellular tissue in its stem having been used by the ancients for making ropes, mats, &c. The Sicilian *P. siculus* has also been used for making paper, and at the present day *P. corymlosus* is used in India for the manufacture of India matting.

BUNCHGRASS (*Elymus condensatus*), a valuable pasture grass found extensively over the open country to the W. of the Rocky Mountains, and remarkable for the great size to which it grows and its fattening properties. Cattle can be driven from the coast to the Rocky Mountains, living on nothing else than this grass, and will arrive fatter than when they started. The droves of cattle and horses which winter in that region live entirely upon it and will scrape it up under the snow. It is accounted superior to hay. It grows in 'bunches,' hence the name.

BUN'COMBE, a slang political expression. During the delivery of a speech in Congress, by a member who came from Buncombe Co., N. C., many of the members became weary and left the room. Turning to those who remained, the speaker told them they too might go, as he was "only talking for *Buncombe*."

BURGESS, George, D.D., born in Rhode Island in 1809, graduated from Brown University, and afterwards pursued his studies in Germany. He entered the ministry of the Episcopal Church, and in 1847 was made Bishop of Maine. Died in 1866.

BURLINGAME, Anson, LL.D., an American lawyer and statesman, born at New Berlin, Chenango Co., N. Y., was in Congress from 1854 to 1860, in 1861 was sent by the government as ambassador to China, and in 1867 came west, representing the Chinese government. Died Feb. 23, 1870.

BURNSIDE, Ambrose Everett, an American officer and statesman, born at Liberty, Ind., May 23, 1824, graduated from West Point in 1847, served during the Mexican war, and in 1853 became a manufacturer of breech-loading rifles, at Bristol, R. I. He entered the civil war with the rank of Colonel, and in 1861 Aug. 6, was promoted major-general. He was in command of the army of the Potomac when it was defeated at Fredericksburg, afterwards was in command of the department of Ohio, and commanded the Ninth army corps in the Richmond campaign of 1864. He was governor of Rhode Island 1866–71. Died at Bristol, R. I. Sept. 13, 1881.

BURR, Aaron, third Vice-President of the United States, was born at Newark, New Jersey, Feb. 6, 1756. He was a grandson of Jonathan Edwards. After studying at Princeton, he entered the Revolutionary army, but siding with the faction opposed to Washington, he was compelled to leave headquarters. In 178[illegible] he began the practice of law in Albany, was made Attorney-General of New York in 1789, and U. S. senator in 1791. B. now became a leader of the Democratic party, and was made Vice-President, 1801, Jefferson being President. A bitter contest for the governorship of New York, in which he was defeated, led to the notorious duel with Alexander Hamilton (July 11, 1804), in which the latter was mortally wounded. B. next entered into a reckless scheme for the establishment of an empire in the S.W., including Mexico. He was apprehended, and tried for treason in Richmond in 1807, and though acquitted, never regained his former influence. He died at Staten Island, Sept. 14, 1836.

BURR'UM, a town of India, N.W. Province, executive district of Boolundshuhur, about 40 miles N.W. of Delhi. Pop. (1871) 15,284.

BURU', one of the Molucca Islands, lying E. of Celebes. Its greatest length from N. to S. is 50 miles, from E. to W. 90 miles; its area is estimated at 2500 sq. m., and its pop. at nearly 20,000. The country is mountainous but fertile, producing, among other produce characteristic of these regions, cajeput oil, rice, sago, dyes, and aromatic woods. On the N.E. coast is the fine sheltered Cajeli Bay, on the S. shore of which lies the Dutch station, Fort Defence.

BUSH'NELL, Horace, was born in New Preston, Conn., in 1802, graduated at Yale College, 1827, and was for a time editor of a newspaper, but was ordained minister of a Congregationalist church in Hartford, Conn., in 1833. He resigned in 1858. B. early became famous both as a thinker and speaker. In 1847 he published *Christian Nature;* in 1849, *God in Christ*, for which he was tried for heresy, but acquitted; in 1851, *Christ in History;* in 1858, *Nature and the Supernatural;* and since then, *Sacrifice, Law, and Forgiveness*, and other works. B. was one of the most subtle thinkers and able theologians of New England. He died at Hartford, Feb. 17, 1876.

BUTLER, Benjamin Franklin. In 1882 he was elected governor of Massachusetts by a combination of the Democratic and Greenback parties, over Bishop, republican; and in 1883 when renominated by the same parties, was defeated by Robinson, republican. In 1884 he was a delegate to the National Democratic Convention at Chicago, but refused to support its nominee for the presidency, Grover Cleveland, because the views of its platform were not sufficiently pronounced against monopoly and in favor of protection. In the same year, he was nominated for the presidency by the Peoples' Party. See Butler, Benjamin F., in Chambers' En.

BYRE (a form of *bower*), is the name used in Scotland to denote a house for dairy cows, but also employed in many localities to designate the place where neat and fattening cattle are accommodated. Till within the last dozen years, not half the attention that ought to have been given was bestowed upon the B., and even now (1876) there is great need for improvement. There can be little doubt that not a small proportion of the diseases cattle suffer from are induced and fostered by uncleanly and ill-ventilated byres. The B. should be placed in the immediate neighborhood of the root and straw-stores, so as to avoid unnecessary carriage. Dairy cows should have, if practicable, a stall each, and this should not be less than 4 feet wide—indeed, 5 feet is better. In a single-stalled B. Mr. Henry Stephens recommends a width of 18 feet, giving 2 feet for the manger, 8 feet for the length of the cow, a foot for the gutter draining off the fluid refuse, and 7 feet for passage for removal of dung, conveyance of food, &c. Perhaps 20 feet would be preferable, as giving more convenience for dairy cows, although the spaces mentioned are sufficient for feeding cattle. Ventilators should be placed at intervals of every five or six cows, and so arranged in the ceilingless roof as to supply fresh air without causing draughts. Light should come in through windows in the wall behind the cattle. In the case of feeding oxen, two may well stand in a stall together provided it be 9 feet wide, but it is better in all cases to have each animal stalled by itself. Dairy cows do not, as a rule, agree very well with each other, and the consequence is that they sometimes do not yield so much milk as they would do if alone; and in feeding cattle it is frequently noticed that one robs the other of its due share of food. In the best-appointed byres the food is run along in a waggon on rails in front of the cattle. The mangers are best placed about 20 inches in height above the ground, and they should be wide enough to keep long-horned animals from injuring the tops of their horns against the walls. The gutter should drain itself into a liquid-manure tank, and the pavement of the floor should not be carried further than the hind posts, as the stones in front hurt the knees of the animals, and not unfrequently produce permanent swelling.

BYRSON'IMA, a genus of plants of the natural order *Malphighiaceæ*, some species of which have edible fruits. They are, however, very astringent. The bark of various species is used in tanning; and American Alcornque bark, which is imported into Britain for the tanner's use, is said to be derived from *B. laurifolia, B. rhopaldefolia*, and *B. coccolobæfolia.*

C.

CABALLE'RO, Fernan, is the *nom de plume* of Cecilia Böhl von Faber, the daughter of a German merchant, who died at Cadiz in 1836. She was born, during a visit of her parents to Switzerland, at Morget in 1797, was educated in Germany, returned to Spain in 1813, and has had a somewhat chequered career. She has been thrice married, and, although inheriting literary tastes from her Spanish mother, who was an authoress of note, only commenced her career as a writer in 1849, at the mature age of fifty-three. It is scarcely less remarkable that one who began so late should have almost at once attained a foremost place in the works of Spanish novelists. In keen perception of the peculiarities of the national life, in genuine national feeling, in originality of treatment, and in a fine idyllic grace of description, she is unsurpassed. Her first work was *Gaviota* (1849). It was followed by *Elia, Clemencia, La Fumilia de Alvareda, Cuadros di Costumleres Populares Andaluces*, and many others. She has published a collected edition of her works (*Obras Completas*) in 17 vols. (Mad. 1860–66). She died 7th April 1877.

CAB'ANEL, Alexandre, a French painter, born at Montpellier, 28th September 1823. He traveled to Rome, and gained prizes at Paris in 1845, 1852, and 1855. Among his works are 'The Agony of Christ in the Garden of Olives,' 'The Death of Moses,' 'The Christian Martyr,' 'Othello relating his Battles,' 'Michael Angelo,' 'Aglaia,' 'Velleda,' and a series of designs representing the twelve months of the year, 'The birth of Venus,' and 'Adam and Eve.' He was made a member of the Académie des Beaux Arts in 1863, and an officer of the Legion of Honor in 1864.

CABOMBA'CEÆ, the Water-shield order, a natural order of plants belonging to the class *Dicotyledonous*. They are mostly aquatic, with floating peltate leaves. There are only three species in the order, found in America, Australia, and India. They have no important properties—*Cabomba* and *Hydropeltis* are the only genera.

CACA'LIA, a genus of plants of the natural order *Compositæ*, natives of the warmer parts of America, Middle Asia, and Eastern Africa. The Chinese employ the leaves of *C. procumbens* as food, and those of *C. ficoides* of the Cape of Good Hope are also wholesome.

CACH'IBOU, or CHIBOU RESIN, a fragrant gum resin, obtained from *Bursera gummifera:* that from *B. acuminata* is known in commerce as the resin of Carana.

CACHŒI'RA, a town of Brazil, in the province of Bahia, on the river Paraguassu, and about 60 miles N.W. of Bahia, the capital of the province. There are in the neighborhood of C. extensive sugar and tobacco plantations. Pop. 25,000.

CACH'RYS, a genus of plants of the natural order *Umbelliferæ* (*Apiaceæ*), natives of the S. of Europe, Siberia, &c. The Cossacks chew the seeds of *C. odontalgica* as a remedy for toothache, the effect being probably owing to the salivation produced. Several species are cultivated.

CADA'BA, a name applied to a genus of plants of the natural order *Capparidaceæ*, natives of Africa, India, and Australia. The roots of *C. indica* are aperient and anthelmintic.

CADA MOSTO, or CA DA MOSTO. Alvise or Luigi, a famous voyager and discoverer on the W. coast of Africa, was born at Venice about 1432. Entering the service of Dom Henriquez, the Infanta of Portugal, he sailed from Lagos on March 22, 1455, visited the river Senegal, and traded along the coast of that region in gold and slaves till, after being joined by two other Portuguese ships at Cape Verde, he sailed southwards and discovered the Gambia. C. then returned to Portugal. In the following year (1456) he discovered the Cape Verde Islands, and the rivers Cazamanza and Rio Grande, after which he returned to Portugal, where he remained till the death of the Infanta in 1463.

C. died about 1480. The first account of his voyages, now a very rare book, was published at Vicenzo in 1507, under the title *El Libro de la Prima Navigazione per Oceano a le Terre de Nigri de la Bassa Æthiopia*. See ZURIA, *Dei Viaggi e delle Scoperte Africane di Cada Mosto* (Ven. 1815).

CADWALLADER, JOHN, born in Pennsylvania in 1743, and served in the Continental army during the Revolution, with the rank of brigadier-general, participating in several important engagements. Died in 1786.

CÆNAN'THIUM, a term applied to the peculiar inflorescence of *Dorstenia*, *Ambora*, and the common fig, in which the receptacle expands, and encloses the flowers, within a hollow, almost completely, as in the fig, and partially so, as in *Dorstenia*.

CAF'TA, KAT, or KHAT, the slender young shoots, with the attached leaves, of *Catha edulis*, a plant belonging to the natural order *Celastraceæ*, which are chewed by the Arabs to produce exhilaration of spirits and wakefulness. It is also used as a decoction. The leaves and shoots of *C. spinosa* are also applied in the same way.

CAIRO, a city of Alexander Co., Ill., at the junction of the Ohio and Mississippi rivers, 175 miles below St. Louis. It is the terminus of several railroads, carries on a large trade, and has several important manufacturing interests. It is a supply center for Southern Illinois, Southeast Missouri, and Western Kentucky. Pop. 11,000.

CAJA'NUS (from *Cajang*, the Malayan name of one of the species), a genus of plants of the natural order *Leguminosæ*, section *Papilionaceæ*. *C. Indicus*, a native of the E. Indies, is now cultivated in the W. Indies, tropical America, and Africa, and on some of the Pacific islands. In Jamaica it is called the Congo pea. In India the pulse or seed is called *dhal* or *dhol*, or *urhur*, and forms a large portion of the food of all classes. In the W. Indies the pulse is called pigeon-pea, and is used as a substitute for English peas, also for feeding pigeons and other fowls. The variety known as No-eye pea is most esteemed. The Congo pea is harder and coarser. Horses and cattle are very fond of the young branches and leaves, either in a fresh or a dried state. It is one of the most generally useful of tropical plants.

CAKE-BREAKER. Within the last quarter of a century, the increasing demand for animal food has rendered it imperative, in England, that the natural supplies of hay and roots should be supplemented by artificial feeding stuffs, in order that cattle and sheep should be ripened at an earlier age, and brought up to heavier weights. Oil-cake, cotton-cake, and a variety of other condimental substances are employed in fattening. It has been found that much cake is wasted when given in a whole state, and a machine was invented for the purpose of breaking it into pieces of from 1½ to 2 inches square. The machine consists of a box set upon iron legs; within the box revolve in opposite directions two iron-teethed rollers, which speedily disintegrate the cake to the required size. The machine is not costly, and the economy very great. There are many good machines in the market.

CALABASH NUTMEG, the seeds of *Monodora Myristica*, a plant of the natural order *Anonaceæ*, the Custard-apple order, having aromatic properties similar to the true nutmeg. They are commonly known as Jamaica or American nutmegs.

CALABO'SA, or CALABO'ZO, a town in the state of Caracas, Venezuela, on the left bank of the river Guarico, a tributary of the Apure, and 185 miles S.W. of Caracas. It was formerly an Indian village, and is now the residence of many wealthy proprietors of cattle-farms (*hatos*) in the surrounding llanos. Pop. 4000. Since 1813 C. has been the scene of several battles; Bolivar and Paez here defeated the Spaniards under Morales, Feb. 3, 1820, and again under La Torre, June 24, 1821.

CALAGUA'LA, the rhizome of *Acrostichum Huacsaro*, or 'little cord,' which is used in Peru as a sudorific, diuretic febrifuge, and anti-venereal. The rhizome of *Polypodium C.*, the slender or genuine C., and those of *P. crassifolium*, the thick C. or deer's-tongue, are also reported to have the same properties.

CALAIS, a city of Washington Co., Maine, on the St. Croix River, at the head of navigation, and on the St. Croix and Penobscot Railroad. It carries on a large trade with the up-river counties, and is extensively engaged in ship building and the lumber traffic. Pop. 6112.

CAL'EA, a genus of plants belonging to the natural order *Compositæ*, natives of tropical America from Southern Brazil to Mexico. About thirty species are described. *C. Zacatechichi*, the 'Jaralillo' of the Mexicans, yields in the fresh state a considerable quantity of camphor; the powdered leaves are applied to wounds, and the plant is used generally as a febrifuge. The leaves of *C. Jamaicensis*, when steeped in wine and brandy, are said to be used as a bitter stomachic in the W. Indies. Perhaps this account applies better to *Neurolæna lobata* (*Treasury of Botany*).

CALENDU'LA, a genus of plants belonging to the natural order *Compositæ*. It gets its name from the fact that the species may be in flower on the *kalends* of every month. They are natives of the Mediterranean region. One (*C. officinalis*, or pot marigold) has been long cultivated, and was at one time famous as a diuretic remedy.

CALIFORNIA, UNIVERSITY OF, an American educational institution, chartered in 1868, and located at Berkeley, Cal., distant nine miles from San Francisco. It is a non-sectarian, state institution, has well equipped buildings, and is well supported.

CALIX'TUS, the name of three popes and of one anti-pope.—C. I., ST. C., or Callistus, is said to have been born a slave at Rome about the middle of the 2d c. He was elected Bishop of Rome in the year 217, and held that office till the year 222, when he died a martyr. The character of C. has been the subject of keen discussion during recent years, on account of the abuse heaped on him in a Greek MS. found at Mount Athos in 1842, published in 1851 at the expense of the University of Oxford, under the title *Philosophumena*, and ascribed by Bunsen to Hippolytus. C. was a zealous opponent of the doctrine of the Trinity, and took mild views of Church discipline, allowing priests to marry after ordination.—C. II., Guido, Count of Burgundy, pope from 1119 to 1124, was, before his elevation, Archbishop of Vienne, and papal legate in France. In the year 1122 he concluded a treaty with the Emperor Heinrich V., by which he succeeded in reserving for the pope the right of Investiture, and in 1123, the year before he died, held the first Œcumenical Council of the Lateran. C. acted as mediator in the dispute between Henry I. of England and Louis VI. of France regarding Normandy, paid the ransom for which Baldwin II., King of Jerusalem, was delivered from the Turks, repressed the tyrannous excesses of the petty Italian princes, and added to the adornments of the principal churches at Rome.—C., THE ANTI-POPE, Giovanni Unghieri, Cardinal-Bishop of Tusculum, was set up in 1168 by the Emperor Friedrich I. as a rival to his enemy, Pope Alexander III. Abandoned by the Emperor and his partisans after the peace of Venice in 1177, C. submitted to Alexander, who pardoned him, and appointed him governor of Benevento.—C. III., Alfonso Borgia, a Spaniard, Bishop of Valencia, was elevated to the papal dignity in 1455. Before this event he had been long a trusted councilor of Alfonso, King of Aragon and the Two Sicilies, and had negotiated a peace between Castile and Pope Eugenius IV. A skillful diplomatist and subtle lawyer, he yet failed signally as a pope. Great efforts put forth by him to organize a grand crusade against the Turks ended in the capture of three useless islands. The open favor he showed his nephew, Rodrigo Lenzuoli, afterwards Pope Alexander VI., lost him the esteem of King Alfonso, and aroused the hostility of his Roman subjects. The *Office of the Transfiguration* in the Roman Catholic service is ascribed to him. C. died August 6, 1458.

CALLIAN'DRA, a genus of Leguminous plants, natives of America, from Buenos Ayres to California. Many are in cultivation, and in all about eighty species are known, all more or less ornamental. The Peruvian women deck their hair with the flowers of *C. trinerva* (the 'Seda sisa' or silk-flower).

CALLIA'NO, a town of Austria, in the Tyrol, on the Adige, 10 miles S. of Trient, in the strongly fortified pass of Castel della Pietra, notable for the defeat of the Venetians by the Archduke Sigismund in 1487, and the storming of the place by Napoleon, September 4, 1796.

CALUMET, a city of Houghton Co., Mich., on the Mineral Range Railroad. The surrounding country is rich in copper ore, and mining is the principal industry. Population, 9,500.

CALVERT, LEONARD, born in 1582. He led the first expedition to Maryland, and was the first governor of that colony. Died in 1647.

CALYSACC'ION, a genus of plants belonging to the order *Guttiferæ* or *Clusiaceæ*, which along with those of *Mesua ferrea*, the dried flower-buds of *C. longifolium*, form the *Nagasar*, *Nag-Kesar*, or *Nag-Kassar* of the Indian bazaars, so highly esteemed for their fragrance, and in Bengal as an antidote to snake-bites. *Nag-Kassar* is also used to dye silks.

CAM, in machinery, an irregularly-shaped revolving disc, used for imparting motion with definitely varying velocity.

CAMASS'IA, or GAMASS'IA, the Camass, or Quamash (as it is sometimes erroneously written), a genus of plants belonging to the natural order *Liliaceæ*, natives of open prairies and grounds in N.-Western America, from California to the northern parts of British Columbia, and from the sea to the Rocky Mountains. The only known species is *Gamassia esculenta*, the bright blue flowers of which give the open country a gay appearance in spring. The plant is about a foot or a foot and a half in height, and has been introduced into our gardens. But it is the bulbous roots that render the plant of most interest. They are collected

and stored by the Indians for winter food, and are nourishing from the amount of starch which they contain. The bulbs are dug up with a sharp-pointed stick as soon as the flowering is over. The camas-gathering is one of the Indian festivals. Numbers gather for this purpose from far and near, and encamp in the woods and plains close by. The work is chiefly done by the women, and, from early morning to dusk, they are busy at it. The young men meanwhile look on, and the hard-working squaw has the best chance of a husband. The roots are cooked by being put into a hole in the ground paved with large stones, in which previously a fire has been lit. The roots are then piled layer upon layer in it, the different layers being separated by leaves and branches, until the hole is full. Earth is then spread over it, and a fire lit on the surface. After they are cooked, they are either pounded into cakes, or more frequently dried for winter use. They are then, by the conversion of the starch into sugar, sweet tasted. There is also a white-flowered variety.

CAMBRIDGE PLATFORM, a system of Congregational church government, adopted by a synod of churches, held at Cambridge, Mass., in 1648. At that time there was wide diversity of usages among the churches of the colony, and the object of this gathering was to attain, if possible, greater uniformity. The doctrinal statements of the Westminster Catechism were accepted, and a system of church polity adopted, much the same as that in vogue to-day among Congregationalists.

CAMDEN, a village of Kershaw Co., S. C., 33 miles N.-E. of Columbia. The principal importance attaching to the place, arises from the battles fought here, or near by. During the war of the Revolution, Lord Cornwallis here defeated Gen. Gates, on Aug. 16, 1780, and Lord Rawdon defeated Gen. Green, on April 25, 1781, at Hobkirk's Hill, near Camden. During the civil war, Camden was captured by Gen. Sherman, Feb. 24, 1865, and large quantities of property and stores destroyed.

CAMELI'NA, a genus of plants belonging to the natural order *Cruciferæ*, containing two or three European and N. American species. *C. sativa*, the 'Gold of Pleasure,' is the most interesting species. It is a native of Central and Southern Europe and temperate Russian Asia. It is cultivated on the Continent for the sake of its seeds, which are a valuable food for cattle, for the oil which they contain, and on account of the fibre which is obtained from its stems. The seeds are sometimes erroneously called 'dodder seeds.' The origin of the English name is unknown.

CAMERON, JAMES DONALD (known in politics as DON CAMERON), was born in Pennsylvania, in 1833, and, after graduating from Princeton College, engaged in commercial pursuits. He was an active member of the Republican Party for years; in 1876 was made Secretary of War; and in 1877 was elected U. S. Senator from Penn., upon the resignation of his father, Simon C.

CAMERON, SIMON, an American politician, born in Lancaster Co., Pa., in 1799. He was at first a Democrat, but joined the Republican party subsequently, and in 1856 was re-elected U. S. Senator by that party, having previously been elected to the same position by the Democrats in 1845. For many years he almost absolutely controlled the Republican party in his state. He was made Secretary of War in 1861, Minister to Russia in 1862, was elected U. S. Senator in 1866, and again in 1873. In 1877 he retired from public life, and was succeeded by his son in Congress.

CAM'PLI, a town in the province of Teramo, Central Italy, has a cathedral, an abbey, several convents, and manufactures of straw hats. Pop. 7500.

CANADA SNAKE-ROOT, or WILD GINGER, the rhizome of *Aristolochia Canadensis*, a plant belonging to the birthwort order (*Aristolochiaceæ*), used in Canada and the United States as a 'tonic diaphoretic and aromatic stimulant.'

CAN'AGONG, or PIG'S FACES (*Mesembryanthemum æquilaterale*), a plant of the order *Mesembryaceæ*, the fruit of which is eaten in Australia.

CANALS, INTERCELLULAR. In most cases cells are united to the contiguous ones so closely as to leave no appreciable spaces between them (the 'perfect parenchyma' of Schleiden), yet in various plants the cells only touch each other at one or two points, leaving, as in the green pulpy parenchyma, spaces between them, known as I. C. In shape they vary much. Most probably they only contain air.

CANAVAL'IA, a genus of plants of the order *Leguminosæ*. About twelve species are known, mostly shrubby climbing plants. *C. gladiata* of the West and East Indies, Mexico, tropical Africa, Brazil, &c., is called the 'Overlook' by the West Indian negroes, who plant it on the edges of their 'provision grounds,' under the belief that it exercises some mysterious power in watching or protecting their property from being plundered.

CANBY, EDWARD RICHARD SPRING, LL.D., an American general, born in Kentucky, in 1817, and graduated from West Point in 1839. He served throughout the Mexican war, and was present at Vera Cruz, Cerro Gordo, Contreras, Churubusco, and the city of Mexico. For gallantry in these actions he was brevetted major, and then lieutenant-colonel. During the Civil War, he was in command of the expedition that captured Mobile, and rendered other valuable services. In 1864 he was made major-general U. S. Volunteers, and in 1866 brigadier-general U. S. A. In 1869 he was placed in command of the department of the Columbia, which at that time was disturbed by a violent outbreak of the Modoc Indians. On April 11, 1873, while holding a conference with several of the chiefs of this tribe, he was treacherously shot by Chief 'Jack,' and killed.

CANDLE-TREE (*Parmentiera cerifera*), a tree of the natural order *Crescentiaceæ*, the fruits of which are shaped like a candle (hence the name), and are devoured by cattle in the Isthmus of Panama.

CANELLA'CEÆ, a natural order of *Dicotyledonous* plants, containing only three species, natives of the W. Indies and the adjoining continent of America. They are aromatic, stimulant, and tonic. *Canella alba*, the laurel-leaved C., or wild cinnamon, &c. *Cinnamodendron axillare*, *C. corticosum*, a native of Jamaica, &c., have also aromatic bark similar in properties to *C. alba*. *C. corticosum* yields 'Winter's bark' as now found in commerce.

CANON CITY, a city of Fremont Co., Col., on the Arkansas River, 45 miles from Pueblo and 90 from Denver. It has hot and cold soda springs; and coal, oil, sandstone, and lime abound. Population, 2300.

CANONICUS, a chief of the Narragansett Indians, noted for his warm friendship towards the early settlers of New England. From him was purchased the territory now contained in the State of Rhode Island. Died in 1647.

CAN'THIUM, a genus of plants belonging to the natural order *Cinchonaceæ*. *C. parviflorum* is used for making fences in India, and the leaves as an ingredient in curries.

CANTON, a beautiful city of Ohio, at the junction of the East and West branches of the Nimishillen Creek. It has flourishing manufactories, and the adjacent county is well stocked with coal and extremely fertile. Population, 22,000.

CANTON, a city of Fulton Co., Ill., on the Chicago, Burlington and Quincey, and the Wabash, St. Louis, and Pacific railroads, 210 miles from Chicago, and 28 from Peoria. It is engaged in manufacturing and coal mining, and has extensive plow and car-wheel works. Population, 4500.

CAPE, or properly VAUNKS, RIVER, in Central America, after a course of nearly 300 miles, falls into the Caribbean Sea near Cape Gracios-a-Dios, whence its popular name. It is navigable for some distance from its month.

CAPE ELIZABETH, in Cumberland Co., Maine, on the Eastern Railroad, one mile from Portland. It has a rolling mill, oil-works, the Eastern Railroad repair shops, and a number of small manufactories. Population, 5000.

CAPEL, THOMAS JOHN, a learned priest of the Roman Catholic Church, born in England in 1835. At the early age of 21 he became president of a normal college, for the education of teachers. He is an eloquent preacher, and has made many converts from Protestantism. He now holds the rank of 'monsignor,' and has recently (1884) visited the United States, where he attracted much attention by his polished manners and logical discourses.

CAPERS, WILLIAM, D.D., an American divine, born in South Carolina, Jan. 26, 1790, studied at South Carolina College, and entered the ministry of the Methodist Church in 1809. In 1844 he was elected bishop of the M. E. Church, South. He was noted for his eloquence and Christian piety. Died at Anderson, S. C., Jan. 29, 1855.

CAPE MAY, a well-known seaside resort in the southern part of New Jersey. It has an excellent beach for bathing and numerous elegant hotels.

CAPE WEED (*Rocella tinctoria*), a lichen from the Cape Verd Islands, from which a dye is obtained. C. W. is also a name given in New Zealand to the European cat's ear (*Hypochæris radicata*), which has been introduced into that colony, and in the vicinity of Dunedin, Otago, is taking the place of the cultivated grasses in the pastures. The name is also applied in Australia to *Cryptostemma calendulacea*.

CARAGA'NA, the Siberian pea-tree, belonging to the natural order *Leguminosæ*. *C. arborescens* is a small tree, with hard wood and tough bark. The seeds are used to feed poultry, and the leaves contain a blue dyeing matter. *C. spinosa* is a thorny shrub, the branches of which are stuck plentifully on the tops of the clay walls about Pekin, in China, for the same reason that broken bottles are strewed on the tops of garden walls.

CARAI'PA, a genus of plants of the natural order *Ternströmiaceæ*, containing about eight species, natives of tropical America. *C. fasiculata* is the tree from which the balsam of Tamacoari is

obtained. This balsam is of the color of port wine and the consistence of oil. A single application will cure the most inveterate attack of the itch in twenty-four hours (Spruce, *Journ. Linn. Soc.*, v. 63).

CARBON, Bisulphide of, is obtained by dropping sulphur into red-hot charcoal in an earthenware retort provided with a good condensing apparatus. It is a colorless, mobile liquid, highly refractive and volatile (boiling point, 48° C.), and possesses a peculiar aromatic odor, which is not disagreeable if the bisulphide be quite pure, but is usually disagreeable from the presence of impurities. B. of C. is an excellent solvent of oils, fats, resins, caoutchouc, phosphorous, sulphur, &c., and is employed in the manufacture of vulcanized india-rubber.

CARBONDALE, a city of Lackawanna Co., Pa., on the Lackawanna River, about 17 miles from Scranton. It is in a region filled with rich mines of anthracite coal. Pop. 7719.

CARDIADAE, a family of *Lamellibranchiate* molluscs, represented by the Cockles and by the genus Conocardium. The shell is equivalve, heart-shaped, the mantle being open in front, and the foot large and curved. The family is represented by cockles on the Devonian rocks; whilst the genus *Conocardium* is represented by Palæozoic shells, which have the anterior side of the shell conical and gaping, and a siphonal tube placed near the beak of the shell.

CAR'DIOGRAPH. This is an instrument used in practical medicine and in physiological research for observing and recording the impulse of the heart on the wall of the chest. In man and in the lower mammalia, the heart is situated in an irregularly wedge-shaped space, the posterior wall of which is formed by the diaphragm. When the ventricles of the heart contract, they push against the wall of the chest with more or less violence. This push is termed the *cardiac impulse*. Various cardiographs have been employed, but the one most in favor was devised by Burdon Sanderson. It consists of a hollow disk, the rim and back of which are made of brass, while the front is made of thin india-rubber. This box is called the tympanum. To the brass back a flat steel spring is secured, which is bent twice at right angles in the same direction, in such a way that it overhangs the india-rubber membrane. The extremity of this spring, which is exactly opposite the center of the face of the tympanum, is perforated by a steel screw, the point of which rests on the membrane, while its head is surmounted by an ivory knob. The tympanum is further provided with three adjusting screws, by which, when in use, it rests on the wall of the chest, with its face parallel to the surface, and can be approximated or withdrawn at will. It is evident that when the screws are so adjusted that the spring presses on the chest, whatever movements of expansion or retraction are made by the surface to which it is applied are communicated to it, and by it to the india-rubber membrane with which its point is in contact. The cavity of the disk communicates by a vulcanized india-rubber tube with a second tympanum in such a way that the two tympana and the tube enclose an air-tight cavity. The result of this arrangement is that whatever movement is performed by the first is simultaneously reproduced, but in the reverse direction, by the second. If the tympana are of equal aera, the extents of the primary and secondary movements are equal. When, as is usually the case, the areas are unequal, the extent of movement is approximately inversely proportional to the areas. The movement of the second tympanum is magnified and inscribed on a registering cylinder by means of a lever. By this apparatus a tracing is obtained, which is an exact representation of the movements of the surface against which the spring is applied, so that, if the instrument is graduated, it may be used not only for the purpose of estimating the relative duration of those movements, but for measuring their extent. See *Handbook for Physiological Laboratory* (Lond. 1873), p. 255.

CARDIOSPER'MUM, a genus of plants of the natural order *Sapindaceæ*, contains about twelve species, mostly natives of S. America, but also found in every tropical country. The leaves of *C. Halicacabum*, the winter cherry (a name also applied to *Physalis*) or heart-pea, are cooked and eaten in the Moluccas, and on the Malabar coast are taken internally with castor oil for lumbago, &c. The root is laxative, diuretic, and, owing to the quantity of mucilage in it, demulcent, but slightly nauseous in taste. It is also used in rheumatism.

CAREY'A, a genus of plants of the Myrtle order (section *Barringtoniæ*), mostly found in India, though one species is found in N. Australia. *C. sphærica*, of the Malayan Peninsula, has a tough bark fit for cordage. *C. arborea* is used for making boxes, hoops, &c.; but the timber splits up when exposed to the sun, and is pervious to rain. The drums of the Sepoys in India were formerly made of it. The bark is manufactured into cordage, and when prepared is used in some parts of India as a slow match for firelocks. In Scinde the fleshy calyx is said to be good for curing colds (Black).

CARINATE BIRDS, or CARINATÆ, is Huxley's name for one of the three great divisions into which he divides the class *Aves* or Birds. The *C. B.* include by far the vast majority of birds, distinguished by the fact that the breast-bone or sternum possesses a prominent ridge or 'keel' (*Carina*). The ostriches, and other *Cursores* having flat or raft-like sterna, are named *Ratitæ;* whilst Huxley's third division, *Saururæ*, includes but a single bird, the extinct *Archæopteryx*.

CARLISLE, Frederick Howard, Earl of, was born 28th May 1748, and succeeded to the earldom at the age of ten. His mother, Isabella Byron, was a sister of the famous admiral and navigator. C. was educated at Eton and Oxford. In 1780 he was appointed Viceroy of Ireland, and was for a time an opponent of Pitt in parliament, but changed his politics after the outbreak of the French Revolution. He died 4th September 1825. C. was an able politician, but is best known by his contributions to literature, which were published in a collective form in 1801 under the title of *Tragedies and Poems*, and gave occasion to a recklessly bitter note in Byron's *English Bards and Scotch Reviewers*.

CAR'LO ALBER'TO AMEDE'O, King of Sardinia, born 2d October 1798, a son of Prince Carlo Emanuele of Savoy-Carignan, who died in 1800. C., connected through his mother with the house of Saxony, married in 1817, Maria Theresa, daughter of Ferdinand of Tuscany, and on the Piedmontese revolution of 1821, became for a short time Regent of Sardinia, introducing a constitutional government, which was repudiated by Carlo Felice, the successor of Vittorio Emanuele on the throne. After acting for two years as Viceroy of Sardinia, C. succeeded, his title having been previously recognized by the Congress of Vienna. At first, Austrian influence and the fear of Carbonarism, thwarted the essentially liberal intentions of the new king, but after the accession of Pio Nono, the army was nationalized, the press laws modified, and, when the year of revolutions came, C. was able to assist Lombardy against the Austrians with a large and enthusiastic army. The superior numbers under Radetzky were victorious at Villafranca, Milan, and Novara (1849), and C., abdicating in favor of his son, Vittorio Emanuele II., retired to Oporto, where he died, 28th July 1849. C. patronized the fine arts.

CARLO EMANUE'LE I., called 'the Great,' Duke of Savoy, born at Rivoli, 12th January 1562, succeeded his father, Filiberto Emanuele (Iron-head), and married in 1585 Catherine, the youngest daughter of Philip of Spain. His favorite policy was to gain a footing in Provence and Saluzzo by playing the part of a Catholic liberator; he even laid claim to the French crown on the death of Henri III., whose cousin he was; but in 1597 the Protestant leaders, Lesdiguières and La Valette, forced him to withdraw from Provence. Compelled in 1601 to give up several districts in the department of Ain, and unsuccessful in his attacks on Geneva, C. at last became the ally of France, and for several years was in the field against the Spanish power in N. Italy, where he obtained the territory of Montferrat. C. was put forward by the Protestant Union as a candidate for the empire at the death of Matthias. The league against the action of Spain against the Protestants of Valtellina, a war with Geneva about the territory of Zuccarello, and the invasion by Louis XIII. of Savoy and Piedmont, fill up the rest of C.'s life. He died at Savillan, 26th July 1630, leaving a military reputation which was not founded on military success.

CAR'LYLE, Alexander, D.D. (born January 26, 1722; died August 25, 1805), for fifty-seven years minister of the parish of Inveresk (Musselburgh), is chiefly known as the contemporary and friend of Hume, Home, and Robertson, and as one of the leaders of the Moderate party in the Church of Scotland. He was a man of singularly fine presence, being popularly known as *Jupiter C.*, and described by Sir Walter Scott as 'the grandest demigod I ever saw.' His autobiography, containing *Memorials of the Men and Events of his Time*, was published in 1860 under the editorship of Mr. (now Dr.) John Hill Burton. It is admitted to be one of the best books of the autobiographical kind, and its shrewd, lively sketches of the men and manners of the period in which he lived are invaluable for historical purposes.

CARNATIONS, (Lat. *caro*, 'flesh') in painting, are the parts of a picture in which the nude form appears, and in which the texture and glow of the body is sought to be realized by flesh-tints. Among the old masters the practice of painting from the nude was more general than in later times, and the C. of the works of the great colorists of the Venetian school are consequently more brilliant and truthful than those of modern artists.

CARPENTER, SHIP'S, the third warrant officer on board a man-of-war, whose duty it is, in conjuncture with his mate and crew, to attend to the necessary repairs of the hull, masts, and spars. He sees after the condition of the boats and pumps, and during battle looks after the plugging of shot-holes.

CARPI'NI, Giovanni de Plano, an Italian traveler of the order of the Franciscans, born in Capitanata, Naples, about 1220, was sent in 1246 by Innocent IV. as a sort of papal legate to the Mongol Emperor, whose devastations in the N.E. of Europe were alarming Christendom. He was present at the election of a new emperor in the capital of Genghis-Khan. After a month's residence at the Mongol court, and a visit to Tourakina, the Emperor's mother, C. returned to Europe. He was the first who gave a trustworthy account of the Mongols and of their country. An English translation of a Latin abridgment of his travels, which appeared in the *Speculum Historicum* of Vincent de Beauvais, is attributed to Hakluyt or Purchas. The exact date of C.'s death has not been ascertained, but the latter portion of his life was spent in missionary efforts in Bohemia, Hungary, Denmark, and Norway. See Peschel's *Geschichte der Erdkunde*, pp. 150–207, and an article by Dora d'Istria in the *Revue des Deux Mondes* (Feb. 15. 1872).

CARPOL'OGY, the division of botanical science which concerns itself with the study and classification of the forms of fruits.

CARPOMA'NIA, or PHYTOLITHES, an affection of quinces, pears, &c., in which, by the deposition of layer after layer in the cells of the fleshy fruit, they become gritty. It is, however, scarcely a disease, as it occurs naturally in pears, melons, &c., and the gardener's efforts are directed, by means of cultivation, to reduce it to a minimum, by creating a condition which is not natural to the fruit.

CARPOPTO'SIS, a term applied to the disease in plants which causes the fruit, after it has begun to 'set,' to have its progress suddenly arrested and to fall off. It is frequently owing to more fruit being formed than the tree is capable of nourishing, or from the tree being covered with so many shoots that the sap which should go to the fruit is diverted to nourish the foliage. In Italy the rice crops are often so affected.

CARRAJAL', Tomas José Gonzalez, a Spanish statesman and author, was born at Seville, 21st Dec. 1753, studied at the university of his native city, and in 1785 went to Madrid, where he devoted himself to politics and philology with equal zeal. From the outbreak of the French Revolution to the reactionary war of 1823, except for a short period (1815–20), he was constantly engaged in public affairs, and showed both ability and patriotism. After repeated affronts and persecutions by the Absolutist party, he was finally received into the royal favor, and became a member of the Supreme Military Council in 1833, but died 9th Nov. 1834. As an author, C. has obtained a great reputation in Europe by his metrical translation of the poetical books of the Bible, begun in his fifty-fourth year, and heroically persisted in amid the din of arms, the distractions of campaigns, and even the fatigues of a march. The fruits of this labor are seen in *Los Salmos* (5 vols. Val. 1819), and *Los Libros Poeticos de la Santa Biblia* (6 vols. Val. 1827). His original compositions are contained in the *Opusculos ineditos en Prosa y Verso* (13 vols. Mad. 1847).

CARROLL, Charles, of Carrollton, an American patriot, born at Annapolis, Md., Sept. 20, 1737. His parents were wealthy, and he received a liberal education, pursuing his studies both in England and France. He was educated for the law, in 1776 was a member of the Continental Congress, and was one of the signers of the Declaration of Independence. He was a man of sterling worth, and rendered valuable assistance to the Continental cause throughout the Revolutionary War. Died Nov. 4, 1832.

CARROLL, John, D.D., LL.D., a distinguished prelate of the Roman Church, born in 1735, and educated in Europe. After teaching for a time at Bruges, he returned to America, and, in 1789, was made the first bishop of the Catholic Church in America. A short time prior to his death, in 1815, he was elevated to the rank of archbishop.

CARTHAGE, a city of Jasper Co., Mo., near Spring River, 316 miles S.W. of St. Louis. It is an important railroad center, has extensive manufactures, and carries on a large trade with the surrounding country. Pop. 7000.

CARTHAGE, Battle of, a battle of the Civil War, fought near Carthage, Mo., July 5, 1861, between a Confederate force, commanded by Gen. Price, and a Union force, under the command of Gen. Sigel, which resulted in the latter being compelled to retire. The losses were slight (150 Confederates and 50 on the Union side), and Sigel's retreat was conducted in perfect order.

CARUS, Julius Victor, a well-known German anatomist and zoologist, was born at Leipsic, August 25, 1823. After acting for a time as conservator of the Oxford Anatomical Museum, he was elected Professor of Comparative Anatomy in his native town in 1853. He lectured in Edinburgh University in the room of Professor Wyville Thomson, who was absent on the *Challenger* expedition, during the summers of 1873–74. He is a strong Darwinian, pushing the claims of natural selection even further than its great originator. His chief works are *System der Thier. Morphologie* (Leips. 1853); *Icones Zootomicæ* (Leips. 1857); *Bibliotheca Zoologica*, with Engelmann (2 vols. Leips. 1862); *Handbuch der Zoologie* (1868); and with Gerstäcker, *Geschichte der Zoologie* (Munich, 1878).

CARTWRIGHT, Peter, D.D., a famous American preacher, born in Virginia, in 1785, and early in life entered the ministry of the Methodist Church. His eloquence was that of the common people, and he labored among the backwoodsmen of Kentucky with marked success. He is said to have baptized more than 12,000 converts. Died in 1872.

CAR'VER, John, the first governor of the Plymouth colony in the New World, was born in England in the second half of the 16th c., and went to Leyden, then a refuge for the Puritans. He was an elder in the Church, and in 1620 sailed with the Pilgrims in the *Mayflower*. C. was a prudent and firm ruler, but did not long survive his arrival in New England, dying at Plymouth, April 5, 1621.

CARY, Alice and Phœbe, sisters and poets. Alice was born near Cincinnati, O., April 26, 1820, and Phœbe at the same place, September 4, 1824. Their educational opportunities were limited, but both, at an early age, began to develop remarkable literary genius. Among the published works of Alice are *Clovernook; Hagar, a Story of To-day* (1852); *Married, not Mated* (1856); *Pictures of Country Life* (1857); *The Lover's Diary* (1867); and *Snowberries* (1869); and among those of Phœbe, *Poems and Parodies* (1854), and *Poems of Faith, Hope, and Love* (1868). At the age of 17 Phœbe wrote the favorite hymn 'One sweetly solemn thought comes to me o'er and o'er,' &c. Alice died at New York, February 12, 1871, and Phœbe at Newport, R. I., July 31, 1871. A beautiful monument was erected to their memory, in Greenwood, by Horace Greeley, who had been an intimate friend during their lives.

CASEA'RIA, a genus of plants of the natural order *Samydaceæ*. *C. ulmifolia*, is a native of Brazil, and is highly esteemed in that country as a remedy for snake-bites. The Brazilians make a drink of the juice of the leaves, and also apply them to wounds. Nearly a hundred species, many of which have medicinal properties, are known. *C. esculenta* of India has purgative roots, but other species are poisonous. For example, the resin surrounding the young flowers of *C. resinifera* is used to kill dogs and cats.

CASEM'BE (*i. e.*, 'general'), the title of a sovereign in the interior of Africa, whose territory, called the country of C., has been made known to Europeans by Dr. Livingstone. It is partly upland, and is 'generally covered with forest, well watered by numerous rivulets, and comparatively cold. The soil is very rich, and yields abundantly wherever cultivated.' The chief river is the Luapula, which connects Lakes Bangweolo and Moreo, entering the latter about 19 miles N.-W. of C.'s town. The climate is in some districts unhealthy. The town of C., near the N. end of the small lake Mofwe, at an elevation of 3319 feet above the level of the sea, consists of huts interspersed among cassava plantations, and covers one sq. mile. Each governor builds a new capital for himself. See the *Last Journals of David Livingstone* (2 vols. London, 1874).

CASS'AREEP is the inspissated juice of the bitter cassava root, *Jatropha manihot*, largely prepared in British Guiana as a basis of various sauces, and particularly of the famous W. Indian pepper-pot. It possesses remarkable antiseptic powers, and meat boiled with the addition of C. is found to keep very much longer than by ordinary boiling. C. was originally a 'buck' or native Indian preparation. The juice of which it is prepared is highly poisonous when newly expressed, but the heat of boiling entirely dissipates the volatile poisonous matter.

CASSYTHA'CEÆ, a natural order of plants, by some considered a section of the *Lauraceæ*, consisting alone of the genus *Cassytha*, of which there are nine species, all leafless parasitic twiners, resembling the dodders in habit. In Australia, some of them are called scrub-vines, and in places grow so thickly as to make travel almost impossible. The white drupes of *C. cuscutiformis* of N. Australia are edible. *C. filiformis* of India is used by the Brahmins for seasoning their butter-milk, and also, when mixed with sesamum oil, for strengthening the hair. In medicine it is employed to cleanse inveterate ulcers; and the juice, mixed with sugar, is considered an infallible remedy for inflamed eyes. All the species are tropical, but are found both in the New and Old Worlds.

CAS'TEL, a town in the Hesse-Rhine province, on the right bank of the Rhine, nearly opposite Mainz, of which it forms a fortress of defence, and with which it communicates by a floating bridge. It is on the Wiesbaden Railway, and has an active trade in cattle. Pop. (1871) 5245. C., as its name indicates, is of Roman origin, and occupies the site of a place called *Castellum Mattiacorum*, which forms the subject of one of Becker's works (Wiesb. 1863). C. is the name of several other small towns and villages in Germany.

CASTELFIDAR'DO, a town in Italy, province of Ancona, near Loretto, among low-lying hills between the rivers Aspis and Musone. It was brought into prominence by a crushing defeat inflicted on the Papal troops under General Lamoricière by the Piedmontese under General Cialdini, on September 8, 1860. Pop. 6275.

CA'SUS AMISSIO'NIS, in Scotch law, denotes the accident by which a legal instrument is supposed to have been lost or destroyed. This accident, or C. A., must be set forth, if an action be brought for proving the tenor of the lost document.

CATAL'PA, a genus of *Bignoniaceæ*, containing four or five species of trees, natives of the W. Indies, N. America, Japan, and China, but which also thrive in the open air in the S. of England, France, and Germany. The wood is fine-grained, durable, and capable of receiving a good polish. The bark is tonic, stimulant, and antiseptic, but the honey from the flowers is poisonous (*Treasury of Botany*).

CATARHI'NA (Gr. 'oblique-nosed'), the section of the order *Quadrumana* which includes those monkeys—exclusively confined to the Old World—in which the nostrils are oblique and closely set. The thumbs and great toes are invariably present (with one exception), and the thumb always opposable to the other fingers, so as to convert the hand into a prehensile organ. The teeth are arranged as in man, and thus number thirty-two. The incisors and canines are prominent, especially in the males. The tail is never prehensile, and may be rudimentary. Cheek-pouches and natal callosities are developed. The *Semnopitheci*, macaques, baboons, mandrills, gibbons, orangs, gorillas, &c., represent this group, which is the highest in the order.

CATAW'BA, GREAT, a river of the United States, rises in Blue Ridge, waters N. and S. Carolina, and unites with the Congaree to form the Santee, after a course of 250 miles. It gives name to a light sparkling wine, originally made from a wild vine found (1801) near its source, and now extensively produced in Ohio, near Cincinnati. This wine, which has a rich Muscadine flavor, and rivals French wine in delicacy, is much used as a substitute for champagne.

CATHELECTROTO'NUS is the physiological condition of a nerve in the neighborhood of the *negative* pole, when it is stimulated by a constant current of electricity.

CATHETOM'ETER (from the Gr. *kathetos*, 'perpendicular,' and *metron*, 'a measure'), an instrument for measuring the change in the height of an object situated at some distance off, especially with reference to a column of liquid in a tube. It consists essentially of a tripod stand and an upright brass rod, to which a telescope is so attached at right angles that it is capable of being fixed at any part of the rod, and of being pointed in any direction. The rod is adjusted to a true perpendicular position by means of spirit-levels and screws, and this secures the perfectly horizontal position of the telescope.

CATLIN, GEORGE, an American artist, born in Pennsylvania in 1796. He practised law for a short time in his native state, but in 1832, becoming interested in the Indians of America, he devoted the remainder of his life to the study of their manners and institutions, and traveled extensively among them, in both North and South America. Among his published works are the following: *Manners, Customs, and Condition of the North American Indians* (1841), *North American Portfolio of Hunting Scenes* (1844), *Eight Years' Travels and Residence in Europe* (1848), and *Last Rambles among the Indians of the Rocky Mountains and the Andes*. Died in 1872.

CAU'CHY, AUGUSTINE LOUIS, a distinguished French mathematician and physicist, was born at Paris, August 31, 1789. He entered L'Ecole Polytechnique in 1805, where, in 1816, he became Professor of Mechanics. At the revolution of 1830, C. resigned his position, and soon after accepted the chair of Mathematical Physics in the University of Turin. In 1838 he returned to Paris, succeeded M. Biot as Professor of Physical Astronomy in 1849, and died at Sceaux, 23d May 1857. C. published numerous memoirs in the *Comptes Rendus*, and in Lionville's *Journal de Mathematiques*. His best works are his *Cours d'Analyse* (1821), his *Leçons sur le Calcul Différentiel* (1826), and his *Présumés Analytiques* (1833).

CAU'DEX (Lat.), the axis of a plant consisting of stem and root. It is, however, generally applied as a synonym of the stipe or woody stem of monocotyledons, especially palms—*Yucca*, *Dracæna*, *Pandanus*, &c.

CAULER'PA, a fine genus of 'green-seeded' (*chlorospermous*) seaweeds of the W. Indies. They form a large portion of the food of turtles; and it is said that the color of the 'green fat' of these reptiles—so dear to gastronomes—is due to this kind of food.

CAVENDISH, THOMAS, one of the great navigators of the Elizabethan age, was born in Suffolk in 1560, and studied at the University of Cambridge. He first accompanied the expedition to Virginia, and soon after his return fitted out three ships in July 1586, to levy contributions on the Spaniards on the W. coast of America. After touching the coast of Patagonia, he rounded Cape Horn, sailed N. to California, where he captured a Spanish galleon loaded with treasure, and returned by the Cape of Good Hope to England, where he landed, 9th Sept. 1588. His voyage is chiefly remarkable as being the shortest round the world that had up to that time been made. A second voyage was not so successful; his crew mutinied, and C. died of vexation in 1592, on the coast of Brazil. From him 'Cavendish' tobacco takes its name.

CAVICOR'NIA ('hollow horned'), the family or group of *Ruminant* mammalia, including the oxen (*Bovidæ*), sheep and goats (*Ovidæ*), and antelopes (*Antilopidæ*). The upper jaw in all is destitute of incisors and canine teeth, and the lower incisors bite against the hardened gum in the front of the upper jaw. The lower jaw has six incisors, two canines, and twelve molars; the latter separated by a wide interval from the canine teeth. Both sexes (as generally in sheep and goats), or the males only (as in some genera of antelopes), may possess horns. These horns, it is to be noted, are hollow structures, consisting each of a hollow sheath of horn surrounding a central bony core. They are not deciduous or shed, as in the *Cervidæ* or deer, but permanent. The feet are cleft, and provided with two accessory hoofs at the back.

CAYUGA LAKE, a beautiful lake in Central New York, between Cayuga and Seneca counties. It is 38 miles long, and from one to three miles wide, and is 387 feet above the sea level.

CEDAR CREEK, BATTLE OF, a battle of the civil war, fought near a creek of the same name, in the Shenandoah Valley, Oct. 19, 1864. During the absence of Gen. Sheridan, the Union forces were commanded by Gen. Wright. On the morning of the 19th they were attacked by the Confederates in force, under the command of Gen. Early, and compelled to retreat. By the time that Wright had succeeded in reforming his lines, Sheridan arrived from Winchester. His presence proved a new inspiration to the discouraged men of his command, and resuming the battle, they drove the Confederates from the field, capturing large quantities of arms and 2000 prisoners. So decisive was the battle that it virtually ended Earle's Shenandoah campaign.

CEDAR MOUNTAIN, BATTLE OF, a battle of the civil war, fought in Culpeper Co., Va., Aug. 9, 1862. The Confederate forces were under the command of Gens. Pope and Jackson, and the Union forces under the command of Gen. Banks. The conflict was fierce and bloody, and resulted in the defeat of the Union army with a loss of nearly 2000 men. The Confederate loss was 1300.

CEDAR RAPIDS, a flourishing city of Linn Co., Ia., on the Cedar River. It has extensive manufactories, and is an important railroad center. Pop. 12,000.

CEL'SIUS, the name of a Swedish family, several members of which have attained celebrity. Among these may be reckoned: 1. MAGNUS C., born 16th January 1621, in Helsingland, died Professor of Astronomy, 5th May 1679. He is the discoverer of the Helsing runes.—2. OLOF C., his son, born 1670, died 1756, was Professor of Theology, and Provost of the Cathedral at Upsala. He was a great student of botany and Oriental languages, of which his *Hierobotanicon* (Ups. 1745–47) is evidence, and was the first to recognize the genius of Linnæus, whom he liberally aided. —3. ANDERS C., nephew of the latter, and the most distinguished of the family, was born 27th November 1701, at Upsala, where he became Professor of Astronomy in 1730, and died 25th April 1744. His chief works are *Nova Methodus Distantiam Solis a Terra Determinandi* (1730), and *De Observationibus pro Figura Telluris Determinanda in Gallia Habitis* (1738); but he is best known as the constructor of the centigrade thermometer.—4. OLOF VON C., son of the Cathedral Provost, born 1716, became Professor of History at Upsala, 1747, was raised to the rank of a noble in 1756, made Bishop of Lund in 1777, and died in 1794. He founded (1742) the first literary society in Sweden, *Tidningar-om de Lärdas arbeten*, and wrote a *Svea-rikes Kyrko-Historia* (Stockh. 1767), besides histories of Gustavus I. (2 vols. 1746–53) and of Eric XIV. (1774).

CENTENNIAL EXHIBITION, a world's fair, held at Philadelphia, Pa., in 1876, on the centennial year of the declaration of the independence of the United States. It was opened in the month of May, and nearly all the nations of the world were represented by an exhibit of their national products. It continued open for six months, and was visited by nearly ten million people.

CENTRAL FALLS, a manufacturing town of Providence Co., R. I., on the Blackstone River and the Providence and Worcester Railroad, 5 miles from Providence. It has thread mills, hair-cloth factory, tanneries, and several cotton mills. Pop. 8500.

CENTRALIA, in Marion Co., Ill., on the Illinois Central Railroad, and at the terminus of the Jacksonville and South-eastern Railroad, 112 miles from Cairo, and 253 from Chicago. Railroad

repair shops are located here which employ a large number of men. Pop. 5000.

CENTRAL PROVINCES, THE, a province of British India, in the heart of the Peninsula, lying between the N.-W. Provinces on the north and the dominions of the Nizam of Hyderabad on the south. Roughly speaking, it occupies the upper valley of the Nerbudda, and is throughout mountainous and overgrown with jungle, the home of wild beasts and aboriginal tribes. Area, 84,078 square miles; pop. (1872) 8,201,519. Native states cover an additional area of 28,834 square miles; pop. (1872) 1,049,710. The administration is conducted by a Chief Commissioner, whose residence is at Nagpur. The total revenue is about £940,000, of which £614,000 is derived from land. The total external trade is valued at about seven millions sterling, chiefly conducted by rail with Bombay. The chief crops are rice, wheat, millets, cotton, oilseeds, and tobacco. Iron is largely smelted by native methods. In 1853 the last portions of the Mahratta kingdom lapsed to the British on failure of heirs, and in 1861 the C. P. were constituted.

CENTRE COLLEGE, an American educational institution, at Danville, Ky., chartered in 1819. Its affairs are under the control of the Presbyterian Church. It has suitable buildings and a growing library.

CER'BERA, a genus of trees belonging to the natural order *Apocynaceæ*, natives of tropical Asia. The seeds of most of them are poisonous. The bark of *C. Odollam*, of the Malabar coast, is purgative, and the unripe fruit is used to destroy dogs, the teeth of the animals being, it is reported, 'loosened so as to fall out after masticating it.'

CER'EBROL. This has been described as an oily substance, of a reddish-color, obtained by the action of alcohol and ether on brain-matter. It is probably composed of oleo-phosphoric and cerebric acids and cholestrin.

CER'EBRO-SPI'NAL AXIS. This term is usually applied to the central part of the nervous system, as distinguished from the nerves or peripheral part. The C.-S. A. consists of the brain and spinal cord. The brain is contained in the cavity of the cranium, and the spinal cord or marrow in the bony canal formed by the vertebræ. Both structures are surrounded by three membranes as follows:—1*st*, and most externally, a strong fibrous membrane termed the *dura mater;* 2*d*. and in the middle, a serous membrane called the *arachnoid;* and 3*d*, and directly covering the brain and cord, a vascular membrane named the *pia mater*. The C.-S. A. consists of a right and left half, exactly symmetrical, which are united together by commissures or connecting masses of white or grey matter. The spinal portion of the C.-S. A. is well developed in all vertebrate animals, but the cranial portion in the skull presents many degrees of development in different genera, from the imperfect condition of the *Amphioxus lanceolatus* to the highly complex cerebrum of man.

CER'EBROTE. Alcoholic extracts of brain-substance yield a deposit; this deposit treated with ether is C. It is no doubt a complex substance, similar in nature to cerebrol and cerebrin.

CEROPE'GIA, a genus of herbaceous plants and shrubs, comprising about fifty species, natives of India and Africa, belonging to the natural order *Asclepiadaceæ*. Several species are eaten either as a salad, or the leaves, stems, and tubers are boiled as potherbs.

CERR'O DE PASCO, a mining city of Peru, the capital of the province of Pasco, department of Junin, 140 miles N.E. of Lima, and 14,100 feet above the level of the sea. The pop., a mixture of all races and nationalities, fluctuates with the state of the mines, being sometimes as high as 14,000, and sometimes much less. The silver-mines, discovered by an Indian in 1630, are the richest in the republic, and coal is found in the vicinity.

CESNOLA, DI'LUIGI PALMA, COUNT, born near Turin, Italy, July 29, 1832. He received a military education, participated in the war of Italian independence, and served in the Crimean War on the staff of General Ansaldi. In 1860 he came to America and entered the Union army with the rank of colonel. He served with gallantry, and at the battle of Aldie, Gen. Kilpatrick presented him his own sword upon the field. At the close of the war he became a citizen of the U. S., and was appointed consul at Cyprus. He conducted extensive excavations on the island of Cyprus, and made a valuable collection of antiquities, which was sold to the New York Metropolitan Museum of Fine Art. In 1879 he was made a director of that institution.

CESPEDES, MANUEL CARLOS, a Cuban patriot, born April 18, 1819, and educated for the law at the University of Havana. In 1868 he became the leader of an insurrection, which had for its object the liberation of Cuba from Spanish authority, and in 1869 was elected President of the Republic. The movement proved unsuccessful, and Cespedes was killed by the Spaniards, Feb. 27, 1874.

CEYLON. MOSS, a seaweed sometimes imported, under the name of *Agar-agar*, for the sake of the nutritive, emollient, and demulcent jelly or decoction which can be made of it for the food of invalids and children. It is the product of *Gracilaria lichenoides* (*Plocaria candida*), *Gracilaria confervoides*, and other species of *Gracilaria*.

CHAIR, an article of furniture used as a seat, differing from a stool in having a rest for the back, and occasionally with supports for the arms. In a dwelling-house chairs are usually designed to harmonize with the other furnishings of the apartment in which they are placed, and therefore they vary very much in form and constructive materials. The chairs of the ancients were often of the most costly description, and their elegant forms have been frequently reproduced and varied by modern cabinetmakers. Numerous examples of antique seats are preserved in national European collections. Of the Egyptian chairs in the British Museum, one is formed of ebony, inlaid with ivory, except the seat, which is of plaited cane, as in modern chairs. The Romans, as well as the Greeks and Egyptians, constructed seats long enough to suit two persons. Two such *bisellia* in bronze, discovered at Pompeii, are now in the *Museo Borbonico* at Naples, and reproductions of them may be examined in the South Kensington Museum. Among other ancient and interesting chairs meriting notice may be mentioned that of St. Peter, formed of wood overlaid with carved ivory work and gold, preserved in the Church of St. Peter at Rome, and that of Dagobert, King of France in the 7th c. (now in the Louvre at Paris), made of bronze, partially gilt, and beautifully chased and chiseled. The chief English seat of the C. trade is at High Wycombe and neighborhood, where extensive beech-woods supply material for common chairs. For the finer kinds of chairs, walnut, rosewood, mahogany, birch, oak, sycamore, and cherry are employed.

CHAMÆDO'REA, a genus of palms containing upwards of forty species, natives of the forests of tropical America. The reed-like stems are used for walking-sticks, and the other unexpanded flower-spikes by the Mexicans as a potherb, under the name of *Tepejilote*.

CHAMBERLAIN, JOSHUA L., LL.D., an American soldier and statesman, born in Maine, in 1828. He served gallantly throughout the civil war, and was promoted to the rank of major-general. From 1866 to 1870 he was governor of Maine, and in 1871 was made president of Bowdoin College.

CHAMBERS, PRACTICE BEFORE A JUDGE OR VICE-CHANCELLOR AT. This term of English law is applied to the arrangement of certain minor matters by the summary decision of a single judge at chambers. The term has a similar meaning in American law.

CHAMBERSBURG, in Mercer Co., N. J., a suburb of Trenton, on the Delaware and Raritan Canal, and on the Pennsylvania, and Philadelphia & Reading railroads, 30 miles from Philadelphia. It has iron, woollen, and cotton factories. Pop. 29,910.

CHAMBERSBURGH, a city of Franklin Co., Pa., on the Cumberland Valley Railroad, 52 miles from Harrisburg and 150 from Philadelphia. It is a center of trade, being surrounded by a fertile and populous agricultural district. Pop. 6743.

CHAMBE'ZE, an important river of Central Africa, forming the headwaters of the Luapula, rises in the Kitwette Mountains, 75 miles S. of Lake Tanganjika, flows S. and S.W., and enters the W. end of Lake Bangweolo, after a course of 100 miles. It is 1200 feet broad before entering the lake, and has numerous tributaries, of which the chief are the Lokutu, Mansia, Lokischa, and Mapampa. The C. was confounded with the Zambeze till Livingstone explored the region in February 1867. See *The Last Journals of David Livingstone* (2 vols. Lond. 1874).

CHAMELEON MINERAL is the name sometimes given to manganate of potash (K_2MnO_4) on account of the curious changes of color which take place in its aqueous solution if left to itself. These changes in the tint of the solution are caused by the gradual decomposition of manganate of potash (solution of which is green) into permanganate of potash (solution of which is carmine colored).

$$\underbrace{3(K_2MnO_4)}_{\text{Manganate of Potash.}} + \underbrace{2H^2O}_{\text{Water.}} = \underbrace{2KMnO_4}_{\text{Permanganate of Potash.}} + \underbrace{MnO_2}_{\text{Binoxide of Manganese.}} + \underbrace{4KHO}_{\text{Caustic Potash.}}$$

C. M. is readily obtained by fusing together equal weights of binoxide of manganese and caustic potash.

CHAMPAIGN, a city of Champaign Co., Ill., on the Illinois Central Railroad, at its junction with the Bloomington and Western, 128 miles from Chicago. It is surrounded by a fertile agricultural country, and contains the State Industrial University. Pop. 5106.

CHAM'PIGNON, the French name for mushrooms, but in Britain only applied to *Agaricus* (*Marasmius*) *Oreades*—the 'Scotch Bonnets'—which is one of the edible species.

CHAMPION HILLS, Battle of, a battle of the civil war, fought midway between Jackson and Vicksburg, Miss., May 16, 1863. Gen. Grant, marching towards the latter place, was here met by a Confederate army, commanded by Gen. Pemberton. After a desperate struggle of five hours duration, the Confederates were compelled to retire.

CHANCELLORSVILLE, Battle of, an important action of the civil war, fought near the village of the same name in Virginia, near the Rappahannock River. In the latter part of April 1863, Gen. Hooker, then in command of the Army of the Potomac, crossed the Rappahannock, and moved towards Chancellorsville for the purpose of attacking the Confederates under Gen. Lee. On May 1 the armies confronted each other and there was sharp skirmishing. During the 2d, 3d, and 4th there was desperate fighting, with success generally on the side of the Confederates. On the 5th Hooker retreated across the Rappahannock and thus ended the struggle. The Union loss was 18,000; that of the Confederates 13,000.

CHANDLER, Zachariah, an American statesman, born in New Hampshire, in 1813, and early in life settled at Detroit, Mich., where he engaged in mercantile pursuits. He was actively engaged in politics, first as a Whig, and afterwards as a Republican. In 1856 he was elected to the U. S. Senate, and was one of the most vigorous supporters of the prosecution of the civil war. In 1865 he was made Secretary of the Interior. Died at Chicago, Ill., in 1879.

CHANDRAGIRI ('Hill of the Moon'), a town in N. Arcot District, Madras, British India, pop. (1871) 4235. During the 16th century C. was the residence of the Rajahs of Vijayanagar, the most powerful princes in S. India. In the citadel was signed the treaty of 1640, by which the site of Madras city was granted to the English.

CHAN'GI, the juice of *Coriaria thymifolia*, of a reddish color, but which in a few hours after exposure turns black. In S. America, during the Spanish *régime*, state documents were written with it. It is said that it does not corrode steel pens, and that the writing made with it is more indelible than that with ordinary artificially-made ink.

CHANTILLY, Battle of, an engagement of the civil war, near the village of the same name, in Fairfax Co., Va., Sept. 1, 1862. The right wing of the Union army under the command of Gen. Pope, was attacked by a Confederate force under 'Stonewall' Jackson, and a fierce struggle resulted. Gens. I. I. Stevens and Phil. Kearney of the Union army were killed.

CHAPIN, Edwin Hubbell, D.D., a distinguished American clergyman of the Universalist church, born at Union Village, Washington Co., N. Y., Dec. 29, 1814, educated at Bennington, Vt., and began to preach in 1837. In 1848 he became pastor of the Fourth Universalist Church in New York, one of the wealthiest churches of that denomination. This position he continued to hold up to the time of his death. He was an eloquent pulpit orator and lecturer. He published *Moral Aspects of City Life* (1853), *True Manliness* (1854), and several volumes of sermons and lectures. Died in New York City, Dec. 27, 1880.

CHAPTER (Fr. *chapitre*, old Fr. *chapitle*, from Lat. *capitulum*, a dim. of *caput*, 'the head'), the society of canons and prebendaries in a cathedral, of which the dean is the head, and which forms the council of the bishop. Prior to the time of Henry VIII., the election of a bishop rested with this body; but now its power is merely nominal in England.

CHAPULTEPEC, a Mexican fortress, stormed by the American forces, under Gen. Scott, Sept. 13, 1847. Situated about two miles from the city of Mexico, it guarded one of the approaches to it, and was regarded as well-nigh impregnable. The conflict was for a short time very fierce, but eventually the Americans overcame every obstacle, and were completely victorious.

CHARLES IV. (*Le Bel*), the last of the Capetians, born in 1294, third son of Philippe le Bel, succeeded his brother Philippe V. (*Le Long*) in 1322, excluding Jeanne, Duchess of Burgundy, in virtue of the Salic law which Philippe V. had just established. C.'s second wife was his cousin-german, Maria, daughter of the Emperor Heinrich VII., and sister of King Johann of Bohemia. Although he relaxed the persecution of the lepers and the Jews, C. allowed Pope John XXII. (then at Avignon) to wreak his fury on the mendicant orders (whose vow of poverty was declared heresy) and on the sorcerers. He also helped Count Louis of Flanders to interfere by tolls with the commercial rights of his subjects. After the battle of Mühldorf C. became a candidate against Ludwig of Bavaria for the empire, which was finally divided between Austria and Bavaria. The disputes about the feudal rights in Guienne estranged C. and Edward II., and the former assisted his sister Isabella and the Lancastrians in the Harwich expedition, which placed Edward III. on the throne. C. died 31st Jan. 1328, leaving Philippe de Valois (who succeeded him on the throne) as tutor to his daughter by his third wife, Jeanne d'Evreux.

CHARLESTON, a city of Kanawha Co., W. V., and the capital of that state, on the Great Kanawha River and the Chesapeake & Ohio, and the Ohio Central railroads. The river is navigable for 25 miles above this point. Charleston carries on a large trade, and is surrounded by coal and iron mines, and there are salt works near by. Pop. 6,000.

CHARLESTON, in Coles Co., Ill., at the junction of the St. Louis & Indianapolis, and the Toledo, Cincinnati & St. Louis railroads, 46 miles from Terre Haute. It is surrounded by a fine agricultural country, carries on a thriving trade, and has extensive railroad machine shops. Pop. 3,000.

CHARLOTTE, a city of Mecklenburg Co., N. C., on the Sugar Creek and the Carolina Central Railroad, and the terminus of several railroads. It carries on a large trade with the surrounding country. Pop. 7,094.

CHARTER OAK, an oak tree in Hartford, Conn., in the hollow of which the colonial charter was hidden, when Governor Andros, by the order of James II., sought to deprive the colonists of it. The tree was blown down in 1856.

CHARTRES, Duc de, Robert-Philippe-Louis-Eugene-Ferdinand d'Orleans, younger son of the late Duc d'Orleans, was born in Paris, November 9, 1840, and at the Revolution of 1848 passed into exile with the rest of the family. He was educated at Eisenach, resided for some time at Richmond, and served along with his brother in the Federal army during the campaign of the Potomac (1862) in the American civil war. In 1863 he married his cousin, the eldest daughter of the Prince de Joinville, and in 1870 returned incognito to France, entering the army of Gen. Chanzy under the name of Robert le Fort. After the German war, the National Assembly having revoked the law of banishment against the Orleans family, he was named commander of a squadron by M. Thiers, and served in Algeria in 1872.

CHARTS are the maps used in navigation, and in which are specially noted the depth of soundings, the position of rocks and sandbanks, and the direction of currents and prevalent winds. The English Admiralty Office expends a large sum annually on the preparation of elaborate C. on a large scale, and these are sold at nominal prices, ranging from 3s. to 6d. each. At various places, as Gibraltar and Cape Town, there are depôts for the supply of C., which are now in almost universal use.

CHASE, Salmon Portland, an American jurist and statesman, born at Cornish, N. H., Jan. 13, 1808, and graduated from Dartmouth College in 1826. He studied law at Washington, D. C., under William Wirt, and in 1830 began to practice in Cincinnati, O. From the beginning of the conflict regarding slavery, he took strong anti-slavery grounds, asserting as a primary principle that 'slavery is sectional, freedom is national.' In 1849 he was elected to the U. S. Senate by the free-soil wing of the Democratic party, where he took a firm stand in opposition to all measures, having for their object the extension of slavery. He was one of the organizers of the Republican party, and was a prominent candidate for the nomination for the Presidency before the convention of 1860. In 1861 he was made secretary of the treasury by President Lincoln, which position he held during the civil war, and it was at his suggestion that greenbacks were issued and made a legal tender for the payment of all debts. During this trying period in our national affairs, Mr. C. rendered invaluable services to his country. In 1864 he was made chief-justice of the Supreme Court of the U. S., which position he continued to fill until the time of his death. In 1868 he presided over the deliberation of the Senate during the trial of President Johnson, who had been impeached by the House. Died at New York, May 7, 1873.

CHATEAU-MARGAUX, a beautiful castle near the village of Margaux, in the department of the Gironde, E. of Castelnau de Medoc, on the left bank of the river Gironde, 14 miles below Bordeaux. It is famous for its vineyards, which yield one of the finest class of clarets.

CHATTANOOGA, a city of Tennessee, on the Tennessee River, about 150 miles S.-E. of Nashville, near which was fought an important battle of the civil war. The Confederate forces were commanded by Gen. Bragg, and the Union forces by Gen. Sherman. The Confederates, who were strongly entrenched, were attacked on Nov. 23, 1863, and there was fierce fighting all along the line on the 24th and 25th. The result was that Missionary Ridge and Lookout Mountain were carried by the Union troops, and the Confederates were utterly routed. Many cannon and great quantities of small arms were captured by the victorious army. The Union loss was between 6 and 7 thousand. The Con-

federates lost in killed and wounded 2500, and 6000 prisoners. Population of the city of Chattanooga, 20,666.

CHAUN'CEY, CHARLES, the second President of Harvard College, was born in England in 1592, and educated at Westminster School and Trinity College, Cambridge. In 1627 he was made vicar of Ware, became a Puritan, and after being imprisoned and fined, emigrated to New England in 1636, and in 1654 was appointed President of Harvard. In 1659 he published twenty-six sermons on 'Justification.' He died 19th February 1672. C. is the ancestor of all the American Chaunceys, who form a pretty numerous body.—CHAUNCEY, CHARLES, D.D., great-grandson of the above, was born January 1, 1705. He was minister in Boston in one parish for sixty years, and is the author of various theological works which are still in repute in America. He died February 10, 1787. See *C. Memorials*, by Professor Fowler.

CHAUNCEY, ISAAC, an American naval officer, born in 1772. He served for some time in the merchant service, but in 1799 entered the navy, with the rank of lieutenant. He served with gallantry in the expedition against Tripoli, and was promoted to the rank of captain, in 1806. During the war of 1812, he rendered valuable services, as commander of the naval forces on the great lakes; and was afterwards, for several years, in command of the Brooklyn navy-yard. Died in 1840.

CHAV'ICA, the dried unripe fruit of *C. Roxburghii*, one of the Pepper order, and known in commerce as *long pepper*. It contains an acrid resin, a volatile oil, and an alkaloid—*piperine*. C. is used in much the same way as black pepper, which in its properties it resembles. In India dried slices of it are in repute as a stomachic. *C. officinarum* of the Malay Islands also yields a similar long pepper. C.-betel is betel-pepper. *C. Siraboa*, mixed with betel-nut and a little lime, is chewed.

CHEBOYGAN, in Cheboygan Co., Mich., on the Cheboygan River, at the foot of the Straits of Mackinac, on the Jackson, Lansing & Saginaw Railroad, 150 miles from Bay City and 270 from Detroit. It is surrounded by a fine farming country, and is largely engaged in lumbering. Pop. 5000.

CHEESE-MITE (*Acarus domesticus*), a species of *Acaridæ*, or true mites, belonging to the class *Arachnida*, and so named from its being mainly found in cheese and like substances. It possesses an oval-shaped body covered with prominent bristles, eight legs, and a mouth provided with mandibles or jaws. In decaying cheese the C.-M. is sometimes found in immense numbers. Reproduction is effected very quickly. No defined circulatory or respiratory organs exist in the animal, in which also the eyes are of simple character.

CHEI'RON, represented by Homer (Il. xi. 831) as the wisest and most humane of the Centaurs; the instructor of Achilles, Jason, and Æsculapius; skilled in hunting, music, medicine, and prophecy; and throughout life and in his death a splendid example of self-sacrifice. The young Achilles, and sometimes the Erotes, or Loves, appear in existing representations riding on his back.

CHELSEA, a city of Suffolk Co., Mass., on the Eastern Railroad, an important suburb, and formerly a part of Boston, and the residence of a large number of business men of that city. It is on the harbor front; is connected with Boston by a ferry, two bridges, and the Eastern Railroad; and has extensive manufacturing interests. Pop. 21,785.

CHÉN'IER, ANDRE-MARIE DE, a French poet and political writer, was born October 29, 1763, at Constantinople, where his father was consul-general for France. He came to France at an early age, and studied at the Collége de Navarre, in Paris, there evincing poetic talent and acquiring a passion for ancient literature. In 1784 he traveled on account of his health in Switzerland, Italy, and Greece, and in 1787 he visited England as secretary to the embassy of M. Luzerne. Returning to Paris in 1790, while the Revolution was raging, he joined the brilliant 'Society of '89,' and volunteered to assist the infirm Malesherbes in the defence of Louis XVI. C. stood as far apart from despotism as from anarchy, and in prose and verse proclaimed at once his love of liberty and his detestation of violence. He was at last brought before the Revolutionary Tribunal, was condemned, along with forty-five others, and was guillotined, July 25, 1794. When in prison C. burst forth in a beautiful ode, *La Jeune Captive*, of which the subject was his fellow-prisoner, the celebrated Comtesse de Coigny. His *Elégies* are exquisite in their mingling of classical spirit with an original boldness and vivacity. Only a tithe of his projected poems were finished, still the influence of C. is clearly visible in the early works of Chateaubriand, Barthelémy, Lamartine, and Victor Hugo. Of the many editions of his *Poésies*, the best are those of Delatouche (Par. 1840), and Becq de Fougières (1862); and of his *Œuvres en Prose*, there is a selection by Hugo (1840).—MARIE-JOSEPH DE C., brother of the former, was born at Constantinople, August 28, 1764, and became famous as the principal dramatist of the Revolution, and as a member of the Legislative Assembly from 1792 to 1802. He is also the author of the *Chant du Départ* and other songs. His dramas, of which the chief are *Charles IX.* (1790), *Jean Calas* (1792), *Henri VIII.* (1793), and *Timoléon* (1795), are full of republican declamation, and of the wild sentiments of the time. C. died January 10, 1811. His *Œuvres Complètes* were published in 8 vols., with a memoir by Daunou (1823–26).

CHEROKEES, a tribe of North American Indians, originally located in Georgia and Alabama, but in 1838 removed to the Indian Territory. They cultivate the soil, are industrious, and maintain schools. They number from 18,000 to 20,000.

CHERRY VALLEY, a small village of Otsego Co., N. Y., made famous by a brutal massacre, perpetrated by the Tories and Indians, Oct. 11, 1778. Thirty-two of its inhabitants, most of whom were women and children, were murdered in cold blood, together with 16 continental soldiers; and all the buildings of the settlement were burned.

CHESTER, a city of Pennsylvania, on the Delaware River, about 15 miles from Philadelphia. It has large shipyards and other extensive manufactures. Pop. 17,000.

CHICKAMAUGA, an important action of the civil war, fought between a Confederate army under Gen. Braxton Bragg, and a Union army under Gen. W. S. Rosecrans, on Sept. 19 and 20, 1863. Repeated efforts to dislodge the Union left, commanded by Gen. Thomas, were unsuccessful, although the right and a portion of the center were completely routed. But on the 21st Thomas withdrew from the position he had so gallantly held, and the Confederates were nominally victorious, although they made no important gains. The Union loss was 16,000 and that of the Confederates 18,000. The latter, however, captured large quantities of arms and accoutrements.

CHICO, a city of Butte Co., Cal., on Chico Creek and the Oregon Division of the Central Pacific Railroad, 96 miles N. of Sacramento. It is the center of a farming community, and conducts a large trade with surrounding mining districts. Population, 3300.

CHILDS, GEORGE WASHINGTON, an American journalist, born at Baltimore, Md., in 1829. In 1864, he became proprietor of the *Philadelphia Ledger*, which, under his able management, has become one of the leading journals of America. He is a man of superior culture, and is noted for his generous gifts towards literary and charitable objects.

CHIMAN'GO (*Milvus C.*), a species of Raptorial birds, belonging to the *Polyborinæ* or *Caracaras*, found in S. America, and, according to Darwin, commonly associated in its habits of feeding on garbage with the Carrancha (*Polyborus Brasiliensis*). It possesses all the distinctive characters of the *Polyborinæ*, and by Darwin is said to be 'generally the last bird that leaves the skeleton' of its prey. He adds, that it 'may often be seen within the ribs of a (skeleton) cow or horse like a bird in a cage.

CHIN'CHA ISLANDS, three in number, belonging to Peru, and situated about 12 miles from the coast, in Piseo Bay, lat. 13° to 14° S. They have since 1840 been famous in Europe for their great guano deposits, which, since 1836, have formed the principal source of Peruvian wealth; but which are now becoming rapidly exhausted. They are named respectively N., Middle, and S. Islands, have an aggregate area of about 400 acres, are rocky and precipitous on the landward side, destitute of water, and without a trace of vegetation. From time immemorial they have been the resort of vast flocks of penguins and other seafowl, the droppings from which, covering the surfaces and filling the crevices of the rocks, have formed immensely valuable stores of guano. The first cargo of guano was shipped to England in 1840.

CHIN-CHIN, a gummy varnish used in China and Japan, and believed to be derived from *Plocaria tenax*.

CHI'NESE GREEN INDIGO, or *Lo-Kao* of the Chinese, a green dye now much used in Europe, prepared from two species of buckthorn, viz., *Rhamnus chlorophorus* (*globosus*) and *Rhamnus utilis*.

CHI'NESE WAX, a substance produced by an insect (*Coccus Pe-la*) which feeds on the Chinese ash (*Fraxinus chinensis*).

CHIPMAN, NATHANIEL, LL.D., born at Salisbury, Conn., Nov. 15, 1752. He served in the Continental army during the revolutionary war, and, in 1779, entered upon the practice of the law in his native state. He held during his career the offices of U. S. Senator (1797) and Chief-justice of Vermont (1791, by appointment of Washington; and again in 1813, by election); and was for many years professor of law in Middlebury College. He published several law works of merit.

CHIPPEWA FALLS, a city of Chippewa Co., Wis., on the Chippewa River. It is an important railroad center, has extensive water power, is engaged in the lumber trade and agriculture, and in its vicinage are numerous saw-mills. Pop. 8000.

CHLO'RATE OF POTASH is the potassium salt of chloric acid ($HClO_3$), and has become of importance in the manufacture of fireworks, of oxygen gas for the Lime Light and of Safety Matches. Its composition is represented by the formula $KClO_3$. It is prepared commercially by acting upon a warm solution of chloride of potassium, in which slaked lime is suspended, with chlorine gas, when in addition to C. of P., chloride of calcium is produced—

$$\underset{\text{Chloride of potassium.}}{KCl} + \underset{\text{Chlorine.}}{3Cl_2} + \underset{\text{Slaked lime.}}{3CaH_2O_2} = \underset{\text{Chlorate of potash.}}{KClO_3} + \underset{\text{Chloride of calcium.}}{3CaCl_2} + \underset{\text{Water.}}{3H_2O.}$$

The solution containing the two salts is evaporated, and when sufficiently concentrated, allowed to cool. C. of P. being far less soluble than chloride of calcium, crystallizes out and leaves the latter salt in solution. C. of P. gives up the whole of its oxygen when heated, a reaction which is turned to account in the preparation of that gas.

$$\underset{\text{Chlorate of potash.}}{2KClO_3} = \underset{\text{Chloride of potassium.}}{2KCl} + \underset{\text{Oxygen.}}{3O_2.}$$

Mixed with charcoal, sulphur, or other oxidizable substances, it forms explosive or combustible mixtures largely used in pyrotechny. C. of P. is also employed in medicine.

CHOATE, RUFUS, LL.D., an American orator and lawyer, born at Essex, Mass., Oct. 1, 1799, educated at Dartmouth College, and began the practice of law at Danvers, Mass., but subsequently removed to Salem, and afterwards to Boston. He rapidly rose to highest distinction, not only as an advocate, but also as an orator. Died at Halifax, July 13, 1859, while on his way to Europe for his health.

CHOCTAWS, a tribe of North American Indians, originally located in Mississippi, but subsequently removed to the Indian Territory, where they till the soil, have a code of written laws, and are partially civilized. They number about 13,000.

CHOR'DADORSA'LIS, a name given to a delicate, semi-transparent thread, at first cellular, but afterwards cartilaginous, which appears beneath the primitive groove in the early embryo. It is seen in the chick as early as three to eighteen hours after incubation. It ultimately contributes to the formation of the bodies of the vertebræ, part of it remaining persistent in the form of the intervertebral discs. It remains persistent in its cartilaginous condition in the lowest or Myxenoid fishes, such as in the lancelet or *Amphioxus lanceolatus*, the lamprey, the sharks, rays, and the *Chimæra*.

CHOR'DÆ VOCA'LES are the true vocal chords found in the larynx or organ of voice. They are the superior *thyroanytenoid* ligaments. Attached by one border to the side of the larynx, the other border is free, and by its vibrations, caused by the current of air forced upwards through the trachea by the lungs, voice is produced.

CHO'RION. At an early period of development of the mammalian ovum, the surface is found clothed with a covering having numerous villi or shaggy tufts upon it. This is the C. A description of its further development will be found under EMBRYO and PLACENTA.

CHORIS'IA is a genus of small prickly-stemmed trees of S. America, belonging to the natural order *Sterculiaceæ*. The silky hairs which cover the seeds of *C. speciosa* are used in Brazil (where it is known as *Arvore de Paina*) for stuffing cushions, pillows, &c. The tough bark of *C. crispiflora* is used in the same country for making cordage.

CHOR'OID, a term applied in anatomy to various textures characterized by a shaggy appearance and a rich supply of blood-vessels. There is the C. plexus and the C. coat of the eye.

CHRISTIAN I., son of Dietrich, the Lucky, Count of Oldenburg and Delmenhorst, born in 1426, became king of Denmark in 1448, and was King of Sweden from 1457 to 1467. He founded the University of Copenhagen in 1478, and died 22d May 1481.

CHRISTIAN BROTHERS, a religious congregation founded at Waterford, Ireland, in 1804, by Edmund Ignatius Rice. This gentleman, a wealthy retired merchant and a native of Callan, County Kilkenny, resided in Waterford since 1780. In 1795, while still engaged in business, he felt strongly impelled to give up all worldly pursuits and devote himself to a life of religious seclusion. He had resolved to go to Rome and there enter a contemplative order, when an accident revealed to him the abject state of ignorance and moral destitution to which the long reign of the Penal Laws had reduced the children of the laboring classes in Ireland. 'It occurred to him that an Institution which would impart a sound religious and secular education to this class of children, would be not only a work of great merit to the founder, but a source of countless blessings to the community at large.' It was an inspiration from above, and Mr. Rice at once acted upon it. Under the direction of Dr. Lanigan, bishop of Ossory, he gave up the design of going to Rome; and, encouraged by Dr. Hussey, bishop of Waterford, he purchased a favorable site on the south side of Waterford city, erected on it the parent house of the Congregation of Christian Brothers, and there opened his first school, May 1, 1804. This spot, thenceforth known as Mount Sion, saw Mr. Rice and two associates thus beginning an enterprise destined to be crowned with such marvelous success. The founder wished to adhere as closely as possible to the Institute of John Baptist de la Salle; but the circumstances of the country and the times compelled him to seek a new path and new methods. The revolution which the Mount Sion School effected immediately in Waterford not only drew to Mr. Rice a supply of zealous and able fellow-laborers, but induced other bishops to ask for colonies of these admirable teachers. Following in the footsteps of De la Salle, Mr. Rice was careful to bestow on his novices a thorough mental as well as a thorough religious training. Carrick and Dungarean were the first places outside of Waterford to be blessed with the labors of the Christian Brothers. Cork asked for them in 1811, and Dublin in 1812. Archbishop Murray became thenceforth Mr. Rice's most efficient helper in the episcopal body. He moved his brother bishops to memorialize the Holy See in 1818 for the purpose of obtaining the papal sanction for the new institute. On Sept. 5, 1820. Pius VII., by his Brief *Ad Pastoralis*, confirmed the congregation, The Superior General resides at Marino near Dublin; three assistants aid him in the government of the congregation. It possesses at present (1885) 90 houses in Ireland, 3 in Gibraltar, 4 in Melbourne, Australia, others at Geelong, Adelaide, Ballarat, Brisbane, Dunedin (New Zealand), and St. John's, Newfoundland. The pupils number in the aggregate between 30,000 and 40,000; the Congregation itself counts upward of 600 members.—The Irish, like the French Institute, aimed before and above all things to impart a thoroughly Christian education, while seeking, by the most improved methods, to give to its pupils an instruction in every way fitted to their place in society and the requirements of the age and country. At the introduction in Ireland of the system of National Education, in 1832, they were induced to make trial of the facilities and advantages the Board held out to Catholics. But they soon discovered that its promoters and managers were anything but favorable to the religion of the majority of Irishmen. They preferred renouncing their share of the pecuniary grant, severed all connection with the National Board, prepared an admirable graduated series of school-books of their own, and continued to give to the sons of the laboring and middle classes a truly national education, animated alike by religion, patriotism, and the ardent pursuit of knowledge through the best methods. On the establishment of the Board of Intermediate Education, in 1878, the Christian Brothers' Schools gave instant and most satisfactory proof of the excellence of their systems and the proficiency of their pupils. The yearly 'Results Book' shows that in spite of the enormous advantages possessed by the numerous and richly 'Endowed Schools' (Protestant), the Brothers' Schools, mainly supported by the voluntary offerings of the impoverished Irish Catholics, are outstripped in the race by none. The pupils they send forth compete successfully with the best in the University matriculation examinations, and in those which are preparatory to the Civil Service, and every department of professional life, or to the industrial career.

CHRISTIAN DOCTRINE, FATHERS AND CONFRATERNITY OF THE, a Sunday-school association founded at Milan about 1560. This admirable confraternity was the fruit of the joint labors of Marco Cusani, a noble Milanese, and of St. Charles Borromeo. Its real title was: *Campagnia dei Servi di carità, che insegna le feste ai puttini e puttine a leggere e scrivere e li beconi costumi gratis et amore Dei*, 'Association of the Servants of Charity, for teaching on Feast Days (and Sundays) boys and girls reading, writing, and good manners, gratis and for the love of God.' Marco Cusani and his associates—priests and laymen—were only following the path opened to them half a century before by another Milanese devoted to the instruction of poor children, and who had been wont to assemble these on Sundays and Feast Days in the Cathedral, there to teach them Catechism with reading and writing. St. Charles Borromeo, who only obtained his degree of Doctor in Law at Pavia in 1559, had been an active member of this band of Sunday-school teachers when his maternal uncle was raised to the papal chair as Pius IV. in 1560. St. Charles was thereupon called to Rome, created a Cardinal, and made the new pope's minister. To Rome Cusani followed his saintly young friend, establishing there a branch of his Confraternity under Borromeo's powerful protection. When the latter returned to Milan, of which he was archbishop, the teaching of Christian Doctrine became one of the chief cares of his pastoral administration. He had learned from his masters, the Jesuits, that the salvation of Christendom depended on thoroughly instructing the people in the Gospel truth and moral-

ity, and in giving to the masses with the knowledge that became their condition an enlightened love of their religion.

St. Charles had also been mainly instrumental, in furtherance of this purpose, in pushing forward the reformatory measures in the Council of Trent, and in composing and publishing, under the authority of the Holy See, the Catechism bearing the name of that Council, and destined to be for all pastors of souls a manual of doctrine in catechising their flocks. Marco Cusani's confraternity flourished throughout Lombardy and all Upper Italy, thanks to the zeal of the Archbishop of Milan. Cardinal Frederick Borromeo, who became archbishop in 1595, emulated the enlightened zeal and heroic virtues of his great relative. The Sunday-School Sodality received from him a more perfect form and was spread all over Italy. Cardinal Frederick had a popular Catechism and a form of instruction drawn up to assist the Sodalists, who now saw noble and pious ladies claiming a place in their ranks and a share in their labors.—In Rome St. Pius V., by a bull issued in 1571, enjoined on all parish priests the establishment of similar sodalities, bestowing special indulgences on the members and the performance of their pious labors. Several churches were placed at their disposition by the popes, and Cardinal Bellarmine was instructed to draw up for their use a short catechism. Thus in Rome and Milan, as the two chief centers, the children of the laboring poor were, for several hours on Sundays and Holy Days, taught the elements of secular knowledge as well as the elements of Gospel truth. At first this Confraternity was only a voluntary association, the priests being designated by the popular title of 'Fathers,' the lay members being called 'Brothers.' In course of time, in Rome particularly, they assumed a corporate form, and their obligations once assumed became permanent. Paul V. raised them to the rank of an Archconfraternity. At length the priests formed themselves into a regular congregation, distinct and separate from the Archconfraternity. But these latest transformations only marked the decay of the sodality itself, and the decrease of that lay fervor which at one time found means to instruct the poor children of nearly all Italy. The revival of this association throughout the Peninsula would be one of the most powerful means of saving Italy from the spread of materialism and communism.

CHRIS'TIANSSUND (Norw. *Kristiansund*), a town frequently confounded with Christiansand, is situated in the amt or bailivik of Romsdal, in the north of Norway, and has an export trade in wood and fish. It was a flourishing place of trade in the 17th c., and bore the name Lille-Fosen till 1742. Pop. (1876) 7489.

CHROME ALUM is the double sulphate of chromium and potassium, analogous in composition to the double sulphate of aluminum and potassium, or alum.

Chrome alum, $Cr_2(SO_4)_3K_2SO_4.24H_2O$
Ordinary alum, $Al_2(SO_4)_3K_2SO_4,24H_2O$

It may be obtained in large violet octahedra by the spontaneous evaporation of its solution, prepared by boiling a solution of bichromate of potash to which oil of vitriol has been added with alcohol, as long as the smell of aldehyde is perceptible. Solution of C. A., if prepared in the cold, is violet colored, but when heated becomes green, and from this green solution no crystals separate; on standing for some weeks, however, the green solution becomes violet, and deposits the salt.

CHROME GREEN (the sesquioxide of chromium) is a beautiful dark-green pigment used in painting porcelain and as an ingredient in green glass and enamel.

Chrome Red (a basic chromate of lead), of various shades of red and orange, is used in calico-printing and the arts generally.

Chrome Yellow (chromate of lead) is most useful in the arts, and exhibits distinct shades according to the mode of its preparation, known as *lemon yellow*, *Paris yellow*, *Leipsic yellow*, &c.

CHRO'MOTISM, or CHROMISM, a disease of plants consisting of an unnatural coloring of leaves, such as when they become red, variegated, &c.

CHRYSOCHLO'RIS, a genus of Insectivorous mammalia, represented by the *C. holosericea* or *aureus*, or golden mole of South Africa. The C. resembles the common mole in form, but is somewhat less in size. Its peculiarity consists in the iridescence of its fur; the beautiful play of metallic tints and lustres exhibited by this form procuring for it its names of golden, changeable, or shining mole. The *setæ* or bristles of the *Aphrodite* or sea-mouse amongst the worms or *Annelida* exhibit the same iridescent lines. The front feet have four toes, and the hinder ones are five-toed. No outer ears or tail are developed. The teeth of both jaws fit exactly into each other, and the food consists of insects and worms.

CHURCH, FREDERICK EDWIN, an American artist, born at Hartford, Conn., in May, 1826. Among his most famous paintings are the 'Heart of the Andes.' and the 'Horse-shoe Fall, Niagara.' He has produced other works of the highest merit.

CHURCH, SANFORD E., LL.D., a distinguished American jurist, born in Milford, Otsego Co., N. Y., April 18, 1815, entered upon the practice of law, and rapidly rose to eminence in that profession. He was successively Lieutenant-Governor of New York (1850 and again in 1852), Comptroller of the State (1857), and Chief-justice of the Court of Appeals (1870). He held the last position until his death in 1880.

CHURUBUSCO, BATTLE OF, an engagement of the Mexican war, between an American army, commanded by Gen. Scott, and a Mexican army, commanded by Gen. Santa Anna, near a village of the same name, about 6 miles south of the city of Mexico, on August 20, 1847. The army of Santa Anna numbered about 27,000, and that of Scott about 8000. After desperate fighting, the Mexicans were completely routed, with heavy losses of prisoners and arms.

CICC'A, a genus of plants of the natural order *Euphorbiaceæ*, consisting of small trees and shrubs, natives of tropical India, Africa, and America. *C. disticha*, the 'Otaheite gooseberry,' is a native of India, but is cultivated in that and in many other countries for the sake of its fruits, which are used either raw or cooked in various ways. The Europeans pickle or preserve them, or bake them in tarts. In Java they are sold in the market for about threepence per gallon. A decoction of the leaves causes perspiration, and the roots are a violent emetic. The wood of *C.* (*Prosorus*) *Indicus*, of Bombay and Ceylon, is white and tough, and is used for shipbuilding in the latter country. Its light-blue seeds constitute a favorite food of the green pigeon.

CIMICIFU'GA, or BUGBANE, a genus of plants belonging to the order *Ranunculaceæ*, natives of Eastern Europe, Siberia, and N. America. The European *C. fœtida* is extremely fetid, and is used to drive away bugs and other vermin—hence the specific name ('bug-fleer').

CIN'CHONINE and CINCHON'IDINE are isomeric alkaloids contained, along with the quinine alkaloids, in the bark of the different varieties of Cinchona. Pale Peruvian bark is richest in C. and its isomer; yellow Peruvian bark in quinine. Another alkaloid called *Cinchonicine*, isomeric with C. and C., is obtained under certain conditions by heating the latter substance. The composition of these bodies is represented by the formula $C_{20}H_{24}N_2O$; that of quinine and its isomers by the formula $C_{20}H_{24}N_2O_2$. Sulphate of C. is used in medicine, and is similar in its physiological action to sulphate of quinine. See QUININE.

CINCINDE'LA, a genus of *Coleoptera* or Beetles, forming the type of the family *Cincindelidæ*, and popularly known as 'Tiger-beetles' or 'Sparklers,' from their carnivorous habits, and from the brilliant hues and lustres of their bodies. The tiger-beetle (*C. campestris*) is a familiar British species, and is noted for its voracious habits, feeding on other insects, and being able to pursue its prey into the air. It exudes a powerful odor or scent, like that of a crushed verbena leaf. The Indian tiger-beetle (*C. octonotata*) is another well-known species. These insects have five-jointed tarsi; the head is wider than the chest, and the mandibles are large, sharp and toothed.

CIRCLEVILLE, a city of Pickaway Co., O., on the Scioto River and the Ohio Canal, and on the Scioto Valley and the Pittsburg, Cincinnati & St. Louis railroads, 25 miles from Columbus and 64 from Zanesville. The Scioto River furnishes water-power, which is employed in manufacturing. It is surrounded by a rich agricultural country, and is an important trade center. Population, 6000.

CIRCUMDUC'TION OF THE TERM, in Scotch law, is the sentence of a judge declaring the time elapsed for leading proof in a case, after which no further evidence can be adduced.

CITIES OF REFUGE were six Levitical cities—namely, Kedesh, Shechem, and Hebron on the W. side of Jordan, and Bezer, Ramoth, and Golan on the E. side—appointed as a refuge to which the manslayer might flee from the Avenger of Blood and where he was protected till he could be tried by the authorities of his own city. If it was found on his trial that the deed had been involuntary, he was taken back to the C. of R., and on the death of the high priest, could return in safety to his home. The right of sanctuary was also possessed by many Greek and Roman cities—especially Ephesus, and by many churches in the middle ages—a privilege which was often too much abused, by letting real criminals escape.

CITTA', the Italian form of *city*, enters into the composition of many names of places in Italy.

CIVIL ENGINEER, strictly every engineer not connected with the army—every engineer, that is, not a military engineer—but in common usage a man who makes or designs railways, docks, roads, canals, &c., as distinct from a *mechanical engineer*, a man who makes engines, boilers, and machinery in general.

CLADODYSTROPH'IA (Gr. *klados*, 'a branch,' and *dustrophos*, 'hard to rear') a disease of aged oaks and other trees grow-

ing in a light soil, in which the upper branches are more imperfectly nourished than the lower, and therefore sooner decay —in other words, become what is called 'stag-headed'. It has been supposed that this is in consequence of the decay of the tap root, possibly from the attacks of fungi, but Mr. Berkley considers this mere conjecture.

CLADOPTO'SIS (Gr. 'a falling away of the twig'), a disease of oaks, willows, and other forest trees, in which the small branches snap off with a regular circular fissure, leaving a cup-shaped scar, somewhat similar to that which takes place when a leaf or fruit separates at the stalk. It appears to be somewhat similar to the disease to which vine branches are subject after a cold summer, and which is known as *Phriganoptosis*. The branches fall off, 'a process facilitated by the peculiar formation of the stem, there being a transverse layer of cellular tissue at each bud' (Berkley).

CLARKE, James Freeman, D.D., an American clergyman and author, born at Hanover, N. H., April 4, 1810. Since 1841 he has been the pastor of a Unitarian church in Boston. He has published *Christian Doctrine of Forgiveness* (1852), *Christian Doctrine of Prayer* (1854), *Orthodoxy* (1866), *Steps of Belief* (1870), *Ten Great Religions* (1871), and others.

CLARKSVILLE, in Montgomery Co., Tenn., on the Cumberland River and the Louisville & Nashville Railroad, 199 miles from Memphis. It is surrounded by a tobacco-raising district and is one of the largest tobacco markets in the West. It has eight tobacco stemmeries, and is a shipping point for tobacco and other produce. It carries on an extensive trade with the surrounding country, and is the seat of the Southwestern Presbyterian University. Pop. 6,000.

CLASSIFICA'TION OF ANIMALS. Two principles may be employed in classifying animals. One of these, forming the *artificial* method, has for its essential feature that of founding its characters upon resemblances between animals of a more or less external and superficial kind. Thus the savage employs an artificial method of classification when he classifies together fishes and whales from their outward appearance, or birds and bats because both fly. Such a procedure resembles the practice of arranging the books in a library solely by their outside resemblances or styles of binding—a method this, which could give no one any reasonable idea of the true nature of the volumes, any more than the classification of the savage expresses any definite relation between the animals he thus classifies. In opposition to this artificial method, which characterized the earlier history of zoology, we have the *natural* method. By means of this latter we group together only animals that are like in the *details of their structure*, and this method, therefore, is the expression of a true structural relationship between the organisms which it brings together. It is, in other words, a convenient expression of the facts and laws of morphology and physiology. The whale would, therefore, in this classification, be placed among the mammals, from a consideration of its structure, and not with the fishes, which it somewhat resembles in outward appearance. The animal kingdom is divided through the consideration of the morphological *type*, or broad features of structure, into five or six sub-kingdoms, which, beginning with the highest, are named respectively *Vertebrata*, *Mollusca*, *Annulosa*, *Annuloida* or *Echinozoa*, *Cœlenterata*, and *Protozoa*. Each sub-kingdom admits of division into *classes*, the classes are divided into *orders*, the latter into *families* and *genera*, and the genera into *species*.

CLAV'ICHORD, or CLAV'ECIN, one of the older forms of the piano, used frequently until about a century ago. Its strings were struck by pins attached to the ends of the keys, and were damped by pieces of cloth so as to produce a very soft sound.

CLAVIJA, a genus of *Myrsinaceous* plants, of tropical S. America, named in honor of J. Clarijo Faxardo, a Spanish botanist. The fruits of some of them are eatable, and the roots of others are emetic.

CLEAR DAYS, an English law-term. In a lawsuit there are several steps in the proceedings which must be taken within a specified number of C. D. In reckoning these, the day on which the process is served and the day of hearing are not counted.

CLEM'ENS, Samuel Langhorne, better known by his *nom-de-plûme* of 'Mark Twain,' an American humorist, was born in Florida, Missouri, Nov. 30, 1835. He worked first as a printer, but afterwards, in Nevada, as a journalist, when he developed a fresh phase of American humor, extravagant, surprising and grotesque. In 1867 C. published *The Jumping Frog*, and in 1869, as the results of his travels in Egypt and the Holy Land, *The Innocents Abroad*, an amusing travesty of lofty and serious things—e.g., in his weeping over the tomb of Adam, his blood-relation, in the Church of the Holy Sepulchre. His other works are his *Autobiography* (1871), *Roughing It* (1872), *The Gilded Age* (1873), by C. and Warner.

CLEM'ENT VII. (Giulio de Medici), who, as cardinal under Popes Leo X. and Adrian VI., had devoted himself to the Spanish cause in Naples and Milan. On his election as Pope in 1523, however, C. attempted to organize a national Italian party against Karl V., whose increasing power he dreaded. This led to the capture of Rome in 1527 by 'Bourbon's black banditti.' The growth of the Reformation after the Diet of Spires and the peace of Kadan was equally alarming to C., who sought the help of François I. and Henry VIII. He died in 1534, having by a secular policy reduced the influence of the Church to the lowest point. He founded the 'Monte della Fede,' or system of public credit, in which the creditors were associated in the management (*dogana*). —Clement VIII. (Cardinal Ippolito Aldobrandini) was elected 20th Jan. 1592. Although belonging to the Ecclesiastico-Spanish party, he is chiefly remembered in connection with the return of Henri IV. to the Church (which enabled C. to wrest Ferrara from Cesare d'Este), the readmission of the Jesuits to France, and the peace of Vervins. He died in 1605.—Clement XI. (Cardinal Giovan Francesco Albani), was elected 16th Nov. 1700. At first a warm supporter of the French claim to the Spanish succession, he was compelled after the victories of Marlborough to acknowledge Charles III. as the Catholic King. By the peace of Utrecht, Sicily and Sardinia, which C. regarded as his own fief, were bestowed on the House of Savoy, with whom he soon had a bitter dispute as to *di Monarchi* (a Sicilian tribunal which encroached on Papal privileges). In 1713 C. published the Bull 'Unigenitus,' condemning the 101 propositions in Father Quesnel's book; this irritated the French Jansenists and Nationalist clergy against Rome. C. was also connected with the great Jesuit missionary movement in China, the Stuart rebellion of 1715, and the expedition of Prince Eugene against the Turks in 1716. He died in March 1721.—Clement XII. (1758–69). His rule is marked by the suppression of the Jesuits by Choiseul in France, Wall and Squillace in Spain, Fanuci in Naples, and Carvalho in Portugal. C. refused to abolish the order, and thus lost nearly all influence in Europe.

CLEOME, a genus of plants of the order *Capparidaceæ*, found in the tropical regions of America. Most of the species are annuals—one, *C. pungens*, attaining the height of 4 or 5 feet. Among other species may be mentioned *C. spinosa* and *C. speciossima*, one of the handsomest of the genus, several of which are cultivated for the sake of their beautiful flowers.

CLERICAL ERROR is, in law, an error accidentally committed in the transcription of a deed or other instrument. Where the error is not *in substantialibus*, it is not fatal to validity.

CLERK, is strictly a person in holy orders; but the term is now generally applied to any one whose chief occupation is writing as a subordinate. In English law, a C. is regarded as a superior servant.

Clerk of the Assize is he that records all things judicially done by the judges of the circuits.

Clerk of the Crown is an officer in Chancery, whose function it is to attend on the Lord Chancellor. He makes out writs for the election of members of Parliament. All returns are made to him. These he cannot alter, except by order of the House, under a penalty of £500—*toties quoties*.

Clerk of the Parliament Rolls is the name of an officer in each House of Parliament, who records the proceedings, and engrosses them on rolls for preservation.

Clerk of the Peace is an officer belonging to the Quarter Sessions, whose duty it is to read the indictments, enroll the proceedings, draw the processes, and transact other business incident to the Quarter Sessions.

Clerk of Session.—The clerks of the Court of Session in Scotland are so called. There are four principal clerks and five deputies. Each principal and depute has an assistant C. The duty of the principal clerks is to attend upon and assist the Judges of the Inner House. The deputies attend upon and assist the Lords Ordinary. The principal clerks and deputies have no fees. They are paid by fixed salary. The former have £1000 a year each, the latter £550. Each assistant C. has £475 a year, and no fees.

Clerks of the Bill Chamber.—There is one C. of the Bill Chamber of the Court of Session. He is responsible for the reputed solvency of cautioners and for consigned money. There is also an assistant C. and two ordinary clerks. They are all paid by salary.

Clerk to the Court of Teinds.—There is one principal and one depute C. of the Teind Court in Scotland.

Clerk of Justiciary.—There is one principal, one depute, and one assistant C. of the Justiciary Court of Scotland.

Every court of law has necessarily a C., whose duty it is to write out the judgments and extract the decrees of the court.

CLERODENDRON, a genus of plants of the natural order *Verbenaceæ*, one of which, *C. Thomsonæ*, of W. Africa, is cultivated for the beauty of its flowers. *C. infortunatum*, an Indian species, is bitter and sub-astringent, and possesses anti-periodic

and tonic properties. These plants are chiefly natives of Tropical Asia, but they are also found in Africa and America.

CLEVELAND, Charles Dexter, LL.D., an American author and scholar, born at Salem, Mass., Dec. 3, 1802, and graduated from Dartmouth College in 1827. He taught Latin and Greek in Dickinson College, and afterwards in New York University; and, in 1861, was made U. S. consul at Cardiff, Wales. He published *Lyra Americana; The Moral Characters of Theophrastus; Compendium of Classical Literature; Compendium of Grecian Antiquities; English Literature of the Nineteenth Century; Compendium of Grecian Literature;* and *Hymns for Schools.* Died Aug. 18, 1869.

CLEVELAND, Grover, an American statesman, born at Caldwell, N. J., March 18, 1837, and in early life removed to Fayetteville, N. Y. He studied law in Buffalo, N. Y., and was admitted to the bar in 1859. He soon gained distinction in his profession, and in 1863 was made assistant district attorney of Erie Co. In 1870 he was elected sheriff of Erie Co., and upon the expiration of his term of office, resumed his law practice, in which he remained engaged until 1882. In 1881 he was elected Mayor of Buffalo, as a reform candidate, being supported by both Democrats and Republicans, in opposition to the long continued rule of a corrupt ring. In 1882 he was nominated for Governor of the State of New York, by the Democratic party, and was elected to that office by the unprecedented majority of 192,854, over Judge Folger, the Republican candidate. It must be explained, however, that this large majority was the result of dissatisfaction in the Republican ranks, over the manner in which Mr. Folger's nomination had been secured. In July, 1884, Mr. Cleveland was put in nomination for the Presidency of the U. S., by the convention of the Democratic party, held in the city of Chicago, during that month. The campaign that followed was one of great excitement and bitter personalities, which it is not fitting to enumerate in this brief article. Mr. Cleveland was opposed by James G. Blaine, the candidate of the Republican party, and B. F. Butler, the candidate of the Peoples party. His only formidable adversary was Mr. Blaine, over whom he was victorious in the November election. He was inaugurated President of the U. S. on March 4, 1885.

CLIFFOR'TIA, a genus of S. African bushes, belonging to the natural order *Rosaceæ*. The holly-like leaves of *C. illicifolia* are used by the Cape Boers (farmers) as an emollient and expectorant in coughs. The name *Cliffortiaceæ* is sometimes given to the *Rosaceæ* proper (including *Sanguisorbeæ*, as distinguised from *Amygdaleæ* and *Pomaceæ*).

CLINK'ER, a firm mass of ash and other matters which is apt to form upon the bars of a furnace in which strongly caking coal is burnt, and which in this case, by impeding the access of air to the fuel, impairs the combustion, and allows the bars to be destroyed.

CLINTON, a city of Clinton Co., Ia., on the Mississippi River, 42 miles above Davenport. It is an important railroad center; is extensively engaged in the manufacture of lumber and other articles; contains extensive railroad repair shops; and has a rapidly increasing trade. Pop. 9068.

CLINTON, a city of Worcester Co., Mass., on the Nashua River, at the junction of the Nashua & Worcester and the Old Colony Railroads, 45 miles from Boston and 16 from Worcester. It is largely engaged in manufacturing. Pop. 10,000.

CLINTON STATE PRISON, a penal institution at Dannemora, Clinton Co., N. Y., built in 1844–45. Usually there are about 500 prisoners confined here, who are kept at work in iron and nail works.

CLINTON, George, an American statesman, uncle of De Witt C., born in Ulster Co., N. Y., July 26, 1739. He served during the French war in the expedition against Frontenac, and at the outbreak of the Revolution, was made brigadier-general in the Continental army. He was governor of the State of New York for 21 years, and, in 1804, was chosen vice-president of the United States. Died April 20, 1812.

CLITO'RIA, a large genus of plants of the order *Leguminosæ* (sub-order *Papilionaceæ*), widely distributed over tropical Asia, Africa, and America, but more particularly in the latter country on the eastern side of the Andes. *C. Ternatea* is originally from the island of Ternata, one of the Moluccas, but now common in most tropical countries and in European conservatories. The corollas of the blue variety yield a dye which is used in Cochin-China, though it is not permanent, and in Amboyna it is employed to color boiled rice. The root is powerfully purgative, and in India is administered to children to promote sickness and vomiting. The butterfly-pea (*C. Mariana*) is remarkable on account of its curious geographical distribution. It is found in the southern American states and Mexico, and in the Khassia Hills in India, without being found in any intermediate place.

CLIT'ORIS is a small body found in the external female generative organs. It is the homologue of the penis in the male. About an inch and a half long, it is concealed in the mucous membrane. Unlike the penis, it is not perforated by a canal resembling the urethra, and it has no spongy structure resembling the *corpus spongiosum* of the penis. It is a rudimentary organ in the female, and has no known function except that it becomes excited and turgid during the sexual act.

CLOUGH, Arthur Hugh, an English scholar and poet, was born at Liverpool, 1st January 1819, educated at Rugby under Arnold, passed to Balliol College, Oxford, and was elected a Fellow of Oriel in 1842. The theological fever was strong at the time, and for a moment it seemed as if C. would catch it; but his spirit was too exquisitely susceptible of living impressions, and his mind too speculative, or rather too critical, to be long enthralled by 'archæological formulas.' The result was that he went the other way, and his brief career was mainly shaped by his antagonism to the 'form of thought which Oxford exacted of her children.' In 1848 he resigned his fellowship, and in the same year, a little earlier, published the *Bothie of Tober-na-Vuolich*, a 'true long-vacation pastoral,' in classical hexameters, instinct with the finest aroma of elegant culture, the bright joys of college friendship, the humor, sympathy, sarcasm, and luminous talk of youth, relieved by picturesque descriptions of Highland scenery and delineations of Highland character. The work is imperfect in art, and is now beginning to fade from the memory; but at the time it was thought to indicate a new poet. Next year (1840) appeared his *Ambarvalia*. After leaving Oxford, C. traveled in France, Italy, and America, was appointed an examiner in the Education Department of the Privy Council in 1853, and in 1856 secretary to the Commission of Report on Military Education. His health now gave way; after visits to Greece and Constantinople, and a short return to England, he was again ordered to the continent; but was carried off by malaria fever at Florence, 13th November 1861. C.'s nature was singularly pure, tender, and strong, and his talent incomparably greater than his fame is likely to be. See *Poems by A. H. C. with a Memoir*, by F. T. Palgrave (Lond. 1862).

CLUB-GRASS, a common name for *Corynephorous*, a grass belonging to the oat tribe (*Avenæ*), by some not considered distinct from *Aira*. Though rare in England, it is generally diffused throughout the continent of Europe.

CLUB-HOUSES, IN LONDON, Law Regarding. It is now settled (Fleming *v.* Hector) that these have no legal character similar to commercial partnerships or joint-stock companies, and that the members are not liable for the acts of their secretaries, stewards, or committees.

CLU'THA, or MOL'YNEUX, the largest river in New Zealand, issues from Lake Wanaka, in the province of Otago, in 44° 35′ S. lat., 169° 20′ E. long., and after a S.E. course of 200 miles, falls into the S. Pacific in 46° 18′ S. lat., 169° 38′ E. long. Its principal tributaries are the Kawarau (draining Lake Wakatipu), Manuherikia, and Pomahaka. The C. is a very deep and rapid river, and was computed by the late Mr. Balfour, colonial marine engineer, to discharge 1,690,000 cubic feet of water per minute.

CLYDESDALE HORSE, a breed which originally belonged to Lanarkshire and Ayrshire, but whose great strength, fine action, noble form, and substance have made it much appreciated in England, on the Continent, in America and Australia. It is the best workhorse in the world, and as much as £1500 has been given for one. See Horses.

CNIDOS'COLUS, a genus of *Euphorbiaceæ*, consisting of shrubs or herbaceous plants belonging to Africa. *C. stimulans*—a native of the Southern States of America—on account of the lacerated segments of the leaves, which are covered with spreading hair, stinging the naked feet of the negroes, is well known as 'Tread Softly.' Its tuberous roots are eaten like those of cassava. *C. quinquelobus* stings even more terribly, and on this account is shunned as a cultivated plant. In some cases the persons so stung will fall down, and remain quite unconscious for some time. In every case an excruciating pain is experienced, which, according to Mr. Black, from whom we take this account, 'lasts for some days, and the parts swell, and sometimes continue swollen, accompanied by an itching sensation, for months.'

COAI'TI (*Nasua*), a genus of Carnivorous mammalia, included in the family *Ursidæ* or Bears, and belonging solely to the New World, being found in Surinam and Brazil. In this genus the molar teeth are small, and the canines compressed and sharp. The muzzle is very elongated, proboscis-like, and extremely mobile. The claws are long, and of curved, compressed shape, and the tail is also of considerable length. The red C. (*N. rufa*), or C.-Moudi, has a fur of reddish-chestnut color, the ears and legs being black, the tail banded with maroon color, and the lower jaw white. It is fond of climbing trees. The brown C. (*N. Narica*), or *Narica*, has a brown-colored fur, which is sometimes mottled

with black, and tinted with chestnut. The under parts are colored grey. The fur is thick and coarse. The C. feed on both animal and vegetable matters, and although shy, may yet be domesticated with success.

COAL. See COAL in Chambers' En.

COBB, HOWELL, an American statesman, born in Georgia, Sept. 7, 1815. He was successively member of Congress, speaker of the House, and governor of Georgia, and in 1857 was made secretary of the treasury by President Buchanan. Towards the close of 1860 he resigned, and in 1861 was president of the Confederate Congress. During the civil war he served in the Confederate army with the rank of major-general. Died at New York, Oct., 9, 1868.

COCCIN'IA, a climbing cucurbitaceous shrub, common in the hedges in India, the ripe fruits of which are used by the natives in their curries, and the leaves and other portions are also used medicinally.

COCC'ULUS, a genus of plants of the natural order *Menispermaceæ*. A decoction of the roots of *C. villosus*, an Indian species, is used in cases of rheumatism, &c., and the fruits supply a kind of vegetable ink.

COC'CYX is the inferior or posterior terminal portion of the vertebral column. In man it consists commonly of four rudimentary vertebræ, sometimes of five, rarely of three. These unite together, and in advanced life the C. unites with the sacrum.

COCHLOSPER'MUM, a genus of small trees and shrubs indigenous to tropical India, Africa, America, and N. Australia, belonging to the natural order *Flacourtiaceæ* (*Bixineæ*). The stem of *C. Gossypium* of India yields kuteera gum, used as a substitute for gum and tragacanth. The cottony substance which adheres to the seeds is used to stuff pillows, &c. A decoction of the roots is used in Brazil as a cure for abscesses, and for pains which are the result of falls and other accidents. *C. Planchoni* is a native of Western Africa; its roots yield a yellow dye. *C. tinctorium* of Senegambia also furnishes a yellow dye, as well as a medicine used in amenorrhœa.

COCK OF THE ROCK (*Rupicola aurantia*), a Dentirostral (*Incessores*) bird, belonging to the Manakin family (*Piprinæ*), and so named from its possessing a singular double crest of feathers rising from the sides of the head, whilst the upper tail-coverts give the bird the appearance of a cocklike tail. It inhabits Guiana. Its color is a fine orange, with the wing-gills and tail black. Another species (*R. Peruviana*) is found in Peru.

CO'DEINE is an alkaloid present in opium, and was first extracted from that substance by Robiquet in 1832. It is a colorless crystalline body possessing a bitter taste and a powerfully alkaline reaction, combines with acids to form crystalline salts, and is a narcotic poison. The composition of C. is represented by the formula $C_{18}H_{21}NO_3$.

CODIÆ'UM, a genus of Spurgeworts (*Euphorbiaceæ*) indigenous to the Moluccas and islands to the N. of Australia. *C. pictum* of the Moluccas is often cultivated about houses in that country, and used for fences. The leaves are strewed on the ground on festive occasions, and are also used to decorate triumphal arches. When chewed, both bark and roots excite a burning sensation in the mouth.

COEL, a town of British India, in the N.W. province, district of Allyghur, 2 miles S. of Allyghur and 80 S.E. of Delhi. It is a station on the East Indian Railway, and the residence of the civil authorities of Allyghur, with which town it is connected by a fine tree-shaded avenue. Pop. (1872) 48,403.

CŒNÆSTHE'SIS, a term designating undue susceptibility to external impressions. Some persons are susceptible of slight changes in the circumstances of their lives, while others are not so. To some individuals freedom from anxiety, good digestion, a bright sun and a dry bracing air, is the cause of cheerfulness, exhilaration, or even of joy; while some mental cause of depression, a slight disorder of digestion or of excretion, or a dull day, may cause gloominess and even despair. (Carpenter's *Mental Physiology*).

CŒ'RULEIN is a dye recently introduced for dyeing and calico-printing, and is obtained by treating gallein with concentrated sulphuric acid at 200° C. (392° Fahr.). A beautiful green color is produced by dissolving C. in an alkaline solution. In calico-printing this solution and the mordant alumina yield a rich green, while iron mordants produce a brown color; both dyes are fast. On treating a hot aniline solution of C. with alcohol and acetic acid, an indigo-blue color results, which may be communicated to wool.

COGGIA'S COMET. This comet appeared in the summer months of 1874 in the northern hemisphere. The nucleus was bright and well-marked, and the tail could be traced for a considerable distance in the sky. Tietjen, Schulhof, and Geelmuyden have given calculations which all agree in assigning to it a great length of revolution, the period deduced by the last being 10,445 years.

COLBY UNIVERSITY, an American college, located at Waterville, Me., and first known as Waterville College. In 1867 it received a large endowment from Gardner Colby, Esq., of Boston, and its name was changed to that which it now bears. It is controlled by the Baptist denomination.

COLDE'NIA, a genus of plants of the natural order *Ehretiaceæ*, consisting of shrubs and trees from India and Ceylon. *C. procumbens* is used in India in a powdered state, mixed with the seeds of the fenugreek (*Trigonella Fœnugrœcum*), for the purpose of promoting suppuration.

COLD HARBOR, a battle of the civil war, fought in Hanover Co., Va. It really consisted of a series of fierce struggles from May 28th, 1864, to June 3d. After severe fighting for several days, on the morning of June 3d a fierce assault was made on the Confederate lines, and after a half hour of desperate fighting was repulsed. The total Union loss in this series of engagements was about 13,000, while that of the Confederates is not known. The Union forces were commanded by Gen. U. S. Grant, the Confederates, by Gen. R. E. Lee.

COLDWATER, in Branch Co., Mich., on the Coldwater River, and on the Lake Shore & Michigan Southern Railroad, 133 miles from Detroit. Population, 5000.

COLE, THOMAS, an American artist, born in Lancashire, England, Feb. 1, 1801, and removed to the United States, in 1819. Having neither money nor influence, he was compelled to be his own educator; but, notwithstanding these adverse circumstances, he persevered, and eventually attained high fame as a painter. In 1825 he opened a studio in New York. Among his most noted works are the following, 'Course of Empire,' 'Dream of Arcadia,' 'Voyage of Life,' 'L'Allegro,' 'Il'Penseroso,' and 'The Cross and the World.' C.'s most popular work is perhaps the 'Voyage of Life,' an allegorical design, executed in four paintings. His life has been written by L. L. Noble (1855). Died at Catskill, N. Y., Feb. 11, 1848.

COLEORHIZ'A (Gr. *koleos*, 'sheath,' *rhiza*, 'root'), the cellular sheath which covers the radicle (and afterwards the fibrillæ) of Dicotyledons, as it pierces the lower part of the embryo.

COLERIDGE, THE REV. DERWENT C., was born at Keswick, Sept. 14, 1800. He was educated at Cambridge, served as a tutor in Plymouth, and was from 1841 to 1864 Principal of St. Mark's College, Chelsea. He afterwards became rector of Hanwell, Middlesex. He is author of a *Memoir* of his brother, H. C., whose poems and prose remains he edited; of a work on *The Scriptural Character of the English Church*, and of a Life of Winthrop Mackworth Praed. In 1861 he addressed two letters on Education to his cousin the Right Hon. Sir John T. C.—HENRY NELSON C., was born in 1800. He wrote a work entitled *Six Months in the West Indies*, and an *Introduction to the Greek Classic Poets*, but is best known for his *Specimens of the Table-Talk of S. T. C.*, which he published in 1835. He contributed to various periodicals, and died Jan. 26, 1843.—THE RIGHT HON. SIR JOHN TAYLOR C., was born at Tiverton, Devon, July 9, 1790. He was educated at Oxford, where he became a fellow of Exeter College, was called to the bar at the Middle Temple in 1819, was appointed sergeant-at-law in 1832, judge of King's Bench in 1835, and privy councilor in 1858. He was made D.C.L. of Oxford in 1852, and was editor of the *Quarterly* after Gifford's death, published an edition of *Blackstone's Commentaries* in 1825, and a *Memoir of Keble* in 1869. He died Feb. 11, 1876.—LORD C., THE RIGHT HON. JOHN DUKE, son of the above, was born Dec. 3, 1820, educated at Eton and Oxford, and called to the bar at the Middle Temple in 1846. He was made Recorder of Portsmouth in 1858, and a Queen's Counsel in 1861. After contesting Exeter unsuccessfully in 1864, he was elected for that city in 1865; was made Solicitor-General in 1871, and in 1873 was appointed Lord Chief-Justice, and raised to the peerage, with the title of Baron C. of Ottery St. Mary's, Devon. He is a man of fine literary as well as legal acquirements, and at one time contributed to various periodicals.

COLFAX, SCHUYLER, an American statesman, born in New York City, March 23, 1823, and in early life removed with his mother to Indiana, where he studied law. Originally a Whig, he joined the Republican party at the time of its formation. He was a member of Congress from 1854 to 1869, and speaker of the House for three terms. In 1868 he was elected Vice-President of the U. S., with Gen. U. S. Grant as President. Died suddenly at Mankato, Minn., Jan. 13, 1885.

COLICODENDRON, a tropical American genus of *Capparidaceæ*, all of which have acrid properties. *C. Yeo* of Brazil possesses the acrid principle to such an extent as to be dangerous to horses and mules (Von Martius).

COLL'EY, or COLLIE, the name given to a Scottish shepherd's dog. The origin of the name is not at all clear. Probably it comes from *colly*, 'grimy, black,' or it may have been called after the name of a person, C., its first breeder. The C. is one of the most sagacious of dogs. For shrewdness it is not excelled by the Newfoundland or the St. Bernard. It seems to combine the merits of both. It can take the water and retrieve like the former; it can gallop up precipices and descend into crevices after man or sheep with as sure a step, as keen a scent, as undaunted intrepidity and gentle carefulness for the lost, as the latter. The stories told about the acute and accurate knowledge of a C. dog are very numerous—indeed, they surpass those recorded of the St. Bernard. Hogg, the Ettrick Shepherd, says that at one time he had several hundred lambs, which he was taking to the fold. They scampered off over the hills in three separate divisions in different directions, defying all efforts to find them. Night came, and the search had to be given up. The dog remained at his task, and in the morning he was found in a gorge standing watch over the whole of the lambs. The C. is an ornamental as well as a useful dog, and is now much sought after in London as a pet. As much as fifty guineas has been refused for one. The general character of the head of the C. resembles that of a fox, the nose pointed, the eye rather small, but full of intelligence, mingled with sagacious craft, the ears half prick, the tips falling over somewhat, neck long and taper, shoulders and brisket deep, back rather short, coat thick and long, tail long, full feathered, and curling well over the back. The backs of the fore-legs should be feathered, the hind ones bare from the hocks, the hips wide and prominent, and the hocks well separated. The color varies from bluish-grey and tan to lightish grey, from black and white and fawn to black and tan; the latter is now held in most esteem. An absolute necessity to the shepherd, the C. makes also a capital watchdog. Its size varies from about 18 inches to 2 feet in height.

COLLIERS AND SALTERS. The workmen at coal-pits and salt-works in Scotland were formerly under servitude. They became bound, independent of agreement, merely by entering the works, to perpetual service there; and in the event of sale or alienation of the ground in which the works were, the right over the workmen passed to the purchaser without express grant. This slavery was abolished by Act of Parliament 15 Geo. III. c. 28; made more effectual by another Act passed in the thirty-ninth year of the reign of Geo. III.

COLLIMATION, LINE OF, the straight line which passes through the center of the object-glass of a telescope and the intersection of the wires placed at the focus. The difference between the actual line and the true axis of symmetry of the telescope is termed the *error of C.*

COL'OBUS, a genus of Old World or Catarhine monkeys, in which alone, of all Catarhina, the thumbs are absent or at most very rudimentary. This genus is allied to *Semnopithecus*, and the *C. Ursinus*, *C. Satanas* and *C. Guereza* are familiar species. These monkeys exclusively inhabit Africa.

COL'ONIES, LAWS OF ENGLAND REGARDING. All persons charged in any colony with an offence committed on the sea, may be dealt with as if the offence had been committed within the jurisdiction of the colonial court, and shall receive the same punishment as would have followed on conviction in England. The term *colony* includes all possessions abroad in which there is a legislature, except the Channel Islands and the Isle of Man. Colonial law is void if contrary to Act of the Imperial Parliament; but mere inconsistency with instructions from the Home Government will not make it void. Since 2d August 1858, all powers previously exercised by the Board of Control and by the East India Company over the territories and revenues of India, have been exercised by the Secretary of State and Council for India.

COLORADO SPRINGS, a city of El Paso Co., Col., on the Denver & Rio Grande Railroad, 76 miles from Denver. It is a favorite resort for invalids, and is in the midst of a wool-growing section. Population, 4279.

COLORIM'ETER, an apparatus of great value in the art of dyeing for ascertaining the strength of dye-stuffs. A known weight of the coloring matter to be tested is suitably dissolved, and the color it produces compared with a standard solution. The colorimetric test is generally applied by the intensity of color produced by an ascertained depth of the solutions in two different graduated test-tubes.

CO'LORS, METALS, and FURS, are the three tinctures in Heraldry. The metals, which are *or*, gold, and *argent*, silver, represent yellow and white, and always take precedence of the C., unless the contrary is specified. The five C. are *azure*, blue; *gules*, red; *sable*, black; *vert*, green; and *purpure*, purple; their abbreviations being az., gu., sa., vert, purp. *Tenne* or *tawny*, an orange color, and *murrey* or *sanguine*, a dark crimson, are sometimes used, but very seldom now in English heraldry. In French heraldry vert is called *sinople*. C. and metals, when engraved, are represented by a very convenient system of dots and lines: *or*, by dots; *argent*, is left plain; *az.*, is indicated by horizontal lines; *gu.*, by vertical lines; *sa.*, by horizontal and vertical lines, like a small check; *vert*, by diagonal lines from dexter to sinister, or heraldic right to left; and *purp.* the reverse of the latter. *Tenne* is represented by vertical lines down through those of *purp.*; and *murrey* or *sanguine* by diagonal lines from both dexter and sinister, crossing each other.

COLT, SAMUEL, inventor of the C. revolver, was born in Hartford, Conn., July 19, 1814, and in early life was successively a sailor and a 'lecturer.' In 1835 he took out a patent for the invention which gave him fame and wealth. In 1837 his revolver was used successfully in the Florida war, and still later in the Mexican war. C. erected large works in Hartford, on the banks of the Connecticut river, reclaiming a great deal of waste land for this purpose. He died January 10, 1862.

COLUMBIA, in Boone Co., Mo., on the Columbia branch of the St. Louis, Kansas City & Northern Railroad. It carries on an active trade and is the seat of the State University, Christian Female College, and Stevens Female College. Population, 4000.

COLUMBIA, in Lancaster Co., Pa., on the Susquehanna River and on the main line of the Pennsylvania Railroad at its junction with the Reading & Columbia, the Baltimore & Frederick, and the Columbia & Port Deposit railroads. It is a lumber and coal depot, and is extensively engaged in the manufacture of iron and stoves. Population, 8312.

COLUMBUS, a city of Bartholomew Co., Ind., on the White River, and on the Jeffersonville, Madison & Indianapolis Railroad, 41 miles from Indianapolis. It is surrounded by a fertile agricultural region, and is an important trade center. Pop. 6500.

COLUMBUS, in Lowndes Co., Miss., on the Tombigbee River, 140 miles from Jackson. The river is navigable for steamboats to this point, which makes it an important place for shipping cotton. Pop. 4500.

COLUMELLIA'CEÆ, a small order of Dicotyledonous plants, consisting of *Columella*, a genus of plants from the Andes, comprising two or three species. It is most nearly allied to the *Saxifragaceæ*, among which it may probably in time be allowed to take its place.

COMANCHES, a tribe of North American Indians, occupying portions of Texas and Mexico. They are exceedingly warlike, and have occasioned white settlers much trouble by their inroads for purposes of murder and plunder. They number about 4000.

COMM'ERCE, OFFENCES AGAINST. The commercial code of Great Britain has undergone material alterations in late sessions of Parliament, and many regulations founded on mistaken notions of the public interest, and which interfered with the general principle of commercial freedom, have been repealed. One of the most noteworthy of these reforms is the repeal throughout the United Kingdom of all the Acts against usury. By this repeal the capitalist is as unfettered in the employment of his money as the landlord is in the disposal of his land and the laborer in the disposal of his industry.

COMMISSIONER OF POLICE, for London and neighborhood, is appointed under 19 and 20 Vict., c. 2. The C. of P. and the constables are empowered to enforce regulations of the Police Acts respecting houses of public resort, driving vehicles and cattle, nuisances in thoroughfares, &c. They have also power to act on the river Thames, and they may at any time go on board vessels, and take cognizance of the conduct of persons on board. Most American cities have a similar officer, or Board.

COMMIX'TION, a term of Scotch law, indicating the mingling of two or more substances. C. may produce a new subject, as where wine is mixed; or it may not alter the nature of either substance, as where grain is mixed. This distinction is of some legal weight in questions which sometimes arise as to right of property.

COMM'ODATE, in Scotch law, is a gratuitous loan, the borrower being bound to restore the subject lent in the condition in which he received it.

COMMUNIS ERROR, a term of Scotch law, denoting the prevalence of an erroneous practice, which practice has been relied on. The Court of Session in case of C. E., generally pass an Act of Sederunt requiring observance of correct practice for the future, but without decision which might disturb past judicial procedure.

COMMUN'ITY. Voluntary associations have no *persona standi in judicio*, but by special statute it is made lawful to establish societies for raising funds to relieve and maintain members during sickness, and to provide burial.

COMMUTA'TION OF SMALL PENALTIES. The Act 28 and 29 Vict. c. 127, provides a scale of equivalent terms of imprisonment for failure to pay penalties between 10*s.* and £5.

COM'PASS PLANT (*Silphium laciniatum*), a plant of the western prairies of America, so called because it is said to turn the faces of its leaves uniformly in a N. or S. direction; 'the leaves on the developed stems of the flowering plants taking rather an intermediate position between their normal arrangement on the stem and their peculiar meridional position. The settlers, when lost on the prairies on a dark night, get their bearing by feeling the direction of the leaves' (Brown). The reason of this is, that owing to the stomata being more equally distributed on both sides of the leaf than is usual in other plants, both sides are equally sensitive to light.

COMPEAR'ANCE, a term of Scotch law, denoting the appearance made for a defender in an action.

Compearer.—Any one not called in an action in Scotland may *compear* and claim to sist himself on the ground of having an interest in it. If his claim is sustained he is called a C.

COM'PETENT AND OMITT'ED, a Scotch legal phrase denoting pleas which might have been maintained in a suit, but which have not been stated. The Court of Session may reduce their own decrees on the emerging of any new fact or writing, unless statement or production has been willfully omitted to protract litigation.

COM'PROMISE, in English law, is understood to be a mutual promise of parties to submit matters in dispute to arbitration. In Scotland the analogous terms are *Submit* and *Refer*. The word arbitration is employed in American law.

COMPTO'NIA, a genus of Deciduous bushy shrubs belonging to the natural order *Myricaceæ*, natives of N. America, and named in honor of Henry Compton, Bishop of London, about the year 1714, and the introducer of many exotic plants into England. *C. asplenifolia*, known as the 'sweet fern,' is employed as an astringent and tonic in diarrhœa. In France it is sometimes called *Liquidambar à feuilles de Ceterach*, though it has no connection with the true Liquedambar (*L. Styraciflua*).

CONCORD, a pretty town in Massachusetts, near the Concord river, 18 miles N.-W. of Boston. On the 19th of April 1775, the first skirmish of the Revolution took place here, and a monument, on the banks of the river, marks the spot where two English soldiers fell. C. is famous as having been the residence of Ralph Waldo Emerson; and it has, at different times, been a favorite residence of American *literati*, as Hawthorne, Thoreau, Alcott, and Hoar. Pop. about 2500.

CON'COURSE, a term of Scotch law.—*Concourse of Actions* means the privilege, not usually allowed, of bringing more than one action on the same ground of right.—*Concourse of the Lord Advocate* means the necessary concurrence of the Lord Advocate in a criminal prosecution, at the instance of a private individual.

CONDE, Louis-Joseph de Bourbon, Prince de C., born at Chantilly, 9th August, 1736, was the son of the Duc de Bourbon, minister of Louis XV. He first distinguished himself at Johannisberg (1762), and other engagements in the Seven Years' War. Army and financial reform and a splendid hospitality occupied his attention till the Revolution, when he emigrated. The corps which C. then formed served in the campaigns of Wurmser, in the Austrian service; in the English service at Ober-Kamlach and Biberach (1796); and in the Russian service at Constance (1799). It was discharged in 1801, and C. came to England, where he remained at Malmesbury till the Restoration. He died 13th May 1818. C. was the grandfather of the Duc d'Enghien, whose official murder so much injured Napoleon's reputation. He was concerned in the Pichegru conspiracy. See *Vie du Prince de C.* (3 vols. Par. 1819–20), by Chambelland, and Muret's *Histoire de l'Armée de C.* (Par. 1844). For the entire family, see Sévelinges' *Mémoires de la Maison de C.* (Par. 1820).

CONDIC'TIO INDIBITI is a term of Roman law for the reclaiming of money paid under an erroneous belief of its being due. It has been decided by the House of Lords (Wilson *v.* Sinclair, 7th December 1830), that when a person pays money under an error, he has no right to recover unless the error be as to fact. Error as to law is not a valid ground for recovery.

CONDITIONAL OBLIGATION. An obligation depending on a condition has no force until the condition exist, but the grantor cannot revoke the ground of hope which he has given. Contracts are null if illegal or impossible conditions are annexed. But such conditions, or frivolous conditions, annexed to a legacy, are merely held *pro non scriptis*, and non-compliance does not affect the right of the legatee.

CONDITIONAL INSTITUTE, a Scotch legal term. Under destination of real property, the immediate disponee of the grantor is called the *institute*. Those to whom the property is destined, failing the institute, are called *substitutes*. When the destination to the immediate disponee is conditional, he is called a C. I.

CONDUCTIV'ITY, thermal or electric, of a given substance, is the amount of heat or electricity which flows through a cube of unit volume in unit time, the difference of the temperature or potentials of the opposite sides being unity. The late Principal Forbes has shown that the thermal C. of pure metals is probably inversely proportional to the temperature from absolute zero, and the same law seems to hold in the case of electric conduction. This law is deducible from theory, upon the hypothesis that heat, during its conduction, arranges itself exactly as it would do if let down from the hotter to the colder part by a perfect engine, *i. e.*, so disposes itself that the least possible amount of work can be got from it during the operation. Non-metallic substances are in general bad conductors of heat, and frequently non-conductors of electricity; and these increase in conducting power as their temperatures rise. Liquids are of small conducting power as compared to solids, and the experimental determination of their C. is a matter of considerable difficulty, in the one case owing to the disturbing effects of the thermal convection currents produced, and in the other, if the liquid be a chemical salt or compound, to the electrolytic action and polarization which generally supervene. The C. of gases is still more difficult of determination, radiation and convection playing by far the most important part. See Electricity, Heat.

CONEY ISLAND, a famous summer resort, on the southern side of the westerly end of Long Island, and distant about 11 miles from the city of New York. Many elegant hotels have been erected here, among the more prominent of which are the Oriental, Manhattan Beach, and Brighton Beach. During the summer season, open air concerts are given at nearly all the principal resorts, and thousands flock thither, to enjoy the music and the cool breezes that sweep inland from the sea. There are mammoth bathing pavilions, and the surf is as fine as can be found anywhere on the Atlantic coast. The island is connected with New York and Brooklyn by numerous railroads, and lines of boats run from the former city and land at the great iron piers, that have been built out into the sea. It is sometimes visited by as many as 30 or 40 thousand people in a single afternoon.

CONFEC'TIONERY. Under this name are included the various manufactures of sugar for use as sweets, or *bonbons*, as they are called by the French. The simplest form in which sugar is prepared for eating is when it is crystallized from a solution into candied sugar. It is generally prepared from raw sugar, and has a brown color; but when tinted, refined sugar is employed, and the coloring material added to the solution. The crystallization takes place around thin slips of wood or pieces of twine, which are always found in the core of the material. Sugared almonds, cloves, caraways, corianders, &c., and sweets having a core either of fruit or backed sugar, as in the case of 'pan drops,' all of which are included in the French *arages*, are thus prepared. The cores of fruit or sugar are placed in a large copper pan, revolving at an angle of about 45°, heated by steam admitted to circulate between its outer and inner surface. The revolution of the pan at this angle causes the materials within it to be in constant motion tumbling over each other. A gentle stream of sugar solution is allowed to trickle continually into the pan, and the continual motion of the materials secures a proportion to each separate piece, and at the same time keeps them from adhering to each other, while the heat dries off the superfluous moisture. Thus the cores become gradually and uniformly encrusted in pure sugar, and the longer the process continues, the thicker becomes the coating. Ordinary lozenges (*trochisi* of druggists) are prepared from loaf-sugar broken, and ground to a fine powder. This is baked up into a stiff cake with a pure solution of gum arabic, rolled out to the required thickness, and the lozenges cut out by hand or machine. They are then put aside to harden and dry in trays. The paste may be tinted with any coloring material, and flavorings such as peppermint, ginger, clove, rose, musk, &c., are introduced in the baking. Medicated lozenges are an elegant and pleasant form of administering minor remedies for coughs, children's ailments, &c., when suitable ingredients are introduced into the paste; but the use of lozenges containing morphia, codeia, and other narcotic substances should be carefully guarded. Pastilles are preparations containing a large porportion of gum, in which the sugar is wholly dissolved, and they are usually tinted and flavored with fruit essences. Preparations of boiled sugar form a distinct class by themselves, and occur in a variety of forms, such as 'drops,' barley-sugar, rock, balls, &c., variously tinted and flavored. The sugar is dissolved by heat over a fire, care being taken to keep it from burning, and when poured out in thin layers, it is worked up into its various forms, after it has acquired such a plasticity as enables it to be handled. Toffee or butter-scotch is made by boiling up sugar, honey, and butter together, but frequently the honey is altogether omitted from the preparation. The French excel in the preparation of various sweets, and their *fondants* have often an exquisite flavor, and are manufactured in a very attractive manner.

CONFU'SION, a term of Scotch law, denoting the extinction or suspension of an obligation by the debt and credit devolving on the same person.

CONI'INE is an alkaloid contained in hemlock (*Conium maculatum*), and is a volatile liquid, boiling at 168° C. It possesses a powerful, pungent odor, like that of tobacco, and is very poisonous. C. is a strong base, and forms crystalline salts with acids. Its composition is represented by the formula $C_8H_{15}N$. It has been prepared artificially.

CONJOIN'ING OF PRO'CESSES, a term of Scotch law. Where two or more processes in the Court of Session relate to the same matter and affect the same parties, the court may conjoin them. They are then discussed together as one group.

CON'JUNCT PERSONS. Under the Bankruptcy Statutes of Scotland, all those who, by their relationship to one who is insolvent, would be legally incapable of being witnesses or judges in a cause in which he might be concerned, are termed C. P. Deeds in favor of any conjunct person by the insolvent, if granted without adequate consideration, are, under statute, reducible.

CONKLING, ROSCOE, a prominent American statesman, born at Albany, N. Y., Oct. 30, 1829, and began to practice law in Utica. He was four times elected to Congress, and was elected U. S. Senator in 1867, again in 1873, and again in 1879. In 1881 he resigned from the Senate, owing to differences with President Garfield, since which time he has conducted a large and lucrative law practice in the city of New York.

CONNECTIVE TISS'UE. This name is given by modern histologists to a number of tissues which originate from the same primary structures in the middle layer of the embryo. Although widely different from each other, both chemically and histologically, in the mature condition, yet on account of this primary relationship they are usually grouped together under the name of C. T. The members of the group are cartilage, mucoid tissue, reticular C. T., ordinary C. T., usually known under the name of white fibrous, or areolar tissue, fatty or adipose tissue, bone, and one of the principal substances entering into the composition of tooth, called dentine. A description of the histological characters of these various tissues will be found under their appropriate headings. The reasons for grouping these tissues together are—(1) *Embryological.* They are formed from the same layer of the embryo. (2) *Comparative histological.* In the bodies of lower animals these tissues frequently replace each other; thus what in one animal is ordinary C. T., in another is reticular C. T., or cartilage, or bone—or bone may be replaced by dentine. (3) *Pathological.* It is found that in morbid changes nearly every member of the C. T. group may be replaced by nearly any other, either by metamorphosis or by reconstruction from the offspring of the original tissue. The C. T. group form a framework for supporting the other tissues, such as vessels, glandular cells, muscular fibres, and nerves. In disease, as has been shown by Virchow, the great German pathologist, the C. T. group is often the most active tissue of the body, and many luxuriant growths and tumors may be traced to it. According to Frey, an authority in matters relating to minute structure, the histological characters of the group of connective tissues are—The embryonic rudiments consist of aggregations of spheroidal formative cells, having no membrane, and enclosing nuclei. A soft, homogeneous intercellular matter of albuminous character is formed between these cells. In course of time the cells as well as the intercellular substance undergo changes. The intercellular matter divides into fibrous masses or fibrillæ, while the cells become short and stunted, or may unite together by long processes so as to form a delicate network. Sometimes calcification, or a deposition of earthy salts, chiefly those of lime, occurs in the intercellular substance. Coincidently with those histological changes, chemical metamorphoses also occur—the albuminous matter of an early period giving place to mucin, chondrin, or elastic matter.

CONNERSVILLE, in Fayette Co., Ind., on the White Water River, at the junction of the Cincinnati, Hamilton & Indianapolis and the Fort Wayne, Muncie & Cincinnati railroads, 65 miles from Cincinnati. It is extensively engaged in manufacturing, and is the center of a large local trade. Population, 4500.

CONSOL'IDATED FUND. The aggregate produce of the branches of the public revenue of the United Kingdom is paid into the Bank of England to the credit of what is called the C. F. It is chargeable with the interest of the national debt, and it is mortgaged for payment of a yearly sum to maintain the Civil List.

CONSTABLE, JOHN, an English landscape-painter, was born in the village of East Bergholt, England, in 1776. The son of a proprietor of several mills, he was engaged about his sixteenth year in learning the miller's business, but his father's scheme that he should inherit the mills was frustrated by his desire to become a painter. After receiving lessons from Reinagle, he was admitted a student at the Royal Academy, 4th February 1799. Many years elapsed before the charming simplicity, freshness, and fidelity of his art met with appreciation, but eventually the tide of fame set in, and he was elected an Academician in 1829. He resided latterly at Hampstead Heath, and died suddenly at 35 Charlotte Street, Fitzroy Square, 30th March 1837. Three of his finest works are 'The Corn-Field' (National Gallery), 'The Glebe Farm' and 'Dedham Vale.' His art, says Ruskin, is 'original, honest, free from affectation, and manly in manner.'' See *Life*, by C. R. Leslie, R.A. (Lond. 1843), and a letter by C. G. Constable, son of the painter, in the *Academy*, January 20, 1877.

CONSTANCE, COUNCIL OF, was held at the town of C. during the years 1414–18. Its professed purpose was to bring to an end the 'great schism' in the Church, and to make a clean sweep of all ecclesiastical abuses. The council, reluctantly summoned by Pope John XXIII., who foresaw the fate that awaited him, was attended by an immense number of dignitaries. Besides the Pope himself and the Emperor Sigismund (the famous *super-grammaticam*), there were present 26 princes, 140 counts, more than 20 cardinals, 7 patriarchs, 20 archbishops, 91 bishops, 600 other prelates and doctors, and about 4000 priests. The three rival Popes of the time—John XXIII., Gregory XII., and Benedict XIII.—were deposed, and a new Pope, Martin V., was elected. Before this election, however, took place, the council formally declared itself the supreme judicial and legislative authority in the Church, but its projected 'reforms' were indefintely postponed; for Martin V., a few months after his election, dissolved the council in alarm, lest his power should be lessened by its pretensions. The discussion of ecclesiastical reforms was first resumed at the Council of Basel. How little this splendid—or perhaps one had better say *showy*—assembly really cared for the advancement of learning or the cause of truth, is seen in the iniquitous trial of John Huss and Jerome of Prague on charges of heresy. Among their bitterest enemies were some of the leaders of this *quasi*-reforming council, which is more likely to be remembered with abhorrence for the burning of the Bohemian Reformers, than with respect for its insincere and impotent schemes for the purification of the Church.

CONSTITUTION, DECREE OF, a term of Scotch law usually applied to those decrees which are requisite to found a title in the person of the creditor in the event of the death of the debtor. But every decree by which the extent of a debt or obligation is ascertained is a D. of C.

CONSTITUTIONS, PROVINCIAL, were decrees made in the provincial synods held under various Archbishops of Canterbury, from Stephen Langton under Henry III. to Henry Chichele under Henry V. The last were adopted by the province of York in the reign of Henry VI.

CONSTITUTION, OF THE U. S., AMENDMENTS TO. The system of government contained in the Constitution of the U. S. will be found outlined under the title UNITED STATES in Chambers' En., and it is purposed here to add only those amendments that were the immediate result of the war between the North and South. They are as follows:

ARTICLE XIII., *Section* 1.—Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Section 2.—Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XIV., *Section* 1.—All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States, and of the state wherein they reside. No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

Section 2.—Representatives shall be apportioned among the several states according to their respective numbers, counting the whole number of persons in each state, excluding Indians not taxed. But when the right to vote at any election for the choice of electors for President and Vice-President of the United States, representatives in Congress, the executive and judicial officers of a state, or the members of the legislature thereof, is denied to any of the male inhabitants of such state, being twenty-one years of age, and citizens of the United States, or is in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such state.

Section 3.—No person shall be a senator or representative in Congress, or elector of President and Vice-President, or hold any office, civil or military, under the United States, or under any state, who, having previously taken an oath as a member of Congress, or as an officer of the United States, or as a member of any state legislature, or as an executive or judicial officer of any state, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But Congress may, by a vote of two-thirds of each house, remove such disability.

Section 4.—The validity of the public debt of the United States authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion shall not be questioned. But neither the United States nor any state shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

Section 5.—The Congress shall have power to enforce, by appropriate legislation, the provisions of this article.

ARTICLE XV., *Section* 1.—The right of the citizens of the United States to vote shall not be denied or abridged by the United States, or by any state, on account of race, color, or previous condition of servitude.

Section 2.—The Congress shall have power to enforce this article by appropriate legislation.

The preceding amendments were adopted as follows: the 13th in 1865, the 14th in 1868, and the 15th in 1870. See UNITED STATES in Chamber's En.

CONTRABAND GOODS are goods imported or exported without paying legal duties—against the 'ban' or proclamation of law. When the buyer of C. G. knows them to be contraband, he has no claim for delivery, nor action of damages for breach of contract. Nor is an action competent on a bill of exchange granted for C. G. in the hands of a drawer, or of his trustee.

CONTRACTILITY is a vital property manifested by certain living substances both in the vegetable and animal kingdoms. By virtue of this property, these substances change their form, push out and retract processes, and they may also move from place to place. It is manifested by all living protoplasm, whether obtained from vegetable or animal living forms. It is seen in many of the humbler forms of life among the protozoa, in the colorless blood corpuscle, in the spermatozoon, in the cilium, in muscular fibre, and in minute capillary vessels. At one time it was supposed that the C. of muscular fibre depended on the nervous system. The old view of Haller, however, is that generally adopted by physiologists—namely, that C. is a property inherent in the ultimate elements of muscular tissue.

CONTRIBU'TION, in its legal sense, is generally applied to contributions made for equalizing loss incurred by sacrifice made for the common safety in a sea-voyage.

CONULAR'IA, an extinct genus of Pteropodous mollusca, remarkable for its large size as compared with living Pteropods. Specimens of the fossil shells of C., of which eighty-three species are enumerated by Barrande, chiefly from Palæozoic rocks (beginning with Silurian formations), may attain a length of a foot, and a breadth of over an inch. The genus also extends into the Mesozoic rocks, and seems to die out in the Lias. The shell is straight, tapering at the end, of four-sided form, with its surfaces striated. Occasionally its cavity may be divided internally. *C. ornata* from the Devonian rocks is a familiar species.

CONVEN'TIONAL OBLIGA'TION is, in Scotch law, an obligation resulting from agreement. The term is generally used in contradistinction to *natural* or *legal* obligation, which arises from the operation of law independently of contract.

CONVEN'TION OF ESTATES. In Scotland, before the Union, a C. of E. of the kingdom used to be summoned to impose taxes in any emergency. These conventions were formed by any members of the three Estates of the Kingdom who could be quickly assembled, and without the formal citation required in summoning a regular Parliament. The power of the Convention was limited to the disposal of the special business for which it was convened. Regularly the Estates could be convened only by royal authority; but when necessary, they met without it, as in the Convention for settling the government at the Revolution of 1688.

CO-OB'LIGANTS, though each bound to a creditor for the whole of a debt, are liable proportionably amongst themselves; and any one paying more than his share is entitled to relief from the rest.

COOK, CLARENCE CHATHAM, an American writer, born at Dorchester, Mass., Sept. 8, 1828, and graduated from Harvard College, in 1849. He has attained high reputation as a journalist and art-critic, and has published *The Central Park* and other works.

COOK'IA, a genus of plants of the natural order *Aurantiaceæ*, named in honor of Captain Cook. The fruit of *C. punctata*, the *wampee* of China and the Indian Archipelago, is greatly esteemed.

COOK'S INLET, a gulf on the N.W. coast of N. America, territory of Alaska, about 60 miles wide at its entrance, and penetrating 200 miles into the interior. It is named after Captain Cook, who explored it in 1778.

COOPER, PETER, an American philanthropist, was born in New York, Feb 12, 1791. About 1828 he engaged in the business of glue and isinglass, and in 1845 he erected large mills in Trenton for iron-rolling. The fortune which C. acquired in business he has liberally used for the public good. Feeling a deep interest in the welfare of the working classes, he erected the *C. Institute* in a central part of New York city. It cost $400,000, and this building, with all its profits and rents, is devoted to the education of the people. It includes a free reading-room, school of design, galleries of art, and evening classes. Died in N. Y. city, April 4, 1883.

CO'PING, in building, the capping or covering course of a wall, which may be flat, or it may be sloping or round, to throw water off. The term *cops* is sometimes applied to the merlons, or rising parts of battlements.

COPROS'MA, a genus of shrubs belonging to the natural order *Cinchonaceæ*, deriving their name from their very fetid odors. The leaves of *C. fœtidissima* are used in diving the will of the gods by the New Zealand (Maori) priests. See Bennett's *Gatherings of a Naturalist in Australasia*.

COR'ALLIN, a red coloring matter, first obtained in 1861 by the German chemists Kolbe and Schmitt, by heating phenol with sulphuric and oxalic acids, and now extensively prepared as a commercial product, under the names of *Aurin* or yellow C., and *Peonin* or red C. The constitution of these dyes is complex and slightly different. Aurin yields peonin on being heated with alcoholic ammonia. Yellow C. forms a stable lime-lake with excess of lime, and is employed largely by paperstainers. Red C. is much used for printing fabrics and dyeing wool, but the color fades into yellow in contact with acids, unless an alkaline body be mixed with the dye. By the use of calcined magnesia in an alcoholic or aqueous solution of red C., a rich and durable Turkey red is obtained.

CORAL ROOT, the common name for *Corallorhiza*, though sometimes applied to *Dentaria bulbifera*.

COR ANGLAIS, a species of bass oboe, not now used in the orchestra.

COR'DIA, a genus of plants comprising nearly all of the *Cordiaceæ*, and containing upwards of 180 species, mostly trees or shrubs. The fruits of *C. latifolia* and *C. Myxa* of India are succulent, mucilaginous, and emollient, and are accordingly eaten. Under the name of *Sebestens* or *Sebesten-plum* they have been employed in chest-complaints as pectoral medicines, a use to which those of *C. Abyssinica* (Wanzey) are also applied in Abyssinia. Those of *C.* (*Varronia*) *rotundifolia* are used to fatten cattle. The bark of *C. Myxa* is used in India as a tonic, and for making astringent gargles. Its wood is said to have been that employed by the Egyptians to make their mummy cases. That of *C. Rumphii* is brown veined with black, and smells of musk. From *C. Gerascanthus* is obtained the dark-brown-veined and fine-grained timber known in commerce as Spanish elm, Prince wood, or *Bois de Chypre* of the W. Indies. Anacahuite wood, imported a few years ago as a tonic, &c., is obtained from *C. Boissieri*.

COR'DICEPS, a genus of fungi which grows on dead leaves, decaying branches, ergoted seeds, and upon the pupæ and larvæ of insects. *C. Robertsii* grows upon the caterpillars of a species of New Zealand *Hepialus*. One species attacks wasps in the W. Indies, and attains a considerable size before the insect dies. The Chinese sell *C. Sinensis* in little bundles, under the belief that it is a drug possessing medicinal properties.

COREOP'SIS (Gr. 'maiden's eye'), a genus of American Herbaceous plants, belonging to the order *Compositæ*, containing several species. The flowers of *C. verticillata*, a shrubby perennial species, are used in N. America to dye cloth red.

CORIAR'IA, a genus of shrubs, by some considered the type of a separate order (*Coriariaceæ*), consisting of eight species. It is most nearly allied to *Ochnaceæ*, but its affinities are by no means well understood. They are natives of the S. of Europe, Chili, Peru, New Zealand, and one (*P. Nepalensis*) is found in Nepal. The fruits of the latter species, as well as those of *C. sarmentosa* of New Zealand, are eaten, but the genus generally is regarded with suspicion, the seeds of *C. sarmentosa* (the 'wine-berry' shrub) being poisonous, though the pericarp of the fruit is wholesome. An agreeable 'wine' is made from it, which tastes like that made from elder-berries. The seeds, however, cause convulsions and delirium, which often end fatally. Sheep are frequently poisoned by eating the plant. The fruit of *C. myrtifolia*, a European species, is said to have proved fatal to some French soldiers who partook of it in Catalonia. The leaves have been used to adulterate senna, and have caused tetanic convulsions in those who have partaken of the adulterated drug. They owe their poisonous properties to a glucoside called *coriamyrtine*. C. is also used in dyeing black.

CORINTH, BATTLE OF, an engagement of the civil war, on Oct. 3 and 4, 1862, between a Confederate force under Gen. Van Dorn, and a Union force under Gen. Rosecrans, near the village

of Corinth, Alcorn Co., Miss. There was severe fighting on the 3d, and on the 4th a desperate but unsuccessful assault was made all along the Union lines. The Union loss was about 2000, and that of the Confederates much greater.

CORK, KORKER, or KORKALETT, a name applied in the Highlands of Scotland and in Shetland to a lichen *Lecanora tartarea*, which, according to Dr. Lauder Lindsay, is made into a domestic dye 'by macerating the powdered lichen for some weeks in putrid wine, with the addition of kelp or salt, and when the requisite crimson or purple tint is obtained, forming the paste into balls or lumps with lime or burnt shells, and hanging it in bags to dry. When used, it is powdered, and then boiled in water with a little alum' (Berkeley).

CORN BRUISER, a machine for bruising oats and other grain for horses, cattle, sheep, and pigs, consisting of an iron frame, underneath which encased is a fluted barrel, the edges of whose grooves are sharp. These, when turned, press the corn against a resisting iron surface, and speedily bruise it to any form desired.

CORNELL COLLEGE, an American education institution, at Mount Vernon, Ia., under the control of the Methodist Church. It was founded in 1850, has a small endowment, and co-education of the sexes is practised.

COROLLIFLO'RÆ, a subdivision of Dicotyledonous plants, in which the stamens are usually inserted (or seem to be inserted) in the corolla, and in which the corolla is gamopetalous, and inserted below the ovary. The heaths, *Labiatæ*, &c., are examples.

COROMAN'DEL, a peninsula in the N. island of New Zealand, 30 miles E. of the town of Auckland. It is traversed by a rocky range of hills in which gold is found, and has been worked for a number of years. The yield is fluctuating, but has reached 16,000 oz., worth £50,000, in a year. Kapanga, the principal township, is a thriving little place.

COR'ONACH, properly *Coranaich* (Gael. *Co-ranaich*, 'roaring or howling together'), a term now applied almost exclusively to a wild lament, consisting partly of inarticulate wailing, with which the Irish and the Scottish Highlanders gave expression to their sorrow for the death of a friend. It was chanted, like the Latin *ululatus*, over the dead body, but the custom is now abandoned. The word C. has long been familiar to the Lowland literature of Scotland—*e.g.*,

> 'Cryand for you the cairfull *corrinoch*.'—Lyndsay.
> 'Be he the *correnoch* had done shout.'—Dunbar.
> 'The *cronach's* cried on Bennachie.'—Scott, *Antiquary*.

It is now passing into English. Thus Tennyson, speaking of the wild-swan's death-song—

> ——'The coronach stole.
> Sometimes afar and sometimes anear.'

COR'PORA LU'TEA, a name given to peculiar appearances seen in the ovary after the extrusion of an ovum from a Graafian vesicle.

CORPUS CHRISTI, a town of Nueces Co., Tex., on a bay of the same name, near the mouth of the Nueces River, 230 miles S. of Galveston. It is the terminus of the Mexican National Railway; has a good harbor and carries on a considerable commerce. Population, 3500.

CORR'EA, a genus of Rutaceous shrubs, natives of Southern and Eastern Australia, where they are known as 'native fuchsias.' The leaves of some of them are used as a substitute for tea.

CORSICANA, in Navarro Co., Tex., at the junction of the Texas & St. Louis and the Houston & Texas Central railroads. It is in the heart of a great cotton and wheat belt, and carries on an extensive trade with the surrounding country. Population, 5500.

CORSICAN MOSS, a name applied to *Gracilaria* (*Plocaria*) *Helminthocorton*, a species of seaweed which has been used as a vermifuge, though it is dubious whether its virtues have not been over-estimated. According to Mr. Berkley, *Laurencia obtusa*, another seaweed, forms the greater part of what is sold in the shops as C. M.

CORTI, ORGAN OF, one of the delicate apparatuses found in the internal ear in connection with the terminations of the auditory nerve, discovered by the Marquise di Corti, an Italian nobleman, and hence named after him.

CORTLAND, a beautiful town of Cortland Co., N. Y., on the Syracuse, Binghampton & New York Railroad, at its junction with the Utica, Ithaca & Elmira and the New York, Ontario & Western railroads, 37 miles from Syracuse. Population, 5500.

CORWIN, THOMAS, a distinguished American statesman, born in Kentucky, July 29, 1794, and early in life removed to Ohio, where he began to practice law, in which profession he rapidly rose to distinction. He was elected to Congress in 1830, Governor of Ohio in 1840, and to the U. S. Senate in 1845. He was Secretary of State under President Fillmore in 1850, and was subsequently Minister to Mexico. He was a member of the Whig party during the greater part of his life, and was distinguished for brilliancy in debate. Died Dec. 18, 1865.

CORYNOCAR'PUS, a genus of New Zealand trees, belonging to the natural order *Myrsinaceæ*, one of which, *C. levigatus*, is cultivated in Great Britain. The fruits and seeds of this tree are valued as articles of food by the natives. The seeds contain a farinaceous substance which renders them nutritious, but if eaten before being steamed for at least twenty-four hours, and then being either buried in the ground or allowed to soak in water for some days, they are poisonous, producing partial paralysis, spasmodic pains, and giddiness.

COSCIN'IUM, a small genus of plants belonging to the natural order *Menispermaceæ*. The wood, bark, and roots of *C. fenestratum* of Ceylon are valued as stomachics and tonics. The wood has been imported and sold as the true Calumba-root (Bentley); it contains *berberia*, and yields a yellow dye.

COSMORA'MA (Gr. *kosmos*, 'order,' 'ornament,' and *horao*, 'I see'), an exhibition of pictures of different parts of the world, which are placed horizontally on a table, reflected by mirrors leaning diagonally opposite them, and looked at through a convex lens in front of each mirror. The pictures are illuminated by lights so placed as not to be reflected by the mirrors.

COTTON-SEED OIL, a secondary product of the cultivation of cotton, of considerable value, is found in the oil obtained by expression from the seeds. The seeds are treated in the same manner as linseed, and yield a brownish fluid oil used for general purposes. The oil-cake of cotton-seed is a valuable cattle-feeding substance.

COTTON-WEED (*Diotis maritima*), a plant belonging to the natural order *Compositæ*, a native of the S.-E shores of Europe and of N. Africa. It gets its name from its leaves being clothed with dense greyish hairs, which look like wool.

COUE'PIA, a genus of plants of the natural order *Chrysobalanaceæ*, comprising about a dozen species, all natives of S. America. The fruits of many of them are eaten—*e.g.*, that of *C. Chrysocalyx*, planted near the villages of the Amazonian Indians. The Indians use the bark of *C. Guianensis* in the manufacture of pottery.

COUNCIL BLUFFS, a flourishing city of Western Iowa, about four miles E. of Omaha. It has fine public buildings, extensive manufactures, and is rapidly growing in population and importance. Population 22,000.

COURT OF JUDICATURE, SUPREME, ACTS 1873 and 1875 (ENGLAND). The statute of 1875 is to amend and extend the Act of 1873, and is to be construed along with it, the Acts together totally changing the constitution of the supreme law courts of England. The new law came into partial operation on 1st November 1875. The constitution of a *High C. of Justice* is declared. All actions which have hitherto been commenced by writ in the superior courts of Common Law at Westminster, or in the C. of Common Pleas at Lancaster, or in the C. of Common Pleas at Durham, and all suits which have hitherto been begun by a bill or information in the High C. of Chancery, or by a cause *in rem* or *in personam* in the High C. of Admiralty, or by citation or otherwise in the C. of Probate, shall be instituted in the High C. of Justice by a proceeding to be called an *action*. There are to be divisions of the C. called the Queen's Bench, the Common Pleas, the Exchequer, the Chancery, the Probate, Divorce, and Admiralty divisions. Her Majesty's C. of Appeal is also constituted by the Acts.

There are to be five *ex officio* judges, and as many other judges, not exceeding three, as her Majesty shall from time to time appoint. The *ex officio* judges are to be the Lord Chancellor, the Lord Chief Justice of England, the Master of the Rolls, the Lord Chief Justice of the Common Pleas, and the Lord Chief Baron of the Exchequer. The Lord Chancellor may, by writing addressed to the president of any one or more of certain divisions of the High C. of Justice, request the attendance at any time, except during the spring or summer circuits, of an additional judge from such division or divisions (not being *ex officio* judge or judges of the C. of Appeal), at the sittings of the C. of Appeal, and a judge to be selected by the division from which his attendance is requested shall attend accordingly. The London C. of Bankruptcy is not to be transferred to the High C. of Justice. No appeal on a final decree is to be pleaded before fewer than three judges. If the subject of appeal is an interlocutory decree or order, it may be pleaded before two judges, but not before fewer. New regulations are made respecting circuits, and the fixing and collection of fees in the High C. and C. of Appeal. There is to be no local Venue for the trial of any action, but when the plaintiff proposes to have the action tried elsewhere than in Middlesex, he shall in his statement of claim name the county or place in which he proposes the action shall be tried, and the action shall be tried in the place named, unless the judge order otherwise.

CONTAREA. a genus of Cinchonaceous trees of Guiana, &c., the bark of one of which, *C. speciosa* (*Portlandia hexandra*), is used as a substitute for cinchona.

COV'ERTURE is a term of English and American law denoting the legal status of a woman during her marriage.

COWBIRD (*Coccyzus Americanus*), also called the American yellow-billed cuckoo, belongs to the family *Cuculidæ*, of the order Scansores, and gets it name from its note, which resembles the word *cow*. It is found in the United States, and migrates northwards in spring. Stragglers have been found in Britain. It feeds chiefly on caterpillars, but also eats various berries. The color of this bird is dark-brown with green hues. The quills of its wings are of cinnamon color, and the under parts pure white. Its average length is 12 inches.

COXE, ARTHUR CLEVELAND, D.D., a bishop of the American Episcopal Church, born at Mendham, N. J., May 10. 1818, and graduated from the University of New York in 1838. He entered the ministry in 1841, and in 1865 was made bishop of Western New York.

CRA'NIA. A genus of Brachiopodous mollusca, forming the type of the family *Craniadæ*, exemplified by many extinct and by some existing species. In this family, the animal is fixed to submarine objects by the ventral or lower valve of the shell. The arms are fleshy, and coiled spirally. No hinge or articulating processes exist. The upper valve is limpet-shaped. The shell may be smooth or striped or spinous. The genus C. is first represented in a fossil state in the Silurian rocks. *C. personata* is a living species, while *C. Ignabergensis*, of the Chalk rocks, is a typical fossil form.

CRA'NIAL NERVES. These nerves, nine in number on each side, originate in some part of the base of the brain or upper portion of the spinal cord, and pass through apertures in the floor of the skull, to be distributed to the organs of sense and other structures in the head. They are named numerically from before backwards, but certain of them have additional names, given on account of their supposed functions. They are as follows: 1st pair. *The olfactory*, distributed to the nose, and connected with the special sense of smell. 2d pair. *The optic*, passing to the eyeballs, and connected with the special sense of sight. 3d pair. Sometimes termed *motores oculorum*, nerves of motion, distributed to all the muscles which move the eyeballs, with the exception of the external rectus and superior oblique muscles. 4th pair. Termed the *pathetici*, nerves of motion, distributed to the superior oblique muscles of the eyeball. When these muscles act, the eyeball is rotated upwards and outwards, so as to give a pathetic expression; hence the name. 5th pair. *Trifacial* or *trigeminal* nerves, both motor and sensory, conferring sensibility on the skin of the face and side of the head, month, lips, cheeks, and teeth; also sending a special branch, the *lingual* of the 5th, to the anterior part of the tongue (connected probably both with taste and tactile sensibility), and, lastly, supplying the muscles of mastication. 6th pair. *Abducens*, a motor nerve supplying the external rectus muscle of the eyeball. 7th pair. Divided into two portions—(1) *The facial*, or *portio dura* of the 7th, being the motor nerve of the muscles of expression; and (2) *The auditory*, or *portio mollis* of the 7th, being the nerve of the special sense of hearing, distributed to the ear. 8th pair. This consists of three nerves—(1) *The glosso-pharyngeal*, the special nerve of taste, distributed to the posterior third of the back of the tongue. (2) *The pneumogastric*, or *par vagum*. so termed on account of its wide distribution in the neck, chest, and abdomen. This important nerve supplies both motor and sensory branches to the pharynx, motor and sensory branches to the larynx, branches to the heart, which exhibit an inhibitory or restraining action over the contractions of that organ, sensory branches to the lungs, motor and sensory branches to the æsophagus, and motor and sensory branches to the stomach. (3) *The spinal accessory*, a motor nerve, distributed to the sterno-cleido, mastoid, and trapezius muscles in the neck. 9th pair. *The hypoglossal*, a motor nerve, supplying motor power to the muscles of the tongue both intrinsic and extrinsic. Each cranial nerve has an *apparent* origin from the base of the brain, and a *deep* or real origin from grey matter in the substance of the organ. The *deep* origins of the C. N. are still imperfectly known. Details regarding these may be found in *Gray's Anatomy*, p. 495, *et seq.*

CRATÆ'VA, a genus of tropical shrubs or trees of the Cape order (*Capparidaceæ*). *C. Nurvala*, of the Malabar and Society Islands, is planted in burial-grounds as a sacred tree. Its leaves and other parts of the tree are aromatic, bitter, and stomachic. The bark of the root of the garlic pear (*C. gynandra*), so called on account of its strong smell of garlic, blisters the skin like Spanish flies.

CRATOX'YLON, a genus of bushes or small trees of the St. John's wort order (*Hypericaceæ*), natives of China, the Malaya Peninsula, Java, and neighboring islands. About ten species are described, but only one—*C. Hornschuchii* of Java, which is slightly astringent and diuretic—is known to have medicinal properties.

CRAWFORD, THOMAS. an American sculptor, born at New York, March 22, 1814. He traveled abroad, and studied under the famous Thorwaldsen. His principal works are, 'Orpheus Entering Hades in Search of Eurydice,' 'The Hunter.' 'The Babes in the Woods,' 'The Dancers,' 'Sopplio,' and 'Hebe and Ganymede.' He also executed numerous busts of distinguished men and the bronze doors of the Capitol at Washington. Died in London, Oct. 10, 1857.

CRAWFORD, WILLIAM HARRIS, an American statesman, born in Virginia, Feb. 24, 1772, removed early in life to Georgia, and began the practice of law in Lexington of that state. He was secretary of war in 1815, and secretary of the treasury from 1816 to 1825. He was a prominent member of the Democratic party throughout his entire life. Died in London, England, Oct. 10. 1857.

CREMAS'TER is a slender muscle found in the human being, investing part of the testicle and spermatic cord. It derives importance in surgery from forming one of the coverings of an oblique inguinal hernia, where a portion of bowel passes obliquely through the ring or opening through which in early life the testicle passes from the abdominal cavity into the scrotum.

CRESTON, a city of Union Co., Ia., on the Burlington & Missouri Railroad, and at the junction of the Chicago, Burlington & Quincy, the Creston & Northern, and the Kansas City, St. Joseph & Council Bluffs railroads. It contains large stock yards, an extensive railroad machine shop, and coal shoots. Pop. 9,000.

CRIS'TA, a term used in anatomy to denote a crest or ridge. Thus we have the *C. galli*, or cockscomb of the ethmoid bone, the *C. ilii*, or ridge round the rim of the iliac or hip bones, &c., &c.

CRITTENDEN, JOHN JORDAN, an American statesman, born in Kentucky, Sept. 10, 1786. Early in life he entered upon the profession of the law, and soon became prominent in politics. He was made attorney-general, by Harrison; but resigning, was, in 1842, elected to the U. S. Senate. Having resigned from the Senate, he was chosen governor of his native state, in 1848. He was again attorney-general, during Fillmore's administration, and in 1855 was once more elected to the U. S. Senate. He was an earnest opponent of the doctrine and right of secession. Died July 26, 1863.

CROCID'OLITE (Gr. 'woolly stone'), a silicate of iron, composed of separable flexible fibres like asbestos, found chiefly in S. Africa. It has a pale-blue, green, or yellowish-brown color, and when cut and polished *en cabochon*, it shows a chatoyant lustre.

CROCKETT, DAVID, born in Tennessee, Aug. 17, 1786. He became a famous hunter, and was the hero of many thrilling adventures. He served in the war against the Creek Indians, and served three terms in Congress, 1827, 1829, 1831. When Texas declared her independence, he entered her service, and was captured at the taking of Fort Alamo and, with others, brutally massacred by the Mexicans, March 6, 1836.

CROFT, WILLIAM D.MUS., one of the greatest English cathedral composers, was born in 1657, and educated under Dr. Blow, whom he afterwards succeeded (1708) in his office at the Chapel Royal, and as organist at Westminster Abbey. He received the degree of Doctor of Music from the Univerity of Oxford in 1715, and in 1724 published *Musica Sacra*, a collection of anthems,—the first music printed from engraved plates. He died in August 1727, and was buried in Westminster Abbey. His compositions are almost all anthems, very many of which are still sung frequently in English churches. In their own department they have seldom, if ever, been surpassed.

CROP. in Scotland, the landlord has a hypothec over the C. for the rent of the year of which it is the C.; and the right continues in force so long as the C. remains in the tenant's possession.

CROPP'ING, a term of the agricultural law of Scotland indicating stipulated or implied conditions of farming under a lease. What is called the *clause of management* is now generally inserted in leases. It provides, among other things, for a variety or rotation of crops. This rotation varies according to the soil, climate, and other circumstance of the farm. Even in the absence of such a clause, there is an implied obligation on the tenant to cultivate according to the rules of good husbandry. By common law a tenant is restrained from such gross mismanagement as will injure or overwork the soil. It is generally provided that white corn crops (*i.e.*, crops which are allowed to ripen) shall never be taken from the same land in immediate succession, and that a certain proportion shall be under turnips, or plain fallow, every year, and be sown to grass with the first corn crop after turnips or fallow. The clause is generally enforced by penalty in case of contravention, as to which the law is, that the tenant is not entitled to pay the penalty and to infringe the clause.

CROSBY, Howard, D.D., LL.D., an eminent American divine of the Presbyterian Church, born in New York, Feb. 27, 1826, and graduated from the University of New York in 1844. After filling various positions as teacher and pastor, he became in 1863 pastor of the Fourth Avenue Presbyterian Church in New York City, which position he continues to hold. Among other works he has published *Lands of the Moslem*, *Oedipus Tyrannus*, *Notes on the New Testament*, *Bible Manual*, and *Life of Jesus*.

CROSSOPTERYG'IDÆ, a division of Ganoid fishes, so named from the fin-rays of the pectoral and ventral fins being arranged so as to form a *fringe* around a central lobe. The living Barramunda, or *Ceratodus* of Australian rivers, shows this arrangement of the fins; whilst the *Polypterus* of the Nile, and the extinct genera *Osteolepis*, *Megalichthys*, *Holoptychius*, &c., are good fossil illustrations of the 'fringe-finned' ganoids.

CRO'TAPHITE, the name given by the older anatomists to the temporal muscle on the side of the head, from *krotaphos*, 'the temple.' The term was also applied to the temporal bones and arteries.

CROWN AGENT is the agent or solicitor in Scotland who, under the Lord Advocate, takes charge of criminal proceedings. The appointment lies with the Lord Advocate for the time and is not held *ad vitam aut culpam*.

CROZOPH'ORA, a genus of annual or perennial low-growing plants (natural order *Euphorbiaceæ*), found in tropical and Northern Africa, and extending as far as India. *C. tinctoria*, a native of the Mediterranean countries, is cultivated for the sake of the dye called *Turnsole*, which is obtained from it by grinding the plants (little herbs seldom more than a foot high) to a pulp in a mill, when they yield about half their weight of a dark-green juice, which becomes purple by exposure to the air or under the influence of ammonia. It is chiefly exported to Holland, and is prepared for exportation by soaking coarse linen rags or sacking with it, the rags being previously washed clean. After soaking they are allowed to dry, and are exposed to the influence of ammonia by being suspended over heaps of stable manure. They are then packed in sacks, and ready for shipping to Holland. Not much is known of the use the Dutch put the dye to, but it is supposed to be chiefly employed as a coloring matter for cheese, and perhaps confectionery, wine, &c. (Black in *Treas. of Botany*). It has been confounded with Litmus.

CRU'RA, a term used in anatomy to designate the roots or peduncles or supports of any structure. Thus we have the *C. cerebri*, or peduncles of the brain, the *C. cerebelli*, or peduncles of the cerebellum, the C. of the diaphragm, the C. of the *corpora cavernosa* of the penis, &c., &c.

CRURÆ'US. The great muscle in front of the thigh, which extends the leg on the knee-joint, called the *quadriceps extensor*, is a large fleshy mass which covers the front and sides of the femur, and is usually divided by anatomists into four parts: (1) One occupying the middle of the thigh, the *rectus femoris;* (2) one portion occupying the outer side of the femur, *vastus externus;* (3) a third portion covering the inner aspect of the femur, *vastus internus;* and (4) the remainder covering the middle of the femur, between the two last named—the *C.*

CRUS'TA PETRO'SA, a substance found covering the fangs of human teeth, and forming layers in some examples of more complicated teeth, as those of the elephant or horse. It is identical in structure with bone, except that in C. P. we find no Haversian canals.

CRY'ING, Physiol'ogy of. This is a modification of the ordinary movements of respiration excited by a mental emotion. Though excited by a contrary emotion, it is nearly related physiologically to the act of laughing. Frequently an individual may be between a 'laugh' and a 'cry.' In both, the muscles of expiration are convulsed, and the breath is sent out in a series of jerks through the open glottis. C., unlike yawning, coughing, sneezing, never originates in the respiratory system, but is always an expression of an emotional state, though it must be confessed that in states of great general weakness, C. may sometimes occur without any very definite emotional antecedent.

CRYPSOR'CHIS (from *krupto*, 'I conceal;' *orchis*, 'a testicle'), a condition sometimes met with, in which the testicles have not descended from the abdominal cavity into the scrotum.

CRYPT, a term used in anatomy to denote a pit or tubular depression in a mucous membrane. Thus there are the crypts of Lieberkühn, in the intestinal mucous membrane.

CU'BOID BONE, one of the bones forming the arch of the foot. It is placed on the outer side of the foot, in front of the *os calcis*, and behind the fourth and fifth metatarsal bones. Its name indicates its shape.

CUCULLA'RIS, an old term, still sometimes used, to denote the *trapezius muscle*.

CUDRA'NIA, a genus of climbing spiny shrubs of the natural order *Artocarpaceæ*, natives of the Moluccas, Philippines, India, and tropical E. Africa. The heartwood of an E. African species yields a light-yellow dye.

CUL-DE-SAC, a term used in anatomy to denote a pouch formed by the infolding of a membrane. Thus we have the *culde-sac* of the pleura, or the pouch formed by the membrane projecting into the root of the neck, so as to cover the apex of the lung in that region.

CUN'EIFORM BONES. These are three bones in the tarsus or arch of the foot, so named on account of their wedge-like shape. With the cuboid bone they form the anterior row of the tarsal bones. They are termed from their position, internal, middle, and external.

CUNONIA'CEÆ (*Ochranthaceæ*), a natural order of Dicotyledonous plants closely allied to the saxifrages. About a hundred species and twenty genera, natives chiefly of tropical regions and of the southern hemisphere, and especially of Australia, are known. *Weinmannia*, *Callicoma*, *Ceratopetalum*, and *Caldcluvia* are examples. They have astringent properties, and some have been used for tanning, while others exude a gummy excretion.

CUPA'NIA, a genus of trees and shrubs of the natural order *Sapindaceæ*, numbering about fifty species, found in most tropical countries, but most abundantly in S. America. *C. edulis*, or *Blighiá sapida*, is the Akee-tree of the W. Indies, where the negro women use the distilled water of the flowers as a cosmetic. The seeds are surrounded by a succulent, slightly acid aril, which is much esteemed as an article of food. A decoction of the seeds is said to be efficacious in diarrhœa. The lofty tulip-tree of eastern tropical Australia (*C.* or *Harpulia pendula*) has a light-colored wood, interspersed with darker-colored patches, and is valued by the cabinetmaker from its being susceptible of a high degree of polish. Dr. Sprnce mentions the curious fact that the embryos of *C. cinerea*, a Peruvian species, 'fall out of the seeds, while the outer coating or husk of the seeds, with their aril contained in the burst capsules, still remain on the trees.' The 'Loblolly woods' of Jamaica also belong to this genus.

CU'POLA, a small blast-furnace used for the re-melting of raw pig-iron, in order that it may be cast into suitable forms in the foundry.

CURA'TELL'A, a genus of small Dillineaceous trees from tropical Africa, the rough leaves of one of which (*C. Americana*) are used in Guiana for polishing.

CURCU'LIGO, a genus of herbaceous plants of the natural order *Hypoxidaceæ*, natives of S. Africa and tropical Australia and India. The roots of *C. orchioides* are used in Travancore as a native cure for gonorrhœa, menorrhægia, &c., and the fleshy roots of some species (like *C. stans* of the Ladrone Islands) are eaten. Most of the genus is bitter and aromatic.

CURD (casein of milk) is a composition similar to the fibrin of wheat, the legumen of bean and pea, and the albumen of egg. It has been suggested by Mulder—and the suggestion is generally accepted—that the cheesy matter in milk is derived directly and without much change from the food upon which the animals live. From a gallon of new milk 1 lb. of C. is produced on the average, but Alderney and Guernsey cattle will give more. According to Dr. Voelcker, the ultimate elements of C. are carbon 53·57, hydrogen 7·14, nitrogen 15·41, oxygen 22·03, sulphur 1·11, and phosphorus 0·74 per cent. Curds-and-cream form a delightful dish, for which Devonshire is specially famous.

CURIA ROMANA, or Roman (Papal) Court. Even under the Pagan Emperors the Roman Pontiffs were burthened not only with the care of the spiritual concerns of the remotest churches, but with that of their temporal necessities. Gibbon in his work on the Roman Empire, dwells at length on the solicitude shown by the Bishops of Rome in the sufferings brought by famine, scarcity, or pestilence on the Christian communities in various parts of the Empire. Diocletian, he informs us, having been applied to for a decision regarding the use of certain revenues, referred the whole matter to the pope. The administration of the Church of Rome itself, in the days when that city counted several millions of inhabitants, required a large staff of priests, deacons, and minor ministers. The Apostles during the infancy of the Church in Jerusalem and before they set forth on their separate missions, were obliged to appoint the Seven Deacons to relieve them of the mere temporal cares of the growing community. Much more must such a necessity have been felt in Rome, even under Nero and his immediate successors, and while Peter and Paul were still living or their memory was yet green in the hearts of their persecuted disciples. In Rome but little comparatively, even in these early times, was left to oral tradition. The body of Notaries or official annalists, charged with recording not only the acts (or sufferings) of the martyrs, but the principal events in the administration of each successive pontiff, continued to exist when the era of persecution had passed away, and are even now, like every institution

belonging to the Roman Church, a living corporation with well defined duties and functions. The deacons who presided in the various districts of Imperial Rome over the distribution of alms and the treasury in which were kept the voluntary offerings in favor of the poor, are perpetuated in the Cardinal-Deacons. The Priests who were at the head of the lowly churches of the great city are perpetuated in the Cardinal-Priests, and the Bishops of the suburban sees who in the age of Diocletian and Constantine beheld the superb capital extend her glittering ranks of palaces to Ostia and even to Preneste are still Cardinal-Bishops of the shrunken towns, and form the Council of the Popes to-day as they did in the evil days of old. In the time of Pope St. Damasus, as in that of St. Gregory the Great, cotemporary writers describe the immense labors incurred by the Pontiffs and the officers of their court in attending to the administration of the universal church.

As one barbarous nation after another, during the middle ages, was brought into the fold of Christianity, and elevated to such civilization as Barbarian Feudalism permitted, the responsibilities and labors of the Pontiffs went on increasing. Christian Rome was the center of missionary activity; there resided those, who, in the name of the Vicar of Christ, directed the apostolic efforts of bishops and priests in the remotest regions both in spreading the faith among the Heathen and in resisting the spread of heresy or Mohammedanism.

In Rome was also the great court of conscience to which every member of Christ's flock had access in every difficulty or doubt. There resided the successor of Peter to whom alone the Keys had been given, with the power to confirm his brethren in the apostleship, and to feed both the lambs and the sheep, the faithful and their guides. It was the seat of the teaching, the legislative, the judicial, the disciplinary authority for the whole of God's people. He who was given power to rule them in all things pertaining to salvation, must share with many every part of a solicitude which extended, in the divine plan, to the entire human race. For, even to this day, the duty of preaching the Gospel to every one of the tribes of earth, is an essential duty of the Apostolic See. And what the Pontiff endeavors, in this respect, to do through the Congregation or Board of Propaganda, he does for the other functions of his supreme office through other like Congregations or Commissions. The duties fulfilled by the various departments of State, by the legislature, the judiciary, the police, the military and civil administrations of the largest empire, kingdom, or republic on earth, fall short of the burthen imposed on the shoulders of the Pope and the Roman Curia.

The College of Cardinals comes first in order: it is the Supreme Council of the Pope, and the electoral body on whom devolves the duty of selecting the occupant of the papal chair. It contains, as such, representatives of the principal Catholic peoples. But the majority, belonging to Italy, must be near the Pope, to aid him in governing the universal church as well as the dominions, which by right belong to the Holy See, and by securing its sovereignty and independence, also guarantee the free exercise of its spiritual authority, and the free intercourse with it of every member of the wide-spread Christian family. Even the Cardinals who do not reside in Rome, are assigned to various Congregations or Boards in this vast administration, and have to perform, though at a great distance from Rome, the specific duties belonging to such Congregation.

In Rome itself every day and hour of the Holy Father, of the Cardinals residing near him, and of the necessarily great number of prelates and officials subordinate to them in the various departments, is taken up with an incessant and strictly regulated round of duties. It will be sufficient to glance at the division of labor in the Curia Romana, that army of workers who constitute the staff of the supreme shepherd of souls. The Congregations which are first in importance, because to them the Vicar of Christ commits the principal share of his office of Universal Teacher and Judge of Doctrine, are: first, the Congregation de Propaganda Fide; and next, the three Congregations of the Inquisition, Index, and Council. The Propaganda, as its name indicates, is charged with promoting the missionary work of the Church in every land, and with fostering the growth of Catholicity in non-Catholic countries. The Inquisition is the supreme court of appeal in all matters of doctrinal discussion. The Congregation of the Index watches over the dissemination of error through the press and warns the faithful against the reading of pernicious books. Auxiliary to this Congregation is the office of the Master of the Sacred Palace, whose sanction is necessary for the publication in Rome of works treating on religious subjects. The Congregation of the Council of Trent is only authorized to interpret the disciplinary decrees of that Council. Intimately connected with the functions of universal teacher are those of supreme judge and director of consciences. In the discharge of the latter the Pope is aided by the Roman Penitentiary, at whose head is the Cardinal Grand Penitentiary, who wields the pontifical authority in the court of conscience, and absolves from all cases specially reserved to the Holy See. He commutes or releases from vows and oaths, and exercises towards all the power of loosing and binding. The functions of the Congregation of Indulgences are akin to those of the Penitentiary. As Supreme Governor of all Churches throughout the world, as 'Bishop of Bishops,' the Pope is assisted by three different Congregations—those of the Consistory, of Bishops and Regulars, and of Regular Discipline. The first deliberates and decides, under the Holy Father, on the erection of bishopricks, the appointment of bishops and their proclamation; the second discusses and decides all controversies between bishops and the religious orders or regulars belonging to their respective dioceses; the third keeps watch over the religious orders themselves, judges, and checks all breaches of regular discipline, all departures from the constitution and rule of each order. Connected with the exercise of this supreme governing power in spirituals, is the Congregation on Immunities (*Congregatio Immunitatis Ecclesiæ et Controversiarum jurisdictionalium*).

This court judges all disputes regarding the right of Asylum and Clerical Immunities. But as these have almost entirely disappeared in practice, the Congregation at present busies itself with disputes between the ecclesiastical and the civil power. As to the organs of the Pontifical jurisdiction and the seats of Christian jurisprudence, the foremost is the Rota Romana, the supreme court of appeal for all spiritual causes in the Church, and the supreme court of justice and appeal for the States of the Church in particular. Its decisions were admired and respected by lawyers of every race and country. Connected with the Rota are the two Boards, the Segnatura di Giustizia and the Segnatura di Grazia. The former is a court of first instance with respect to the Rota, and takes cognizance of suits of competence, causes of nullity of marriage, demands for restitution, &c. The Dean of the Rota, the Regent of the Chancery Office, and two members of the Papal Court of Exchequer (Camera) sit on this Board. The Pope signs every sentence with his own hand. The Segnatura di Grazia hears appeals made from the preceding courts to the favor or clemency of the Pope. He always presides in person.—Public Worship is, naturally, one of the most important departments in this vast administration. Two Boards of Cardinals are charged with this matter—the Congregation of Rites and that on Ceremonies. To the former is intrusted all that relates to the proceedings for beatification and canonization. Special commissions superintend all that pertains to St. Peter's and the other great churches of Rome. The *Capella Pontificia* or the official staff which regulates the papal chapels and the worship therein together with the order of precedence in which, on solemn occasions, all the dignitaries of the universal church are placed around the Great High Priest, is another important department in the Curia.—Foremost in dignity and the veneration of Christian peoples as the Papacy has been since the formation of Christendom, the men who represented the Holy Father in his twofold supremacy of honor and jurisdiction, always had precedence of all others in foreign courts. The personage who stands next to the Pope in the Roman Court, and in the eyes of the world, is his Secretary of State, who fills the post of prime minister both in the temporal and in the spiritual administration. It is through him that the Holy See conducts all affairs of the greatest importance. For 'extraordinary ecclesiastical affairs' there is a special Congregation of 22 Cardinals, with a council of the most learned prelates in the church.

The Roman Chancery with its numerous staff of officials is closely connected with the Secretariat of State. The Chancery drafts and publishes bulls, encyclicals, &c., and is thus the organ by which the Holy Father speaks to the church. The Cardinal presiding in this department is called Vice-Chancellor of the Roman Church: it is he who governs the temporalities of the Holy See during the vacancy of the papal chair. With the Chancery is connected the Dataria, a board especially intrusted with all that concerns benefices and dispensations. The Camera Apostolica is the Treasury Department in the pontifical administration. As to the Pope's own diocese of Rome, its government is intrusted to a Cardinal Vicar, who has under him a large official staff. Besides these branches, there are special Congregations or Boards for the affairs, ritual literature of the Oriental churches, a congregation for the regulating and promoting of studies, &c., and even for the examination in theology and canon law of candidates for the episcopal office.—Most numerous on this long roll-call of the Curia, are those belonging to the Pontifical Household (*Famiglia Pontificia*), either in active service, or as honorary dignitaries. They embrace many hundreds of prelates and laymen of all nationalities. This is only a natural consequence of the place which the Bishop of Rome, as Christ's vice-gerent on earth, holds toward all peoples, and of the reverence and affection which they entertain toward him.—The ceremonial observed in the Court of Rome, the hierarchical gradation and titles of its officials, and the very costumes they wear, are of remote origin. They seem to partake of the stability and perpetuity of the Papacy itself, which existed in the Catacombs, endured Napoleon's insults at Fontainebleau, outlived empires, kingdoms, and dynasties, and can afford to wait

patiently for the changes with which the present is big. Centuries count for little in the life of the Church.

CURL, a destructive disease in potatoes—a variety of chlorosis—in which the tubers 'produce deformed curled shoots of a pallid tint, which are never perfectly developed, and give rise to minute tubers. It is supposed C. arises from the tubers being overripe.' It is a local disease, and quite unknown in many districts (Berkley).

CURSO'RES, the order of Running birds represented by the *Struthionidæ* or ostriches, rheas, emeus, and cassowaries, and the *Apterygidæ* or New Zealand *Apteryx*. This order is distinguished by the flat nature of the breastbone or sternum, by the rudimentary wings, by the length of limbs, and by their muscularity, adapting them for running. The hinder toe is wanting in all but *Apteryx;* the ostriches have two toes only, while the others have three toes. The claws are blunt nails, and the under surfaces of the toes are broadened to form soles in running. The barbs of the feathers are unconnected and loose. The pelvis (as in the ostriches) is unusually strong and firm, and in these latter birds the pubic bones unite to form a *symphysis*—a conformation seen in no other bird. The C. correspond to Huxley's division *Ratitæ*, or those birds with flat shield-like breastbones.

CURTIS, GEORGE WILLIAM, a well-known American writer and public speaker, born at Providence, R. I., Feb. 24, 1824. He studied in Europe, and returning to America, devoted himself to literary pursuits. For a number of years past he has been editorially connected with the publications of the Harpers in New York. Among his published works are the following: *Nile Notes of a Howadji* (1851), *The Howadji in Syria* (1852), *Lotus Eating* (1852), and *Potiphar Papers* (1854). Mr. Curtis is a polished writer and a brilliant orator.

CURTIS'IA, a genus of *Cornaceæ*. *C. faginea* of S. Africa furnishes the wood from which the natives make their spear or *assagay shafts;* hence the tree is usually called Assagay-tree or Hassagay-wood.

CUR'WEN, THE REV. JOHN, founder of the Tonic Sol-fa method of teaching music, was born at Heckmondwike, Yorkshire, in 1816, and educated at Coward College and University College, London. He became an Independent minister in 1838, and a few years afterwards his attention was called to the subject of teaching children music in connection with his Sunday-school. In 1841 he visited Miss Glover's school at Norwich, and afterwards tried her system with some success. His own notation and system he developed gradually from this time, without any idea at first of the revolution it would effect in the matter of musical education. C. became pastor of the Congregational church at Plaistow, Essex, in 1844, and retained his charge until failing health and the growing cares of his musical work, which he felt it his duty to carry on, compelled him to resign it in 1865. He became (1876) President of the Tonic Sol-fa College, an institution founded by him in 1862 to grant certificates of proficiency in music and promote musical culture. C. devoted most of his time to the duties of this office, to the publication of the *Tonic Sol-fa Reporter*, and to spreading the knowledge and love of music among the people.

His works include a *Grammar of Vocal Music*, a number of courses of lessons and exercises in choral singing adapted to different classes, a book on analytical harmony, *How to Observe Harmony*, *Commonplaces of Music*, *Lectures on Psalmody*, &c.

CUSHING, CALEB, LL.D., an American orator and jurist, born at Salisbury, Mass., Jan. 17, 1800, and educated at Harvard College. He allied himself with the Whig party, and soon gained distinction as an eloquent debater. In 1835 he was elected to Congress, and was three times re-elected. In 1841 he left the whigs and joined the Democratic party. Raising a regiment at his own expense, he served during the Mexican war with the rank of colonel. From 1853 to 1857 he served in the cabinet of President Pierce as Attorney-general. In 1871 he was appointed with two others to represent the U. S. government before the Alabama-claim arbitrators, at Geneva, Switzerland, and in 1873 was made minister to Spain. Died at Newburyport, Mass., Jan. 2, 1879.

CUSHMAN, CHARLOTTE SAUNDERS, an American actress, born in Boston, July 23, 1816. She at first appeared before the public as a singer, but, in 1835, losing her voice, she began her dramatic career. In the character of 'Lady Macbeth,' she met with great success, and soon became famous as a *tragedienne*. C. was also noted for the purity of her private life and her general culture. She moved in the most refined social circles and was respected by all. Died at Boston in 1876.

CUSTER, GEORGE A., an American general, born in Ohio in 1840, and graduated from West Point in 1861. He served with gallantry during the civil war, participating among others in the following engagements: Bull Run, Yorktown, South Mountain, Antietam, Gettysburg, Wilderness, Cold Harbor, Opequan, Cedar Creek, and Appomattox. He was rapidly promoted from position to position, and at the close of the war was brevet major-general, and in 1866, lieutenant-colonel U.S.A. In 1873, he commanded the Yellowstone Expedition. On June 25, 1876, in an attack on the Sioux Indians, on the Little Big Horn River, he was killed with his entire detachment, including 13 officers and more than 200 men. He wrote *Life on the Plains* (1875).

CUTIS VERA, the true skin, covered by the epidermis, and resting on close connective tissue, in the meshes of which there are often numerous fat cells.

CUYLER, THEODORE LEDYARD, D. D., a distinguished American clergyman, born in Aurora, N. Y., Jan. 10, 1822, and graduated from Princeton College in 1841, and from Princeton Seminary in 1846. After filling pastorates in Trenton, N. J., and New York, he was called to the La Fayette Avenue Presbyterian Church in Brooklyn, which under his ministrations has grown to be one of the largest churches of that denomination in the world, and where he still remains. He has published several works of devotional character, and has written much for the religious press.

CYCLO'PIA, a genus of S. African shrubs of the order *Leguminosæ*. The leaflet of *G. genistoides*, a plant cultivated in greenhouses, is called the 'bush tea,' from its agreeable tea-like smell. A decoction of it is used as an expectorant in chronic catarrh and consumption.

CYM'OPHANE (Gr. *kuma*, 'a wave,' and *phaino*, 'I appear'), a variety of Chrysoberyl, which shows a milky opalescence or 'wave of light,' and is much prized, when cut *en cabochon*, by jewelers, who call it *opalescent chryosolite*.

CYM'RIC, or KYM'RIC, LANGUAGE AND LITERATURE. The Cymric, as well as the Gaelic branch of the Celtic language, shows the peculiar characteristic, the *differentia*, of the Celtic—*i. e.*, changes on the beginning as well as on the ending of its words; but though these changes differ so much in each of the dialects into which Cymric is subdivided as to warrant their being classed separately, the general resemblance of the laws which regulate them is sufficiently strong to prove them all to be of one family. See Rhys's *Lectures on Welsh Philology* (Lond. 1877).

The Cymric is divided into three branches—Welsh proper, Cornish, and Breton or Armoric. The English public knew almost nothing of any literature contained in these languages until Edward Lhuyd, an accomplished scholar, published in 1707 his *Archæotogia Britannica*, showing that in Welsh many ancient treasures were preserved. His work excited very little attention at the time. In 1764 the Rev. Evan Evans, and twenty years later E. Jones, Esq., published specimens of the old poems of Wales, accompanied with English translations. Two Scotchmen, Laing and Pinkerton, who had taken a very prominent part in denouncing the Gaelic Ossian as a forgery, denounced the Welsh bards in the same style, and were listened to, although they were profoundly ignorant both of Gælic and of Welsh. Sharon Turner answered them with considerable ability in his *Vindication of the Genuineness of Ancient British Poems* (1803). In 1801 Owen Jones, a native of Myvyr, in Wales, who devoted much time and money to the illustrating of his country's literature, published a collection of great extent and value under the title of *The Myvyrian Archæology of Wales*. Two accomplished writers, Mr. Stephens (*Literature of the Kymry*, 1840), and Mr. Nash (*Taliesin, the Bards and Druids of Britain*, 1858), labored hard to prove that the great majority of poems published by him are spurious, while they admitted a few to be genuine and ancient.

The question, however, has been conclusively disposed of by Mr. W. F. Skene, who in 1868 published the *Four Ancient Books of Wales*, with a translation and a learned and exhaustive dissertation. He assigns the poems ascribed to the four great bards, Taliesin, Aneurin, Llywarch Hen, and Myrddin, to the 7th c., and considers that they were written down at various periods from the 12th to the 15th centuries. There are no traces of poetic composition from the 7th to the 12th centuries preserved, but during the next two centuries great literary activity manifested itself both in N. and S. Wales, and the writings of no fewer than seventy-six authors are handed down in circumstances which forbid any question of their genuineness.

It is worthy of remark that, in the old poems, Arthur is spoken of without romance or extravagance as the Guledig, or war-leader, who fought many successful battles against the enemies of his country, while in the later ones the popular romances concerning him are found full-blown. Much of the Welsh literature is of great historical value, and the Welsh deserve praise beyond any of their Celtic cousins elsewhere for still publishing newspapers and periodicals in their native tongue.

Little need be said of the Cornish dialect of the Cymric. It was spoken in Cornwall until after the middle of last century. The English has, however, entirely displaced it, and it is chiefly through the *Archæologica Cornu-Britannica* of Dr. Pryce, published in 1790, that a knowledge of it must now be sought.

The Armoric or Breton is still spoken by a numerous people in the N. of France, and is much better known.

CYST'OLITHES (Gr. 'bladder-stones'), clusters of crystals found in the superficial cells of nettles and some other species of the order *Urticaceæ*, and various genera of *Acanthaceæ*, &c. They are globular or club-shaped and of various other forms, usually hanging by a short stalk in an enlarged cell; their principal mass is found to be cellulose, but their surface is studded with crystalline points of carbonate of lime.' The crystalline contents of the cells are enclosed by the general cell-wall, and by a very delicate organic covering closely applied to every part.

CYT'OPLASM is a semi-fluid molecular material in which cells may originate or grow.

D.

DACTYLORHIZ'A, a disease of carrots, turnips, and other agricultural plants, in which the root divides and becomes hard and worthless. It is commonly called 'fingers and toes.' Mr. Berkley thinks that it is not properly a disease, but only a tendency in the plant to revert to the wild state, and can only be remedied by a careful selection of seed. It must be distinguished from 'anbury,' which is caused by the attacks of insects.

DAG'OBERT, I., surnamed the Great, one of the Merwing kings of France. He was born about 600; succeeded his father, Hhlotar II., in 628; warred successfully against Gascons, Bretons, Saxons, and Slavonians; first opposed and then favored the clergy; reformed the Frankish laws; died at Epinay, and was buried at St. Denis, in 638. He was an able but a cruel and licentious king. He is said, after conquering the Saxons, to have caused all those whose stature was greater than the length of his sword to be slain.

DAHLGREN, JOHN A., an American naval officer, born at Philadelphia, Pa., Nov. 13, 1809, and entered the U. S. Navy in 1826. At the outbreak of the civil war, he had attained the rank of commander, and in 1862 was made captain. In 1863 he was placed in command of the South Atlantic squadron, engaged in blockading the Confederate ports of that section. In connection with the land forces, under Gen. Gillmore, he captured Morris Island, silenced Fort Sumter, secured an anchorage for Union vessels in Charleston harbor, and checked the blockade-running that had been carried on from that port. In 1863 he was made rear-admiral. Died at Washington, D. C., July 12, 1870.

DAILLÉ (Lat. *Dallæus*). JEAN, a Frence Protestant theologian, born at Chatelherault, 6th January 1594. After finishing his studies at Saumur, he was intrusted in 1612 with the education of the grandsons of Duplessis-Mornay. In 1625 he was appointed pastor and professor at Saumur; the following year he was translated to Paris, where he was a pastor for forty-three years. D. died April 15, 1670. Among his warmest friends were Conrart and Balzac. His masterpiece is his *Traité de l'Emploi des Saints Pères pour le Jugement des différends qui sont Aujourd' hui en la Religion* (Gen. 1632; Eng. trans. 1651), in which he did much to shatter the authority of the fathers. Among his other writings may be mentioned his *Apologie pour les Églises Réformées* (1633; Eng. trans. 1653, and *La Foy fondée sur les Saintes Écritures* (Char. 1634), and 20 vols. of sermons. Even his adversaries admit his important services to the history of the Church by his learned researches into church antiquities. See *Abrégé de la Vie de Daillé, avec le Catalogue de ses Ouvrages*, by his son, Adrien Daillé (Gen. and Par. 1670).

DAILY COUNCIL was the court which, in Scotland, immediately preceded the institution of the College of Justice, and from which the present court derives its title of 'Council and Session.'

DALHOU'SIE, FOX MAULE RAMSEY, EARL OF, was born at Brechin Castle, April 22, 1801. He entered the 79th Highlanders in 1819, and, after serving in Canada under his uncle the Earl of Dalhousie, retired as captain in 1831. In 1835 he entered Parliament for Perthshire as a Whig, and sat for this county for two years, and subsequently for the Elgin Burghs (1830–41) and for the city of Perth (1841–52). In 1852 D., hitherto known as Fox Maule, on the death of his father became Baron Panmure, and filled in succession the offices of Under-Secretary for the Home Department, Vice-President of the Board of Trade, President of the Board of Control, and Secretary at War (1855–58). His conduct in the latter post, during the war with Russia, excited a good deal of criticism. D. retired from political life in 1858, when Lord Palmerston resigned. In 1860, on the death of his cousin the Marquis of D., he succeeded to the title of Earl.

DALLAS, ALEXANDER JAMES, an American statesman, born in the island of Jamaica, June 21, 1759. Early in life he removed to Philadelphia, Pa., where he entered upon the practice of law. He was secretary of the treasury under Madison, and was the projector of the U. S. Bank. Died Jan. 16, 1817.

DALLAS, a city of Dallas Co., Tex., on Trinity River, 215 miles N.-E. of Austin. It is the central commercial city of Texas; is surrounded by a wheat and cotton growing country, containing mines of coal and copper; and carries on manufactures. Pop. 20,000.

DAL'TONISM. Certain individuals are more or less deficient in the power of discriminating colors. This is D., from the name of the distinguished chemist who was himself the subject of it. It is sometimes termed color-blindness. The most common form of D. is an inability to distinguish red from green,—thus ripe cherries can be distinguished from the leaves of the tree only by their form. In other cases blue and green are confounded. In most cases, the color-blindness is for the red rays. Frequently low tones of color give rise to the same sensation as certain mixtures of black and white—producing grey. D., in all probability, depends on some peculiarity of the structure of the retina. It is well-known that the periphery of the retina shows defective perception of the different colors—red appearing grey; green, blue; green, yellow, &c.; and it would appear that D. is 'only an extension of the want of perceptivity, normal in the periphery of the retina.'

DALY, CHARLES P., LL.D., an eminent American jurist, born in New York City, Oct. 31, 1816, and began the practice of law in 1839. In 1845 he was made a judge of the Court of Common Pleas in New York, and in 1857, was made chief judge of that court, which position he still continues to hold. He has been for a number of years president of the American Geographical Society.

DALZIEL', THOMAS, of Binns, W. Lothian, a Scottish general, born about 1599. He took the royal side in the civil war, and held the town of Carrickfergus for the King; was a major-general at Worcester, where he was captured, but escaping from prison, he entered the service of the Czar of Muscovy, and distinguished himself in the wars against the Turks and Tartars. In 1665 he returned to Scotland, and was appointed commander-in-chief of the forces there. On the 28th of Nov. 1666 he suppressed a rising of the Covenanters at Pentland, with more humanity than might have been expected from a man of his ferocity of temper, intensified by Russian service and a fanatical loyalty to his King. After the execution of Charles I. he never shaved his beard, which grew down to his middle, and this, coupled with his antique dress, never failed to gather round him a crowd of boys when he appeared in London. D. died in 1685.

DAM'AGING MANUFACTURES, MACHINERY, or MINES. The Act 24 and 25 Vict. c. 97, enacts special penalties, ranging from two years' imprisonment to penal servitude for life, for these offences.

DAMNUM, in Roman law, signified any loss sustained in person or property. In Scotch law, *damnum absque injuria* denotes losses for which the sufferer has no legal right of compensation against the person causing his loss. Thus, where a new school is established to the detriment of one previously established, the latter sustains *damnum absque injuria*.

Damnum Fatale, a term of Scotch law denoting inevitable accident.

DAN (Heb. 'judgment') was the fifth son of the patriarch Jacob. The tribe was the most numerous of all (62,700, Num. i., 64,400, Num. xxvi.) except Judah, although the territory it received in the land of Canaan was the smallest. It was, however, the most fertile part of the country, and tempted the Canaanite

neighbors to seek to possess it, during which contest Samson appears on the scene. Perhaps on this account the tribe migrated to the N. and took possession of the town of Laish, which, under the name of D., was afterwards the northern extremity of the country.

DANA, CHARLES ANDERSON, an American editor, born at Hinsdale, N. H., Aug. 8, 1819, and was educated at Harvard College. In 1858, he became editor of the New York *Sun*, which, under his management, has become one of the leading metropolitan journals.

DAN'AVIRKE, a long wall in Slesvig, about 8 miles long, from 24 to 40 feet high, ascending from the Slei to the river Trene. Tradition says it was built in the 10th c. by King Gorm and his wife Thyra. It was restored and strengthened in 1850, but was captured by the Austro-Prussian troops in the Danish war of 1865.

DANBURY, a flourishing manufacturing town of Fairfield Co., Conn. In 1777 it was burned by the British. It has extensive hat-factories, and other important manufactures. Pop. 11,669.

DANEMO RA, a town in the province of Gothland, Sweden, 22 miles N. of Upsala, famous for its extensive iron-mines. There are seventy-nine shafts in the neighborhood, of which seventeen are worked. The iron is of the best quality, and large quantities of it are exported to England. Pop. (1874) 1089.

DANVERS, a town of Essex Co., Mass., on branches of the Boston & Maine and Eastern railroads, 16 miles from Boston. It is largely engaged in the manufacture of leather, shoes, and brick. Pop. 7000.

DANVILLE, in Montour Co., Pa., on the N. branch of the Susquehanna River. Three railroads pass through the town. It has iron works and other manufactures. Pop. 8346.

DANVILLE, in Pittsylvania Co., Va., on the Danville River, 141 miles from Richmond, and is the terminus of several railroads. It is engaged in tobacco raising, and has flour and cotton mills. Pop. 8000.

DANVILLE, in Boyle Co., Ky., on the Cincinnati, New Orleans & Texas Pacific Railroad, 113 miles from Cincinnati. It is an educational center of Kentucky, and contains one male and two female colleges, a Presbyterian theological seminary, and an institution for the deaf and dumb. It is surrounded by an agricultural district. Pop. 3074.

DANVILLE, in Vermillion Co., Ill. Three railroads pass through it, and it is the terminus of four others. It is 112 miles distant from Springfield and 125 from Chicago. It is actively engaged in coal mining, manufacturing and agriculture. Pop. 7735.

DARES, the reputed author of a pseudo-history of the fall of Troy, popular in the middle ages, and even in the 16th c. Chaucer places D., with Homer and others, on the highest pedestal in the house of fame, and refers to D., not to Homer, for the deeds of Troilus. The Greek version of D., at one time attributed to the D., priest of Hephæstus, mentioned in the *Iliad*, is supposed to have been the work of a Sophist, and was extant in the 3d c. B.C., but is now lost. A Latin prose work, *Daretis Phrygii de Excidio Trojis Historia*, has been preserved. This is either a fabrication of the 5th, 6th, or 7th centuries, or perhaps an abridgment from the Latin epic by Joseph of Exeter, who flourished about the 12th c. It was translated into French verse in the 12th c., and was first printed at Cologne in 1470. This work, which is of no value, was said to be a translation, by Cornelius Nepos, from the original Greek. It is generally printed along with Dictys' Cretensis. The best edition is by Diederich (8vo, Bonn, 1837).

DARTMOUTH COLLEGE, New Hampshire, was chartered in 1769. It grew out of an earlier Indian school, and received its name from Lord Dartmouth, president of the original trustees. In 1815–19 the college became the subject of litigation, a result of which was that the United States Supreme Court decreed the inviolability of chartered property. D. C. comprises an arts, medical, and scientific school, with an observatory. In 1870 there were 29 teachers and 289 students; in the medical department, 14 teachers and 52 students; income from endowments, $9000; other sources, $20,000.

DARTOS, a thin layer of involuntary muscular fibre, endowed with contractility, found immediately beneath the skin of the scrotum. By its contractile action the testes are drawn up, and the skin of the scrotum is wrinkled.

DAVENPORT, REV. JOHN, a distinguished Puritan divine, was born at Coventry, in England, 1598. He was educated at Oxford, became minister of St. Stephen's, London, and came over the sea with the first Puritan settlers of New Haven, Connecticut, in 1638. He remained their minister for thirty years, and died in Boston in 1670.

DAVIDSON COLLEGE, located in Mecklenburg Co., N. C., established in 1837, and controlled by Presbyterians. It maintains two courses, classical and scientific.

DAVIES, CHARLES, LL.D., an American educator, born at Washington, Conn., Jan. 22, 1798, and graduated from West Point, in 1815. He was professor of mathematics at West Point, in Trinity College, Hartford, Conn., in the University of New York, and in 1857 was made professor of higher mathematics in Columbia College. He wrote and published a complete series of mathematical text-books, which have been widely used. Died Sept. 18, 1876.

DAVIS, ANDREW JACKSON, an eminent American Spiritualist, born at Blooming Grove, Orange Co., N. Y., Aug. 11, 1826. He has published several works on Spiritualism, many of which he claims were written under the influence and by the dictation of spirits. The following are his leading works: *The Principles of Nature*, &c. (1845), and *The Great Harmonia* (1850–59).

DAVIS, DAVID, LL.D., an American jurist and statesman, born in Maryland, March 9, 1815, educated at Kenyon College, O., and in 1836 began to practice law at Bloomington, Ill. In 1848 he was elected judge of the Eighth Judicial Circuit of Illinois, and was re-elected in 1855, and again in 1861. In 1862 he was appointed to a seat on the bench of the U. S. Supreme Court by President Lincoln, and in 1880 was elected U. S. Senator.

DAVIS, NOAH, a well-known American jurist, born at Haverhill, N. H., Sept. 10, 1818, removed with his parents, while a child, to Albion, N. Y., and began the practice of law in 1841. He was twice elected to Congress, and in 1873 was elected a justice of the N. Y. Supreme Court, which position he still holds.

DA'VISON, JOHN, the author of the well-known *Discourses on Prophecy*, was born at Morpeth, 28th May 1777, and educated at Oxford, where, between 1810 and 1817, he was tutor of his college (Oriel), public examiner, and preacher at Whitehall. In 1826 he was made prebendary of Worcester, and shortly after rector of Upton-upon-Severn. He died 6th May 1834. D. had great learning and clearness of judgment. His *Discourses* were published in 1812.

DAW'SON, JOHN WILLIAM, LL.D., naturalist, was born at Picton, Nova Scotia, in October 1820. After studying for some years at Edinburgh University, he returned home, and has since wholly devoted himself to the study of natural science. He has greatly increased our knowledge of the palæontology of Canada, and is the discoverer of the oldest known form of organic life, the *Eozoön Canadense*, which belongs to the Laurentian formations. D. is Vice-Chancellor of the M'Gill University at Montreal, and a member of many scientific societies of Europe and America. Among his principal works are his *Archaia, or Studies of the Cosmogony and Natural History of the Hebrew Scriptures* (1858), his *Acadian Geology* (2d ed. 1868), and, most important of all, his *Devonian and Carboniferous Flora of Eastern N. America* (2 vols.), published by the Geological Survey of Canada. His latest works are *The Story of the Earth and Man* (1872), in which he combats Darwin's views on the origin of man, and his *Dawn of Life* (1875).

DEANE, SILAS, an American statesman, born at Groton, Conn., Dec. 24, 1737, and graduated from Yale College in 1758. In 1774 he was a member of the Continental Congress, and in 1776 visited France as the financial agent of the U. S. Various charges of dishonesty were brought against him by his enemies, and in 1777 was recalled in disgrace. There is now, however, no doubt but that these aspersions were false, and that Mr. Deane was a sincere and honest patriot. In 1842 his accounts were investigated by Congress, and it was found that a large sum of money was due to his heirs. Died in England, Aug. 23, 1789.

DEARBORN, HENRY, a general of the revolutionary war, born at Hampton, N. H., Feb. 23, 1751. He began the practice of medicine, but at the outbreak of the war for independence, he entered the Continental army. He participated in the battle of Bunker Hill; marched with Arnold, to Quebec, where he was taken prisoner; and served under Gates, in the campaign which terminated in the surrender of Burgoyne. He was also present at Monmouth and Yorktown. He was a member of Congress from Mass., 1793–97, and was made Secretary of War, by Jefferson, in 1801. He served during the war of 1812, with the rank of major-general, and commanded the expedition which captured York, Canada, in 1813. He was appointed Minister to Portugal in 1815. Died June 6, 1829.

DE BE'NE ESS'E, a term of English law, signifying the admission that something done may be allowed to stand for the present; but that it must ultimately stand or fall by the result of future examination.

DEB'ITUM FUN'DI is in Scotch law a debt attached to land, and having a *lien* over it. A *Feu-Duty* and arrears of feu-duty are *debita fundi*. Rents, tithes (*teinds*), and similar burdens, though dues connected with land, are not *debita fundi*. Debts constituted by this title may be made effectual by Poinding of the Ground.

DECAP'OLIS (Gr. 'the region of the ten cities'), a district of Palestine, lying chiefly E. of the Jordan, but including a small part of Galilee, was so named from containing ten cities, which are generally given as Damascus, Philadelphia, Raphana, Scythopolis, Gadara, Hippos, Dios, Pella, Gerasa, and Canatha. These cities probably held privileges from the Roman Senate, and seem to have been free from Jewish authority. D. was fully 200 miles long, with a breadth of 60.

DECATUR, a city of Macon Co., Ill., about 39 miles E. of Springfield. It has street railways, numerous churches and factories, and is an important railroad center. Pop. 9548.

DECATUR, STEPHEN, an American commodore, born at Sinnepuxent, Md., Jan. 5, 1779, and entered the navy in 1798. During the war with Tripoli, he led a small party, which burned the *Philadelphia*, an American vessel, which had been captured by, and was in the possession of the enemy. For his bravery on this occasion he mas promoted to the rank of captain. In 1815 he led a squadron against the Algerines, captured several of their vessels, and compelled the Dey to seek peace. He was killed by Commodore James Barron, in a duel, on March 22, 1820.

DECAZES', ÉLIE, DUC, a French statesman, born at St. Martin-du-Laye, Gironde, September 28, 1780. After holding various civil offices, he was made a cabinet-councilor by Napoleon in 1807; in 1814 became a captain in the National Guard, and fought at the siege of Paris; held office under Louis XVIII.; was made Comte in 1816, and in 1818 Minister of the Interior, in which capacity, he gave great attention to commerce and manufactures. In 1819 he was made President of the Council, and shortly afterwards Duc D. After the Revolution of 1830 he devoted himself to the advancement of manufactures and art. He died 24th October 1860. D. was sagacious and tolerant, free from the intense party spirit of most French politicians.—His eldest son, LOUIS CHARLES ÉLIE AMANIEU, DUC D., was born May 19, 1819, served as French Minister and Envoy at the courts of Spain and Portugal, and was elected to the Conseil Général in 1867, and to the Assembly in 1871. In 1873 he was appointed Minister of Foreign Affairs. Formerly a leading member of the Right Center, he greatly contributed to the wise and moderate foreign policy of his country.

DECEB'ALUS, a title of honor among the Dacians, probably equivalent to the English *king*. The D. mentioned by Dion Cassius was, during the reigns of Domitian and Trajan, a dangerous enemy of Rome. Between 86 and 90 A.D. he defeated the Roman generals in Mœsia, and frightened Domitian into purchasing a dishonorable peace. Trajan, however, restored the honor of the Roman arms, and after suffering several disastrous defeats D. committed suicide, A.D. 105.

DECID'UA, a membrane formed in the interior of the pregnant uterus from the mucous membrane of that organ. At first single, it ultimately forms to layers—(1) the *D. vera*, which lines the uterus, and (2) the *D. reflexa*, which covers the exterior of the ovum.

DEC'IMÆ GARBALES, the tenth sheaf of the cut corn, which the rector of the parish had a right to take from the ground.

Decimæ Inclusæ, teinds which have never been separated from the stock, and which are not demandable by the titular or minister.

Decimæ Restoriæ, parsonage tithes, due from all kinds of grain produced by culture.

Decimæ Vicariæ, vicarage tithes, due only, according to use and wont, from certain articles—wool, grass, fish, eggs, &c.

DECI'SION. The D. of a court is its pronounced judgment in a cause. In Scotland, the word is usually applied to the printed reports of cases decided in the Court of Session. In England the decisions of courts of law carry greater authority in determining the law than they do in Scotland; though in the latter country, two or more consecutive decisions of the Court of Session, not changed by the House of Lords, are held to determine the law.

DECUSSA'TION, a term used in anatomy to denote the crossing of fibres from one side to the other. Thus we have the D. of the fibres of the optic nerves, and the D. of the motor fibres of the spinal cord in the *Medulla oblongata*.

DEDHAM, in Norfolk Co., Mass., on the Charles River, 10 miles from Boston. Several railroads connect it with Boston, and it is extensively engaged in the manufacture of woollen goods, loom pickers, brooms, cocoa, chocolate, and gold leaf. It is surrounded by an agricultural district. Pop. 6400.

DEEMS, CHARLES F., D.D., a prominent American clergyman, born at Baltimore, Md., Dec. 4, 1820, educated at Dickinson College, and entered the ministry of the M. E. Church. After filling several important educational positions in the South, he became the pastor of the Church of the Strangers in New York City, which position he still holds (1885). He has written voluminously for the religious magazines, and has published, among other works, the following, *Life of Dr. Clark. Devotional Melodies*, *Home Atlas*, *Triumphs of Peace*, and *Life of Christ*.

DE FACTO, is, in law, a thing actually done or existing. A king *de facto* is one in possession of sovereignty. A king *de jure* is one who is considered to have a right to a crown, but is not in possession.

DEFÆCA'TION, the act of voiding the fæces by the anus, is accomplished by the combined contraction of the abdominal muscles, and the simultaneous opening of the sphincter or ring-like muscle which keeps the anal opening closed. Previous to the action of the abdominal muscles, the glottis is closed so as to prevent the upward motion of the diaphragm, and thus the abdominal wall presses with advantage on the bowels. These actions are assisted by the contraction of the walls of the rectum. The anal opening is controlled by a ganglionic nerve-center situated in the lower part of the spinal cord, subject, to a certain extent, to the control of the will. Thus D. may be delayed by powerful efforts of the will, but if the fæces press firmly on the inner surface of the *sphincter ani*, the effort of the will is soon of no avail. According to most authorities, the desire for D. is the result of the sensation caused by the descent of the fæces from the sigmoid flexure of the colon into the rectum. In some circumstances, however, the rectum may be loaded with fæces without any desire to void them.

DEFEN'DANT. In English law, he who begins an action is termed the *plaintiff*; the person against whom it is brought is termed the *defendant*. In Scotch law, the name used is *defender*.

DEFIANCE, a town of Defiance Co., O., at the confluence of the Maumee and Auglaize rivers, and on the Wabash and Erie canal. Two railroads pass through the town, and it carries on an extensive trade with the surrounding country. It is also engaged to a considerable extent in manufacturing. Pop. 5907.

DEFRAUD'ING OF CREDI'TORS. Creditors may be defrauded by the funds of their debtor being concealed, by their being conveyed to favorite creditors, or by the undue increase of debts against the estate of the debtor. Creditors have redress by common law and under the bankruptcy statutes of England and Scotland. Similar laws prevail in the U. S.

Defrauding the Revenue.—Any contrivance by which an imperial tax or duty is evaded constitutes this offence. By the treaty of Union between England and Scotland, the law regarding it is the same in the two countries.

DE KALB, JOHN, BARON, born in Bavaria, June 29, 1721, and in early life entered the French army. In 1777 he came to the United States, and was made a major-general by Congress. He rendered gallant and valuable services throughout the war of the Revolution. Died Aug. 19, 1780, from the results of a wound received at the battle of Camden.

DELABEC'LEA, a genus of north-eastern Australian trees belonging to the natural order *Sterculaceæ*. *D. rupestris* is the bottle-tree, so called on account of the middle of the trunk being bulged out like a barrel. It yields a mucilaginous gum like gum-tragacanth, which is nutritious, and used by the aborigines in times of scarcity. The wood is remarkably loose in texture.

DELAWARE, in Delaware Co., O., on the Olentangy River. Several railroads pass through the town and it carries on a large trade with the surrounding country. It contains the Ohio Wesleyan University and the Wesleyan Female College. It is engaged in the manufacture of hemp, jute, woollen goods, agricultural implements, wagons, and cigars. Pop. 6894.

DELPHOS, a town of Van Wert Co., O., 90 miles from Toledo, on the Miami & Erie Canal. It is a railroad center; has fine water power, which is employed in manufacturing; and is surrounded by a fine agricultural district. Pop. 5000.

DEMET'RIUS, the name of three kings of Syria.—1. D. SOTER, grandson of Antiochus the Great, spent his early years at Rome as a hostage, whence he fled, partly through the help of Polybius, when twenty-three years old, and established himself on the throne of Syria. He conciliated the senate and secured his recognition as king, but acted so despotically towards his neighbors, that the Jews under Judas Maccabæus took up arms and defeated his general. D. fell in battle (B.C. 150) against an impostor named Balas, whose claims were supported by the Romans, the Jews, and Attalus, King of Pergamus.—2. D. DICATOR, son of the preceding, after remaining in exile for some years, recovered the kingdom from Balas by the assistance of Ptolemy Philometer, but the infant son of Balas being set up as a pretender against him, D. lost Antioch and a great part of Syria, and withdrew to Babylon. His army was soon after destroyed by the Parthians, and himself taken prisoner (B.C. 138). After a captivity of ten years he was re-established on the throne, but his soldiers and subjects having become disaffected, he was assassinated at Tyre, B.C. 125.—3. D. EUCÆRUS, grandson of the preceding, held with his brother for a time the whole of Syria. War, however, broke out between the

brothers, and Philip, having blockaded D. in his camp compelled him to surrender at discretion. He remained in honorable captivity with Mithridates, King of Parthia, until his death. His coins bear date from 218 to 224 of the era of the Seleucidæ, *i.e.*, from 94 to 88 B.C.

DEM'ODEX, a peculiar genus of mites (*Acarina*), represented by the species *D. folliculorum*, which inhabits the sebaceous follicles of the human skin, especially near the nose. This parasite is of minute size and thoroughly harmless.

DENDROGRAP'SUS, an important fossil genus of *Hydrozoa* or Zoophytes, exclusively found in the Upper Cambrian and Lower Silurian rocks. The species of this genus have been referred by palæontologists to the modern order of the *Sertularidæ*, or 'sea-firs,' as well as to the extinct order of the *Graptolitidæ*, or Graptolites. *D. Hallianus* is a familiar species, and exists in the form of a plant-like organism, springing from a stout footstalk, which was probably attached to some fixed object, like our modern zoophytes. The branches bear on one side a series of cups or *cellules*, resembling the 'thecæ' of living sea-firs, each of which cups must have contained a little *polypite*, or single member of the zoophytic colony. In D. the cups, like those of graptolites, partially overlap each other.

DENDROPHYLL'IA, a genus of compound *Sclerodermic* corals belonging to the *Zoantharia Sclerodermata*, and ranked among the 'deep-sea' corals and reef-building forms. The species of D. derive their name from their branching tree-like shape. *D. nigrescens* is a familiar species. It is regularly branched, possesses deep cells, and the tentacles of the polypes are cleft or divided in a longitudinal manner. It is found in the tropical seas.

DENEB', a brilliant star of the first magnitude, in constellation Cygnus, forming with Vega and Polaris an evident right-angled triangle. Near it is the small double star 61 Cygni, interesting as having a large proper motion, and being one of the nearest stars to our system—according to Bessel 650,000 times more distant than the sun is from the earth.

DENISON UNIVERSITY, established by the Baptists, at Granville, O., in 1831. It was originally known as Granville College, but the name was changed to that which it now bears in 1845. It has valuable buildings, and maintains a preparatory department and classical and scientific courses.

DEN'IZEN (Old Fr. *deinzein*, one who is *deins;* Mod. Fr. *dans;* Lat. *de intus*, 'from within,' i. e., 'the city') is an alien born who has obtained letters of denization, which entitle to purchase and transmit lands, though not to inherit them. The right to grant letters of denization is a prerogative of the crown.

DENTA'TUS MANI'US, according to some MARCUS CURIUS, the most famous of the Curii, was said to have derived his surname of D. from having been born with teeth. He was of Sabine descent. After holding the office of tribune of the people, he was elected consul in 290 B.C., and compelled the Samnites to sue for peace after they had waged war against Rome for forty-nine years. Immediately after he subdued the Sabines, and thus celebrated two triumphs in his first consulship. In his second consulship (B.C. 275), D. defeated Pyrrhus, King of Epirus, near Beneventum, as he was returning from Sicily, and obliged him to quit Italy. His triumph was distinguished by four elephants, the first ever seen at Rome. The booty taken from Pyrrhus was wholly given up to the republic. Elected consul for a third time (274 B.C.), he brought the final war with the southern Italians to a successful issue. In B.C. 272, during his censorship, D. built an aqueduct which brought the water of the Arno into Rome. He also dug a canal, by which the waters of Lake Velinus were precipitated into the river Nar from a height of 140 feet. This is the famous Caseata del Marmore, which inspired the splendid stanzas of Byron (*Childe Harold*, Can. iv. st. 69–72). He then retired to his Sabine farm, to devote the rest of his life to agriculture. D. is the type of the old Roman simplicity and valor, and many anecdotes finely flavored with a spirited patriotism and unselfish honor are recorded of him.

DESCHAM'PS, EUSTACHE, a French poet, was born at Vertus, in Champagne, about 1340. He studied at Orleans University, traveled into Italy, Germany, and Hungary, and, according to his own statement, was for some time captive among the Saracens. He was a great court favorite, but always poor, and his property in Champagne was pillaged by the English, whom he heartily abuses in his ballads. He died about 1409. 'He is,' says Besant, 'the most *real* French poet of his century.' His works, comprising 90,000 verses, display grim humor and fierce satiric energy, and give a valuable picture of his times. He resembles Jean de Meun, from whom he occasionally borrows. Professor Morley suggests that Chaucer may have taken the idea of the *Flower and the Leaf* from one of D.'s ballads. See *Poésies Morales de D.*, edited by M. Crapelet (Par. 1832), Besant's *French Humorists* (Bentley, 1873) and *Early French Poets*, and Gidel's *Histoire de la Literature Française* (Par. 1875).

DES MOINES, a city of Polk Co., Iowa, and the capital of that state. It is situated on the Des Moines River, and is about 357 miles W. of Chicago. The state capital was removed here in 1855, and a new state house has been erected at a cost of over $3,000,000. Here are also located the state arsenal, and the state library. It has numerous churches, several daily and weekly papers, well-equipped public schools, and an abundant water supply by means of the Holly system. There are large manufactories, and extensive coal mines are worked. Pop. in 1860, 3965; in 1870, 12,035; present pop. 22,408.

DESTRUC'TION OF REC'ORDS, WILLS, AND WRITINGS. In England, by 24 and 25 Vict. cap. 96, if any person steal, or for any fraudulent purpose take away or injure any writing belonging to any public office, or belonging to any civil or criminal law process, he is liable to penal servitude for three years. By the same Act any one who fraudulently conceals, cancels, or destroys any testamentary writing is guilty of felony, and liable to penal servitude for life.

DETAIN'ER, in English law, the name of a writ which lay against prisoners in the Marshalsea or Fleet Prison, directed to the marshal or the warden, directing him to detain the prisoner until lawfully discharged.

DEVIA'TION OF A SHIP. Under the contract of affreightment, if a vessel be compelled by weather, by an enemy, or by accident, to deviate from the appointed line of voyage, no claim arises to the freighter against the owners; and it is now held that the master may detain the cargo, though formerly the rule was that he was bound to forward it in another ship. An unnecessary D., being an alteration of risk, discharges the underwriter. The *onus probandi* lies on the person alleging D.

DEWEY, ORVILLE, D.D., LL.D., a distinguished American Unitarian minister, born at Sheffield, Mass., March 28, 1794, and graduated from Williams College in 1814. He assisted Dr. Channing for two years, and afterwards preached in New Bedford, and then in New York city. In 1858 he was called to the pastorate of the New South Church in Boston, Mass. Dr. Dewey was noted for originality of thought and impressive eloquence. Among his works are the following, *The Unitarian Belief* and *The Education of the Human Race*. Died in March, 1882.

DEXTER, HENRY MARTYN, D.D., a distinguished American clergyman of the Congregational Church, born at Plympton, Mass., Aug. 13, 1821, and educated at Yale College and Andover Seminary. After filling pastorates at Manchester, N. H., and Boston, Mass., he became, in 1867, editor-in-chief of the *Congregationalist*. He has published several works, the best known of which, is, perhaps, his *History of the Congregationalism of the Last Three Hundred Years, as seen in its Literature*. This work is a standard authority on Congregationalism. D. is a scholar of broad attainments, and has been a critical student of the workings and history of the Congregational polity.

DEYSTER, LOUIS DE, a Flemish painter, born at Bruges in 1656. He studied under Jean Maas, resided for six years in Rome, and also for some time in Venice, after which he returned to his native place. Of a deeply religious disposition, he rarely went into society, and somewhat of the gloom of his life is reflected in his works. Of these, the principal are 'The Death of the Virgin,' 'The Resurrection of Christ,' 'The Appearance of Christ to the Three Marys,' and the 'History of Judith,' in several parts. His manner is bold and large, evincing a strong Italian taste, while his color is bright, warm, and pure. To give prominent effect to the work, on the chief parts of his subject, he occasionally slurs and sacrifices the setting. In later life D. abandoned his art for music. He died at Bruges in 1711. His daughter ANNIE D. (died 1746), won considerable reputation both in music and painting. She wrote a Life of her father. See Deschamps, *Vies des Peintres Flamands*, vol. iii.

DIANA MONKEY (*Cercopithécus Diana*), a species of Catarhine monkeys, found in Guinea, Congo, and other parts of Africa, and attaining a length of about 4½ feet. It is distinguished by a long white beard, and by a crescentic white line on the forehead. The fur is generally chestnut, the lower parts being bright orange. The hands are black. The D. is intelligent and of cleanly habits.

DIAPEDE'SIS (Gr. 'a leaping through'). Under certain abnormal conditions, both red and colorless corpuscles of the blood may leave the blood-vessels without rupture of their walls. This is D. The red corpuscles sometimes escape during venous congestion, when, in consequence of the high pressure, the plasma is first squeezed out, and afterwards the red corpuscles. The colorless corpuscles leave the vessels by virtue of their power of amœboid movement in inflammation. When the web or mesentery of a frog is seen under the microscope in a state of inflammation, the colorless corpuscles may be observed clinging to the walls of the vessels, and actually passing through these into the surrounding tissues. The conditions seem to be sufficient slowness of the blood

stream, and a peculiar adhesiveness of the colorless corpuscles, the result of inflammation.

DIAPHAN'OSCOPE (Gr. *diaphanos*, 'transparent,' and *skopeo*, 'I see'), a box, with or without a lens, for exhibiting transparent photographs or other pictures. It is frequently combined with a Stereoscope.

DIARTHRO'SIS, a term used in anatomy to denote a particular form of joint, such as that of the elbow. Here we have plates of cartilage covering the articular surfaces of the bones. The joint is lined in every part by a membrane, termed a *synovial* membrane, which secretes a fluid which lubricates the joint. The bones are held together by strong fibrous ligaments, constituting membranous capsules, bands, or cords; and they are likewise kept in apposition by the tension of surrounding muscles and by the pressure of the atmosphere.

DIAS'TOLE is dilatation of the heart and arteries when the blood enters their cavities. It is the opposite to *systole*, when the heart and arteries contract to send forth the blood. See HEART.

DIBRANCHIA'TA (Gr. 'two-gilled'), the name applied to an order of Cuttlefish distinguished by the possession of two branchiæ or gills, and not more than eight or ten arms; by the arms being provided with suckers; by the presence of an inksac, and by the shell being internal, or, if external, not chambered. In this order are the paper nautilus or *Argonaut*, the *Octopi* or *Poulpes*, the *Squids*. *Spirula*, the extinct *Belemnites*, &c. The companion order, *Tetrabranchiata*, is represented by the pearly nautilus alone.

DICEN'TRA, a genus of Fumariaceous plants (the *Diclytra* or *Dielytra* of De Candolle). *D. Cucullaria* is the 'Dutchman's Breeches' of the United States; *D. Canadensis*, the squirrel-corn; *D. farinosa*, a species from Virginia and N. Carolina, much cultivated in our gardens; but the best-known species is *D. spectabilis* of Northern China and Siberia, one of the most beautiful of the genus, introduced into Britain in 1846. It can be grown in the open air, but requires the protection of the house in most situations before it can attain to full perfection. It is one of the favorite plants of the Chinese.

DICKINSON, ANNA ELIZABETH, an American social reformer, born at Philadelphia, Pa., Oct. 28, 1842. Her parents belonged to the Society of Friends and she received her education in the schools of that sect. In 1860 she appeared before the public as an advocate of women's rights, and soon acquired distinction by the grace and eloquence of her oratory. During the war she delivered many patriotic addresses, and since then has delivered many lectures and addresses on social themes. She has recently appeared upon the stage, but failed to meet with success.

DICKINSON, DANIEL STEVENS, LL.D., an eminent American lawyer and statesman, born at Goshen, Conn., Sept. 11, 1800, and entered the legal profession. In 1842 he was elected lieutenant-governor of the State of New York by the Democratic party; and in 1844 was elected U. S. Senator. After his retirement from the Senate he settled at Binghampton, N. Y., where he resumed the practice of law, and in 1861 was elected attorney-general of that state. During the civil war he was an ardent supporter of the Union cause. Died April 12, 1866.

DICKINSON COLLEGE, an educational institution, at Carlisle, Pa., established in 1783. It was named in honor of Hon. John Dickinson, who gave liberally towards its endowment. At first it was controlled by the Presbyterians, but in 1833, owing to the division of that church into the Old and New Schools, it was transferred to the Methodists, who still control its affairs. It has superior buildings and an excellent library.

DICK'SON, DAVID, a noble Scottish divine, born in 1583, at Glasgow, was minister of Irvine from 1618 to 1641, when he was elected Professor of Divinity in his native town; helped to draw up the Confession of Faith, and was ejected from the Church for nonconformity in 1662, the year of his death. D.'s works comprise commentaries on Hebrews, Matthew and the Psalms, *Therapeutica Sacra*, and a *Treatise on the Promises*.

DICKSO'NIA, a genus of Ferns, mostly arborescent. The silky hairs from the caudex of *D. Culcita* of Madeira and of *D. chrysotricha* of Java are used in Holland and Germany as a styptic, and for stuffing beds, cushions, &c. The hairs of the latter species is imported under the name of *Pakoe Kidang*. *D. antarctica* of Australia is now a common ornament of our greenhouses, while others are found in Juan Fernandez, Brazil, St. Helena, Columbia, and Java.

DIC'TYS CRETEN'SIS, the alleged author of a Latin history of the Trojan war, which differs widely from Homer, chiefly in excluding all supernatural agency. It is asserted in the preface that the original was composed by D. of Cnossus, who accompanied Idomeneus to the Trojan war, that it was buried in the author's grave till exhumed by an earthquake in the time of Nero, that it was then brought to Rome by one Eupraxis and translated into Greek, from which Greek translation the Latin version was made by Q. Septimius Romanus. All that is actually known about it is, that a Greek work under the name of D. is frequently quoted by the Byzantine writers, which was probably written in Greek about the time of Nero, and afterwards translated into Latin. The chief literary value of the work consists in its being the principal channel through which the legendary lore of Greece flowed into the romances of the middle ages, passing thence into popular tales and ballads. D. is generally printed along with Dares (q. v.). The best edition is that by Diederich (Bonn, 1837).

DIDO, the name of a beautiful genus of *Lepidoptera* or Butterflies, belonging to the family *Nymphalidæ* of that order, and found in Brazil and Guiana. The wings are blackish-brown above, with markings of pale-green, whilst the under surface is chocolate colored, with green patches bordered with silvery white. The caterpillars are green, with red and white stripes. The wings in the D. (*Cethosia D.*) have a stretch of 4 or 5 inches.

DIELEC'TRIC, the name given by Faraday to the medium which separates two conductors of electricity, and through which induction acts. Faraday discovered that the charge induced upon a conductor, placed at a given distance from a charged conductor, varied with the D. employed, being dependent upon what he termed the specific inductive capacity of the D. He was thus led to the conception of the theory of action through a medium. Specific inductive capacity is the induction across any surface due to unit normal charge, and is therefore unity for air, since in this case the induction is equal to the charge. A complete discussion of the theory of the D. and of action through a medium will be found in Clerk Maxwell's *Electricity and Magnetism* (2 vols., Clarendon Press, Oxf. 1873).

DIG'BY, a seaport in the Dominion of Canada, province of Nova Scotia, on the Bay of Fundy. It has an active industry in the curing of pilchards, which are prized on account of their flavor, and are known as *Digbies* in the fish trade. There are also valuable herring and mackerel fisheries, and some shipbuilding and lumbering. Pop. (1871) 1300.

DI'GEST, the name given to the Pandects of the civil or Roman law, as containing *Legalia præcepta excellenter digesta*.

DILKE, CHARLES WENTWORTH, a well-known English critic and journalist, was born 8th December 1789, served in the Navy Pay-Office, took to literature, contributed to the *Westminster Review*, &c., became (1830) editor and proprietor of the *Athanæum*, and established the *Daily News* in 1846. He edited *Old English Plays* (6 vols. Lond. 1814), wrote ably on Junius and other curious questions of literary history, and died at Alice Holt, Hampshire, 10th August 1864. See *The Papers of a Critic, Selected from the Writings of the late C. W. D., with a Biographical Sketch by his Grandson* (2 vols. Murray, 1875), containing original letters from Charles Lamb, Keats, Hood, Haydon, Lord Lytton, Dickens, Savage Landor, &c.—SIR CHARLES WENTWORTH D., eldest son of the former, was born in London, 18th February 1810, studied at Westminster School and Cambridge, and was one of the active originators of the Industrial Exhibition of 1851. A member of the Society of Arts from 1844, he received a baronetcy in 1862. He died at St. Petersburg, 11th May 1869.—His son, SIR CHARLES WENTWORTH D., was born at Chelsea, September 4, 1843, graduated at Cambridge in 1866, and traveled round the world, giving his experiences in *Greater Britain, a Record of Travel in English-Speaking Countries* (2 vols. 1868), in which he traces the influence of race on government, and of climate upon race. D. was elected member of Parliament for Chelsea in 1868, and was re-elected in 1880, when he was appointed Under Secretary of Foreign Affairs in Mr. Gladstone's ministry.

DILOLO, LAKE, in the interior of S. Africa, Muati Janvo's kingdom, 475 miles W. of Bangweolo, is an expansion of the Leeba, a branch of the Zambesi, and is 10 miles long, and has an extreme breadth of 4 miles. It was discovered by Livingstone in 1856. See his *Missionary Travels and Researches in South Africa* (new ed. Lond. 1875).

DIMOR'PHISM. Of late years, chiefly owing to the observations of Charles Darwin, it has been discovered that in several plants belonging to different orders two forms are found, the one form having long stamens and a short pistil, the other a long pistil and short stamens, and with different-sized pollen grains, but differing in no appreciable way. Such plants are called *Dimorphic*. The common primrose is an example. These two forms act towards each other almost exactly as if they were separate species, instead of merely forms of the same species, with no difference appreciable to the ordinary observer. In such a case, the pollen of the long stamened form must be carried attached to the bodies of insects to fertilize the long pistiled form, and that of the short-stamened form to fertilize the short-pistiled form; otherwise it acts like so much inert dust. The object of this and similar arrangements for cross fertilization seems to be to prevent too close interbreeding.

DING'ELSTEDT, Franz von, a German poet and novelist, born 30th June 1814, at Halsdorf near Marburg, studied at Marburg, and was for some time teacher in the Gymnasium at Fulda. In 1843 he was appointed librarian and reader to the King of Würtemberg, in 1850 manager of the Court Theater at Munich, in 1857 general superintendent of the same at Weimar, in 1867 director of the Court Opera at Vienna, and in 1871 of the City Theater there. D.'s chief works are *Lieder eines Kosmopolit. Nachtwächters* (1840), *Gedichte* (2d ed. 1858), *Nacht und Morgen, Neue Zeitgedichte* (1851), the novels *Heptameron* (2 vols. 1841), *Unter den Erde* (1840), *Novellenbuch* (1850), *Die Amazone* (1868), the tragedy *Das Haus des Barneveldt* (1850), *Studien und Kopien nach Shakespeare* (1857), and translations of several plays of the great English dramatist. Delicacy of sentiment, pictorial beauty, and epigrammatic terseness of reflection are D.'s most conspicuous merits.

DIN'KA, a pastoral people of Central Africa, in the Upper Nile district, to the S. of the confluence of the Bahr-el-Ghazal and the White Nile, and occupying an area of from 60,000 to 70,000 sq. miles. They are one of the most extensive and unique of African races, peculiar alike for their cleanliness, their civilized tastes and pursuits, and their ferocity in war. Very dark in color, they are taller than the English, and have thick lips, contorted features, and shallow foreheads. Their hair is cut short, and is adorned with ostrich feathers, in imitation of the heron. No covering is worn except by the women, who are scrupulously clad, and who wear heavy iron rings on their wrists and ankles. Both sexes break off the lower incisors, a practice that renders their language inarticulate. The dwellings of the D. are conical, well-built huts, and are scattered in clusters over the cultivated plains. Nearly the whole of their vast territory is a steppe of dark alluvial clay, unbroken by a single hill, mass of rock, or large tract of forest. Of the cultivated plants the chief are sorghum, penicillaria, beans, earth-nuts (*archis*), earth-peas, sesame, yams, and Virginian tobacco. The domestic animals are the ox (of the zebu race), the sheep, goat, and dog. A village of a few huts has seldom less than 2000, and sometimes as many as 10,000 cattle. An estimate of the total number of cattle gives three for each inhabitant. The ox, which is never killed, is the object of exclusive, almost religious care. Whatever of religion the D. has, centers in an institution called the Cogyoor, which embraces a society of necromancers and jugglers. There is much tribal disturbance. Since about 1855 the various efforts of the Khartum slave-dealers to subdue the Dinkas have completely failed, and it is even at some risk that parties venture through their territory to reach Bongo, Niam-Niam, Mittu, &c. All the early captives taken to Egypt were converted into soldiers, and still form a conspicuous element in the ranks. See Dr. Schweinfurth's *Heart of Africa* (2 vols. Lond. 1873).

DIN'MONT, the name given in Scotland to a wether or gelded hogg after its first fleece has been cut.

DIONYSIUS, surnamed PERIEGE'TES, from his being the author of a *periegesis* (Gr. 'geographical description of the earth') in Greek hexameters, was a native of Africa, and lived probably in the latter part of the 3d or beginning of the 4th c. His work, which is still extant, is written tersely, and was translated into Latin by Rufus Festus Avienus, and also by the grammarian Priscian. There still exist a commentary upon it by Eustathius, and a Greek paraphrase and Scholia. The *editio princeps* appeared at Ferrara in 1512, with a Latin translation. It was also printed at Venice by A. Manutius in 1513, but the best edition is that of G. Bernhardy (Leips. 1828).

DIONYSIUS THRAX, or the Thracian, was a celebrated Greek grammarian, who taught at Rome about B.C. 80. He is remembered for the merit of his grammatical works, and for his explanations and criticism of Homer. His grammatical treatise was used in schools for many centuries.

DIOSCOR'IDES, the author of thirty-nine epigrams in the Greek Anthology, is thought to have lived in Egypt in the time of Ptolemy Euergetes. His epigrams, chiefly on the ancient poets, were included in Meleager's *Garland*.

DIPH'YES, a beautiful genus of oceanic *Hydrozoa*, or Zoophytes, belonging to the order *Calycophoridæ*, and consisting of a delicate thread-like *cœnosarc* or connecting medium, bearing the various polypites, or individual animals of which this compound organism is composed. At its proximal end the cœnosarc expands to form two mitre-shaped *Nectocalyces*, or 'swimming-bells,' by means of which the organism is supported in the water. Each of the polypites is protected by a glassy 'bract,' or hydrophyllium. *D. appendiculata* is a familiar species of this genus of *Calycophoridæ*, and occurs in the Mediterranean and warm seas.

DIP'LOE, the cellular bony structure between the two plates or tables forming the flat bones of the skull. These cells are filled with a reddish pulpy substance, similar, when examined microscopically, to the marrow of bones.

DIPLOGLOSS'US, a genus of *Lacertilia*, or Lizards, found in Cuba. The color of the best-known species (*D. sagræ*) is grey with bronze tints, whilst a black streak marks each side. The D. is an active little creature, and inhabits dry localities.

DIP'TERYX, a genus of Leguminous plants. The seeds of *D. odorata* of Guiana, owing to the presence of Coumarine, are very pleasantly scented, and under the name of *Tonquin, Tonga*, or Itonka beans, are used for perfuming snuff, &c. The Eboe nuts of the Mosquito Coast (*D. Eboensis*) are also fragrant, and yield a fatty oil much used for anointing the hair of the natives. The timber is heavy and yellow colored.

DIS'CINA, a typical genus of Brachiopodous mollusca, represented by living forms, and also by fossil species, which begin in the Silurian period. The family *Discinidæ* is recognized by the shells being attached to fixed objects by a fleshy stalk or pedmncle, which passes through the ventral valve. The characteristic arms of the *Brachiopoda* are fleshy in *Discinidæ*, and the valves or halves of the shell are not articulated by any distinct hinge. The shell in D. is circular, its upper valve being limpet-shaped, the lower valve being flat or convex. *D. circe*, and *D. pelopæa* are well-known fossil species from Silurian rocks.

DISCIPLES OF CHRIST, also known as Campbellites, and calling themselves Christians. This Christian sect was founded through the labors of Alexander Campbell and his father, Thomas Campbell, in the U. S. in the beginning of the present century. Originally in fellowship with the Baptists, they ultimately (1827) became a separate denomination. They agree with the Baptists in many respects, and although rejecting the Trinitarian terminology, are evangelical in their conceptions of Christ's person and work. They are numerous in the central parts of the U. S., and have several educational institutions under their control.

DISCLAIM'ER, in English law, is a plea of denial or of renunciation.

DISCLAMA'TION, in Scotch law, signifies the disavowal by a vassal of some one who is, or claims to be, his superior. The penalty of D. on frivolous grounds is forfeiture of the fee. But any reasonable excuse will exempt the vassal from the penalty.

DISCOPH'ORA (Gr. 'disc-bearers'), a name given in modern zoology to a subclass of Hydrozoa, represented by the true *Medusidæ*, or sea-bubblers and jelly-fishes. These organisms may be defined as possessing a free, oceanic body (*hydrosoma*), consisting of a single *nectocalyx*, or swimming-bell, from the roof of which a single zoöid or *polypite* hangs. A system of canals runs through the swimming-bell. Many forms at one time regarded as *Medusæ* are now known to be merely the free-swimming reproductive bodies of zoophytes.

DISCRE'TION. According to English law, if an agent or trustee is instructed to act according to his D., he must act according to law and reason. The law of Scotland recognizes the same rule, as does also American law.

DIS'CUS PROLIGERUS, a small heap of granular cells found within a graafian vesicle, and on which the ovum rests.

DISDIACLASTS, minute doubly-refracting molecules, which, according to Brücke, form part of the ultimate structure of muscle.

DISEASE, Acts Respecting. By 29 and 30 Vict. c. 35, and 32 and 33 Vict. c. 96, provision is made for the prevention of contagious D. in certain towns which are military stations. By the Sewage Utilization Act, the sewer authorities in England are in boroughs the municipal corporation; in other towns, those intrusted with cleansing or paving. Several amending Acts have been passed. By the Sanitary Act of 1866, a house-owner may be called on to remedy deficient draining within reasonable time. If water supply is inadequate, the authorities may dig wells, make reservoirs, &c. The Act defines a *Nuisance*, and provides against infection. Cattle-plague is dealt with by the last Act. Cattle may be slaughtered to ascertain the nature of a D. No animal is to be moved alive from any infected place. Local authorities are to appoint an inspector, who, when plague is found to exist, is to make an official declaration of the place infected. In America, nearly every city and town has its Board of Health or health officers, to whose charge the enforcement of sanitary ordinances is committed, and special study is being everywhere devoted to sanitary affairs.

DISIN"TEGRATOR, a machine for pulverizing, or disintegrating various soft or hard materials. The patent D. of Mr. Thomas Carr, Montpelier, Bristol, held in much favor for breaking up ores, rock, asphalt, artificial manures, peat, fireclays, oilcake, also for mixing moist sugars, the ingredients of mortar, &c., is here described. It consists of a pair of circular metal discs, fixed to two separate shafts on one side of the machine, the shaft of the right-hand disc working through the tubular shaft of the left-hand one without touching it; an arrangement which leaves the hopper, by which the machine is fed with materials, unob-

structed with driving-belts. The inside faces of the discs are studded with four concentric rings, or cagers, of very strong projecting bars, or beaters, the rings of beaters in one disc occupy the opposite alternate interstices of the other, and the discs are driven in opposite directions at a high speed, varying from 350 to 500 revolutions per minute. The material to be ground being introduced through the hopper, is beaten, in its passage through the machine, with great violence by the beaters of the successive cages revolving in opposite directions, so that disintegration is thoroughly effected before the particles reach the end of their zigzag course to the circumference of the discs. A mineral D., 4½ feet in diameter, can pulverize from 5 to 15 tons of material per hour, according to the hardness of the material and the degree of fineness required. The disintegrating flourmill of the same inventor has a similar construction, and its efficiency may be judged from the fact that one seven feet in diameter produces as much flour, of a superior quality, as thirty pairs of millstones, and at a less cost.

DITTELASMA, a genus of *Sapindaceæ*. The berries of *D.* (*Sapindus*) *Rarak* of the Malay Peninsula and S. China have marked saponaceous properties, 'making a lather even with salt water; used as a lotion, they are useful in skin-diseases, and when eaten produce giddiness.'

DIX, John Adams, LL.D., an American statesman, born at Boscawen, N. H., July 24, 1798, and in 1812 entered the army, but soon afterwards resigned, studied law, and settled at Cooperstown, N. Y. In 1833 he was elected secretary-of-state by the Democratic party, and in 1845 was chosen U. S. Senator. For a short time in 1861 he was secretary of the treasury of the United States, and while holding this position issued the frequently quoted order: 'If any man attempts to haul down the American flag, shoot him on the spot.' He served during the civil war with the rank of major-general, was minister to France in 1867–68, and was elected governor of New York in 1872 by the Republican party. Died April 21, 1879.

DIX, Morgan, S.T.D., son of John A., a distinguished American clergyman of the P. E. Church, born in New York, Nov. 1, 1827, and educated at Columbia College and the general theological seminary of the P. E. Church. In 1862, he was made rector of Trinity Church, New York, which position he still holds (1885). He has published several commentaries and numerous essays and sermons.

DOANE, George Washington, D.D., LL.D., born at Trenton, N. J., May 27, 1799; entered the ministry of the Protestant Episcopal Church, and, in 1832, was made Bishop of New Jersey. Died April 27, 1859.—His son, William C., was made Bishop of Albany in 1869.

DOCKING HORSES. When young work-horses are sent to grass, they are docked, *i. e.*, six joints of their tails are amputated, the object being to keep the naturally long tails from being incommoded in the trams of a cart. The cutting is accomplished by aid of a machine similar in form to a pair of nutcrackers.

DODD, Charles, the assumed name of Hugh Tootel, an English Roman Catholic historian, who was born near Preston 1672, studied at Douay and at St. Gregory's, Paris, entered the priesthood, and settled (1697) as a preachor in Lancashire. He wrote a *Church History of England from* 1500 *to* 1688, which contains much curious and valuable information drawn from original papers, letters, &c. This work was published in Brussels in 3 vols. folio (1737–39–42), and a new and corrected edition was begun by the late M. A. Tierney, but only five vols. appeared (1839–43). D. wrote many other works. He died February 27, 1742–43.

DODD'ED CAT'TLE are animals without horns. The name is also given to cattle which, naturally having horns, have had them cut off to prevent them goring their neighbors in the field or fold.

DODGE, Mary Abigail (better known as Gail Hamilton), a popular American writer, born at Hamilton, Mass., in 1830. She was for some time engaged in teaching, but of late years has devoted her time entirely to literary work. She has published *Woman's Worth and Worthlessness; Country Living and Country Thinking; The Battle of the Books;* and other works.

DODGE, William Earl, born at Hartford, Conn., Sept. 4, 1805. He removed to New York, where he became a successful merchant. He was a public-spirited citizen, interested himself in all the philanthropic movements of the day, and gave liberally in the cause of charity. Died Feb. 9, 1883.

DOL'ERITE, a term given by geologists to a group of igneous rocks of a dark green or gray color, and composed of felspar (triclinic) with magnetic iron and olivine. The typical D. is a 'crystalline-granular mixture of labradorite and angite with magnetic iron.' It often contains small quantities of the carbonates of iron and lime.

DOLICHOCEPH'ALIC, a term first introduced by Retzius to denote human skulls which are much elongated from before backwards, as distinguished from those termed *brachycephalic*, which have nearly as great breadth as they have length.

DON, an Italian and Spanish contraction of the Lat. *dominus*, 'lord' or 'master.' The Portuguese form is *dom*, the Old Eng. *dan* or *daun*. In Spain and Portugal the word is applied as a title to all persons of noble birth, including kings and princes, but it is also bestowed in courtesy on those who are not grandees. The Latin form was originally assumed by the popes, and descended from them to all ecclesiastics and scholars. Hence the 'dons' of English colleges, and the 'dans' of old English poetry.—*Dan* Chaucer, *Dan* Lydgate, &c. Tennyson has restored the word to modern English in his *Dream of Fair Women*.

DON'DA-NDU'GU (Kisuaheli, from *donda*, 'ulcer,' and *nduga*, 'brother' = brother-ulcer), a peculiar form of ulceration, confined to the lower extremities, endemic in Zanzibar and Eastern Africa. This formidable disease is common in inter-tropical Africa, more especially after the rainy seasons, and it probably depends on the development of larvæ from eggs deposited by some species of insect. The ulcer is always situated on those parts exposed while the natives are traveling, with bare feet and legs, through mud and water, and most generally on the shin-bones, the gastrocnemius muscle or its insertion, the instep, and the toes. On the first appearance of the disease there is not, generally, very severe pain; the skin is smooth and glazed, and the sub-lying tissues have a boggy feeling, and not fluctuating as in abscess; in the center there is a small spot, like an abraded pimple, exuding a little serous matter. An incision made at this stage reveals an extensive, deep-seated, slough; but if left to itself the glazed skin soon separates as a slough. In severe cases the sloughing proceeds with great rapidity; tendons are laid bare, and the bone is denuded of periosteum; joints are opened, and the toes or foot may be separated from the limb. The disease is of the most loathsome description, both in appearance and odor; it is very fatal, and those who recover are generally permanently lamed. Death results from purulent absorption, from extreme exhaustion, and occasionally from hæmorrhage. This disease seems to be allied to the ulcer Yemenensis, common in Arabia. The late Dr. Livingstone was confined to his hut at Bambarré, in Central Africa, for eighty days with this disease. The antiseptic is the only mode of treatment of any avail. The disease was first described by Dr. Christie (*Chotera Epidemics in E. Africa*, Macmillan, 1876).

DONELSON, Fort, a strong fortification, two miles below Dover, on the W. bank of the Cumberland River. It was erected by the Confederates shortly after the outbreak of the civil war. On Feb. 16, 1862, it was surrendered by Gen. Buckner, in command, to Gen. U. S. Grant, together with 8000 prisoners of war.

DONK'EY ENGINE, a small auxiliary engine used on board ship for filling up the boilers and doing other work when the main engines are not in motion.

DO'RA D'IS'TRIA, the pseudonym of Helena Ghika, Princess Koltzoff-Massalsky, a Wallachian authoress, born of a noble family at Bucharest, January 22, 1829. Her early studies and travels made her an accomplished linguist, and at the age of fifteen she undertook to translate the *Iliad* into German. She composed several dramas when very young; became famous for her beauty and acquirements; and in 1849 married Prince Koltzoff-Massalsky, whom she accompanied to the Russian court. After further travels she published *La Vie Monastique dans l'Église Orientale* (Paris, 1855), under the pseudonym D. d'I., in allusion to the Ister or Danube. Among her other works are *La Suisse Allemande* (Geneva, 1856); *Gli Eroi della Rumenia* and *I Rumenied il Papato*, both in Italian; *Les Femmes en Orient* (Zurich, 1860); *Des Femmes par une Femme* (1864); *La Vénitienne* (1864); *Au Bord des Lacs Helvétiques* (1864), &c. Her works are pervaded by ardent love of freedom and Christianity. She has produced numerous articles in French, Italian, and German journals, has attempted painting with success, and been chosen a member of learned societies which had never before admitted a woman.

DOR'ISLAUS, Isaac, a Dutchman who removed to England in the early part of the 17th c., and was made lecturer on history in Cambridge University by Fulke Lord Brooke in the beginning of the reign of Charles I. He lost this post for his avowed republicanism, became judge-advocate in the royal army, embraced the cause of the Parliament, helped to draw up the accusation against the king, and was murdered by several exiled royalists, May 2, 1849, at the Hague, where he had been sent as ambassador.

DOUGLAS, Stephen Arnold, an American statesman, was born at Brandon, Vermont, April 23, 1813. He began life as a cabinetmaker, but afterwards studied law and settled in Jacksonville, Illinois, where he was known by the sobriquet of the 'Little Giant.' D. was chosen State Secretary in 1840, a judge in 1841, entered the House of Representatives in 1843 as a Democrat, and was a senator from 1847 to 1861. He advocated *Popular Sover-*

eignty in the Territories, and in 1854 his Kansas and Nebraska Bill, repealing the Missouri Compromise, let loose a torrent of political passion over the whole country. D. was the presidential candidate of the Northern Democrats in 1860, when Lincoln was elected. He died 3d June 1861. D. was idolized as a leader in the Western States. A splendid monument, costing $80.000, was erected to his memory at Chicago, on the banks of Lake Michigan.

DOUGLASS, Frederick, an American orator, was born of a negro mother and white father at Tuckahoe, in Maryland, about 1817. He was a slave, first on a plantation and afterwards in Baltimore, but having taught himself to read and write, escaped from bondage at the age of twenty-one. For a time he worked on the wharfs of New Bedford, Mass., but soon attracting notice by his gifts, was employed as an agent of the Anti-Slavery Society. In 1845 he published his *Autobiography*, and soon after visited England, where the thrilling story of his life, and his manly oratory, excited much sympathy. For some years he was editor of a paper in Rochester, N. Y., and in 1855 wrote *My Bondage and Freedom*. In 1870 D. became an editor in Washington, and in 1872 was the first in the list of presidential electors chosen by the Republicans of New York State.

DOVER, the capital of Delaware, U. S., is situated on a rising ground, 5 miles W. of Delaware Bay, and 65 miles S.S.E. of Philadelphia by railway. It has a handsome state-house, a library of 30,000 volumes, and six churches, while the streets run at right angles, and are lit with gas. There are large steam flour and saw mills, and a trade chiefly with Philadelphia in flour and fruit. Pop. (1880) 2811.

DOW, Lorenzo, a zealous, but eccentric American preacher, born in Coventry, Conn., Oct. 16, 1777. He entered the ministry of the Methodist Church, and, although a man of but limited education, preached with an eloquence which everywhere drew large congregations. He twice visited England and Ireland. Among his writings are the *History of a Cosmopolite; A Short Account of a Long Travel;* and *The Stranger in Charleston, or the Trial and Confession of Lorenzo Dow.* Died Feb. 2, 1834.

DOW, Neal, an American temperance reformer, born at Portland, Me., in 1803. While a member of the legislature (1851) of his native state, he was instrumental in securing the passage of the 'Maine Law,' a strict enactment, prohibiting the sale of ardent liquors. He served in the Union army during the civil war, with the rank of brigadier-general.

DOW'LAIS, a town in Glamorganshire, and a station on the Brecon, Merthyr, and Rhymney railways, 1½ miles N.E. of Merthyr Tydvil, is the seat of one of the largest ironworks in the world, the property of the Guest family. These works, which, with the collieries, employ 11,000 men, comprised (1876) 19 blast-furnaces, 140 puddling-furnaces, and 10 rolling-mills, and produce 150,000 tons of iron annually. Steel-making is also extensively carried on by Siemen's and Bessemer's processes. The town has a public library and literary institute. Pop. (1876) 19,000.

DOWN-TREE, a name given in the W. Indies to *Ochroma Lagopus*, one of the *Malvaceæ* (sub-order *Bombaceæ*), the cork-wood of Jamaica, on account of its downy seeds being used to stuff beds, &c.

DRAKE, Joseph Rodman, an American poet, born in New York, N. Y., Aug. 7, 1795. His best known poem is *The American Flag*. He also wrote *The Culprit Fay*. Died Sept. 21, 1820.

DRAVIDIAN LANGUAGES AND PEOPLES. The term D. has been applied by philologists to a group of cognate languages, whose present home is almost entirely confined to the S. of India. The name itself is derived from *Dravira*, the Sanscrit appellation for the Tamil country, the most ancient and powerful of the Southern Indian kingdoms; and the name Tamulian has been sometimes used for the entire group. The D. L., which all conform to a common type, belong to the more highly-developed stage of the so-called Turanian family of speech. They are agglutinative in the fundamental portions of their grammar; but they also exhibit incipient inflections, which can for the most part be reduced to separate words incorporated with the roots. Their alphabet is manifestly derived from some prototype of the Devanágarí character; but it differs from the Sanscrit proper in being rounded rather than angular, and cursive rather than either inscriptional or capital. The D. group of languages, which comprises five chief members, has been subdivided by Professor Wilson into the two following branches:—(1) Telugu, Carnata or Canarese, and Tuluva; (2) Tamil and Malayálam. Telugu is spoken by about 14,000,000 people in the N.E. of the Madras Presidency; this language is the sweetest of the five, but its literature is composed of translations from the Sanscrit. Carnata is spoken in the Carnatic and the State of Mysore by about 5,000,000; its literature, though recent, is partly original. Tuluva, which is largely mixed with the Carnata, is spoken by only some 150,000 persons, living on the western coast between Cochin and Goa. Tamil is spoken by about 10.000,000, who live in the tract between Madras city, Cape Comorin, and Mysore; it boasts an indigenous literature, cultivated as early as the 9th c., and the Tamil race is by far the most civilized and energetic of the D. peoples. Malayálam is spoken by about 2,500,000, inhabiting what is known as the Malabar coast, which runs up on the W. from Cape Comorin; nearly two-thirds of this language is said to be of Sanscrit derivation. Besides these five languages, it has lately been discovered that certain barbarous tribes in the middle of the peninsula use dialects which can certainly be referred to a D. type. Among these are the Gondhs of Central India, the Kandhs of Orissa, the Uraons of Chota Nagpore, and the Rajmahalis bordering on the Ganges; these number collectively nearly 3,000,000. It has also been conjectured that other tribes, dwelling as far N. as the slopes of the Eastern Himalayas, are D. in origin, though no longer so in language. It is probable, therefore, that one-sixth of the total population of India is D. See *A Comparative Grammar of the Dravidian and South-Indian Family of Languages* by the Rev. R. Caldwell, LL.D. (2d ed. Lond. Trübner & Co. 1875).

DREW, Daniel, a well known American speculator, born at Carmel, N. Y., in 1797. Beginning life poor, he accumulated a large fortune through steamboat and railroad enterprises. He gave liberally towards the educational institutions of the Methodist Church and in the cause of charity. By a series of unfortunate speculations, he lost his fortune shortly before his death. Died in 1879.

DREW THEOLOGICAL SEMINARY, an institution of the Methodist Church, at Madison, N. J., founded in 1868, and endowed by Daniel Drew, in honor of whom it was named, to the amount of half a million dollars.

DREY'SE, Johann Nicolas von, the inventor of the needle-gun, was born at Sömmerda, near Erfurt, November 22, 1787. From 1809 to 1814 he worked in the imperial armory, Paris. Thenceforth he devoted himself to the manufacture of fire-arms, and in 1827 produced the first model of a needle-gun, an invention which he afterwards developed, and which, in 1840, was adopted in the German army. D. was placed at the head of a large manufactory of fire-arms in Sömmerda, and appointed a privy-councilor. He died December 9, 1867.

DROMATHE'RIUM, an extinct genus of Marsupial mammalia, the remains of which (consisting of the lower jaw) are exceedingly interesting as forming one of the earliest traces of mammalian existence on our globe. The D. remains occur in the Triassic rocks of N. America. D. was a mammal of small size, and appears to have been very nearly related to the little *Myrmecobius fasciatus*, or banded ant-eater of New South Wales. *D. sylvestre* is the name which has been given to the D. remains. The lower jaw contains 'ten small molars in a continuous series, one canine, and three conical incisors—the latter being divided by short intervals' (Owen).

DRONE-FLY (*Eristalis tenax*), a genus of *Diptera* or Flies belonging to the family *Tabanidæ*, and noted for its close resemblance to the hive-bee. The larvæ are known as 'rat-tailed maggots,' and are found in mud.

DRO'VERS ('drivers,' *i.e.*, of cattle) are those who buy cattle in one market to sell in another. They are traders subject to the bankrupt laws. The name is also commonly applied to those whose busines is to drive cattle to or from the markets. In the English metropolis they are classified as *country*, *butcher*, and *London* D. They are required, under a penalty of 40s., to wear a ticket, to take a yearly license, and to use no stick which has not been marked by the clerk of the market.

DROY'SEN, Johann Gustaf, a German historian, born at Treptow, in Pommern, July 6, 1808; studied at Stettin and Berlin; became professor in Berlin in 1835, and Professor of History at Kiel in 1840; was elected to the National Assembly in 1848; appointed professor in Jena in 1851, and again in Berlin, 1859. His writings include *Geschichte Alexanders des Grossen* (Berlin, 1833); *Geschichte des Hellenismus* (Hamb. 1836–43); *Vorlesungen über die Geschichte der Freiheitskriege* (Kiel, 1846); *Leben des Feldmarschalls Grafen York von Wartenburg* (Berlin, 1851, 2d ed. 1854); *Ueber Preussen und das System der Grossmächte, Actenmässige Geschichte der Dänischen Politik* (Hamb. 1850). Later works are his *Geschichte der Preuss. Politik* (10 vols. 1855–70); *Urkunden und Actenstücke zur Geschichte des Grossen Kurfürsten* (1864–65); and translations of Æschylus (3d ed. 1868) and Aristophanes (2d ed. 1869).

DRUM-FISH, a general name given to those fishes which, like the maigres, make a kind of grunting noise, but applied more specially to the *Pogonias chromis* or bearded D.-F. of the N. American coasts, which produces a noise close resembling the beating of a drum. In this Teleostean fish, which is included in the family *Sciænidæ*, the chin is provided with many small *barbules* or fil-

aments. The first dorsal fin is provided with ten spines, whilst the anal fin is two-spined.

DRUMMER (*Blatta gigantea*), a large species of cockroach common in the West Indies, and named from the noise it makes during the night, chiefly by knocking its head against wood.

DU'CAS, MICHAEL, a Byzantine historian, who flourished towards the middle of the 15th c. After the capture of Constantinople in 1453 by the Turks, D. sought a retreat in Lesbos, and was employed by the tributary prince of that island in various diplomatic missions to the Turkish sultans. On the annexation of Lesbos to the Ottoman Empire in 1462, he retired to Italy, and there composed his *Historia Byzantina*, commencing with the creation of the world, and ending with the taking of Lesbos. D.'s history is a valuable authority for the reigns of Joannes Paleologus and his successors Manuel, Joannes, and Constantine. It also contains a reliable account of the siege and sack of Constantinople, and has been largely used by Gibbon, who remarks that D. 'writes with truth and freedom; but the style is a barbarous obscure jargon, full of Turkish words and strange constructions.' A folio edition of the *History* was published in Greek and Latin at Paris (1649). It was also edited by Bekker (1834) for the Bonn series of Byzantine historians, along with an early Italian translation found at Venice by Ranke. It has been translated into French by Cousin.

DUCLOS, CHARLES PINEAU, a witty French writer of memoirs, romances, essays, &c., was born at Dinan, February 12, 1704. In 1746 he was made a member, and afterwards perpetual secretary, of the Academy. He died at Paris, March 26, 1772. His chief works are his *Considérations sur les Mœurs de ce Siècle* (1750), *Mémoires pour servir à l'Histoire du Dix-huitième Siècle*, and *Mémoires Secrets sur le Règne de Louis XIV., la Régence et le Règne de Louis XV.* (1791). See his *Œuvres Complètes* (10 vols. Par. 1806).

DUCROT, AUGUSTE-ALEXANDRE, a French general, was born at Nevers in 1817, served in Algeria, and in the Italian campaign of 1859, and was made general of division in 1865. On the outbreak of the German war he was placed at the head of the first division of the first army corps, under Marshal MacMahon. He fought well at Sedan, and refused to sign the capitulation treaty. Escaping from prison at Pont-à-Mousson, he took an active part in the defence of Paris, and subsequently became a member of the National Assembly (1871), and was appointed commander-in-chief of the eighth corps in 1872. He is the author of *La Journée de Sedan* (1871), *De l'État-major et des Différentes Armes* (1871), and *La Vérité sur l'Algérie* (1871). &c. D. is strongly opposed to democracy.

DUCT, an anatomical term signifying the tube which conveys the secretion away from a gland. Thus we have the D. of the liver, the D. of the parotid gland, &c.

DUNG, the excrement of animals, and the most necessary of all articles in fertilizing a farm. Restricting the word to its ordinary sense, horse, cow, sheep, pig, and pigeons' D., the preference for securing growth may be given to the last, if applied to barley or wheat, but its limited production makes it of little account in ordinary farm-management, although doubtless it is quite equal in plant-nutritiveness to that of the birds which left guano deposits in Peru. Horse-D. is much appreciated, and, mixed with cow and sheep D., makes an excellent manure. All artificial substances are inferior, everything considered, to that which is made in the stable, byre, or shed; and the only regret farmers have is that they cannot obtain a sufficient quantity of it. The quality of D. purchased from towns or made on the homestead is not preserved as well as it ought to be. It should not be exposed to sun and wind, which rob it of its virtue, but should be put up in heaps, mixed with earth, as then its savor and fructifying powers are preserved for months. Some farmers are of opinion that D. is best made in covered courts, and carried direct from thence to the fields. Dunghills should be frequently turned, and not placed in proximity to drains, as the liquid percolates through the earth downwards, and tends to choke the drain. See Stephen's *Book of the Farm;* Gent's *Systema Agriculturæ* (published 1669); Mechi's *Profitable Farming;* Kames's *Gentleman Farmer;* and Hoskin's *Chronicles of a Clay Farm.*

DUNKIRK, a city of Chautauqua Co., N. Y., and port of entry on Lake Erie. It is an important railroad and commercial center, and has direct railroad communication with the oil, coal, and iron regions of Pennsylvania. The surrounding country is a fine dairying district. Pop. 9000.

DUPAN'LOUP, FELIX-ANTOINE-PHILIBERT, a French churchman, was born at St. Felix, Savoy, January 3, 1802. He studied theology at Paris, became a priest, and won notice as an excellent preacher and catechist. After refusing various charges in Paris, he was appointed Professor of Sacred Eloquence in the Sorbonne in 1841, and Bishop of Orleans in 1849. In 1848 he attended the deathbed of Talleyrand. In 1854 he was made a member of the Academy, and since 1850 he has taken part with considerable energy and keenness in politics, arguing for the rights of the Pope as a temporal sovereign against Edm. About. He was returned to the National Assembly in 1871, and voted with the Right. He died Oct. 11, 1878. Among his most important works are *Manuel des Catechismes* (1838); *Des Associations Religieuses. De la Pacification Religieuse* (1845); *Souveraineté Temporelle du Pape* (1849); *Lettres sur l'Éducation Particulière* (1849); *Œuvres Oratoires* (1873).

DUPIN, LOUIS ELLIES, a French historian, born of an old Norman family, at Paris, 17th June 1657. He studied at the Collége d'Harcourt, entered the Church, and was through life persecuted for his liberal opinions, being accused of treating the Virgin and the Fathers with disrespect. His favorite scheme was to unite the Roman Catholic, Greek, and English Churches. He died at Paris, June 6, 1719. Among his voluminous writings are *Nouvelle Bibliothèque des Auteurs Ecclésiastiques* (Par. 58 vols. 1686–1704); *Histoire des Juifs depuis Jesus Christ jusqu'à Présent* (Par. 1710), *Histoire Profane* (Par. 6 vols. 1714). &c. See Niceron's *Mémoires.*

DU PONT, SAMUEL FRANCIS, an American naval officer, born at Bergen Point, N. J., Sept. 27, 1803, and entered the navy in 1815. In the early part of the civil war he led an expedition against Port Royal, which he captured after a severe engagement of four hours duration, and afterwards prosecuted the work of blockading the Confederate ports with great vigor. The order of his promotion was as follows: lieutenant in 1826, commander in 1842, captain in 1855, and rear-admiral in 1862. Died June 23, 1865.

DURHAM, SIMEON OF, an English chronicler of the 12th c., who taught at Oxford, and wrote Latin annals of England to the reign of Henry I. His book is specially valuable for the history of the N. of England, and was continued by John of Hexham.

DU'ROC, GERAUD-CHRISTOPHE-MICHEL, DUC DE FRIULI, was born at Pont-à-Mousson, October 25, 1772. He served as aide-de-camp to Bonaparte in the Italian and Egyptian campaigns. His services to the Consul in 1799 procured him a generalship, several important embassies, and the post of Grand Marshal of the Palace. He carried through the peace with Saxony (1806), the cession by Charles IV. of his rights to the throne of Spain, and the armistice of Znaim (1808). The scene between the Emperor and D. on the field of Markersdorf (where the latter was killed, May 22, 1813) is well known.

DUST-BALL, a disease in horses, provoked by too much food composed of corn and barley-dust. The disorder affects chiefly the intestinal canal. Its presence is made known by a haggard countenance, a distressed eye, distented belly, and hurried respiration. The ball is sometimes about four inches in diameter, and as hard as iron.

DUVAL', ALEXANDRE VINCENT PINEU, was born at Rennes, 6th April 1767. He was from 1792 to 1815 one of the leading dramatic authors in France in comedy, legitimate drama, and opera-comique. His works (ed. 1822–23, in 9 vols.) show skill in plot, effective dialogue, and comic situations. His most successful piece was *Édouard en Écosse, ou la Nuit d'un Proscrit.* He had a bitter controversy with Victor Hugo and the Romantic School, whom he accused of ruining the stage. He died at Paris, January 1842.

DUVAU'CEL, ALFRED, a French savan, born in 1793, was the son-in-law of Cuvier, who instructed him in natural history. In 1817, as royal naturalist, D. undertook an expedition to Chundernagore, Sumatra, Malacca, and the valleys of the Ganges and the Brahmapootra. He made large collections, which were transmitted to Paris. He was a constant correspondent of the Asiatic Society of Paris. He describes his travels in a graphic style, without losing scientific precision. His visit to the King of Cossya and the 'Cavern of the Devil' is of especial interest. He died at Madras in August 1824.

DUYCKINCK, EVERT AUGUSTUS, born in New York, N. Y., Oct. 17, 1823, and graduated from Columbia College in 1835. His entire life was devoted to literary pursuits. With his brother, George L., he published a *Cyclopædia of American Literature*, a work of great value. He also published *History of the War for the Union*, and other works. Died in 1878.

DWIGHT, THEODORE, an American author, born at Hartford, Conn., March 3, 1796, and graduated from Yale College in 1814. Among his works are the following: *Tour of Italy. History of Connecticut, Life of Garibaldi, A School Dictionary of Roots and Derivatives, The Northern Traveler, The Tour of New England, The Father's Book, First Lessons in Modern Greek, The Roman Republic of* 1849, and *The Kansas War.* Died Oct. 16, 1866.

DWIGHT, THEODORE WILLIAM, LL.D., an American lawyer and teacher of law, born at Catskill, N. Y., July 18, 1822, graduated from Hamilton College in 1840, and studied law in Yale University. He established a law school in connection with Ham-

ilton College in 1846, and in 1858 was called to the professorship of municipal law in Columbia College, New York City, which position he continues to hold. Under his management Columbia Law School has become one of the leading institutions of its kind in America. Besides his work as an instructor, Dr. Dwight has written largely for the press, and has held several judicial positions.

DYNACTINOM'ETER (Gr. *dynamis*, 'power;' *actis*, 'a sunbeam;' and *metron*, 'a measure'), an instrument for measuring the intensity of the light-rays of the sun and comparing the powers of object-classes. See Claudet's paper in the *Philosophical Magazine* for June 1851, and Hunt's *Photography*.

DYNAM'OMETER, an instrument for measuring the effort exerted or the work done by a machine. There are three classes of dynamometers, viz.—(1) Those which merely indicate the effort exerted, leaving the distance and time through which it is exerted to be separately noted. Some machines of this class record the effort on paper by self-acting mechanism, as well as indicate it. (2) Those which record both effort and distance, generally in the form of a curve, of which the ordinates represent the magnitudes of the efforts exerted or resistances overcome, and the abscissæ the distances moved through,—the area consequently giving the product of these two, i. e., the work done. (3) Those which, by means of suitable apparatus, record the work done; the product, that is, of the effort (or resistance), and the distance through which it is exerted. These are called integrating dynamometers. In Class 1 the ordinary friction brake and some kinds of spring-balances are used for the purpose of measuring effort; to Class 2 most dynamometers used for measuring traction belong, and the steam-engine indicator; to Class 3, Ashton and Storey's power meter, &c.

DYOOR ('men of the woods'), a race of Central Africa, in the region of the Upper Nile. The Dyoors are of a noble negro race, with small development of jaw and graceful slimness of limb. They occupy a small territory, and are not over 20,000 in number. Occupying a ferruginous district, they are famed for their skill in ironwork, and provide the coin which circulates in the whole Upper Nile region—i. e., spades and spear-heads. Like the Shillooks of the N., from whom they are derived, and whose dialect they use, the Dyoors can gain a livelihood in various ways. Besides working in iron, they farm, hunt, and fish, and are quick and ingenious in constructing wickerwork and pottery. The Nubian slave-dealer has greatly injured the prosperity of the Dyoors. The river D. traverses the country of the same name, and is a large tributary of the Ghazal, which it joins about 150 miles S.W. of the confluence of the latter with the Nile.

E.

EAD'GAR (mod. *Edgar*), an English king, the second son of King Eadmund, was born about 940, and in 956 was chosen king of Mercia and Northumberland in place of his brother Eadwig, who had enraged the churchmen, and especially Dunstan, by an uncanonical marriage. In 960 Wessex yielded to his rule. Under E., whose policy was solely moulded by Dunstan, civil strife and the Danish descents ceased, and the English kingdom was consolidated. Among his titles was *Anglorum Basileus*, and it is said that once eight kings rowed his barge on the Dee. He is reported to have freed Wales from wolves by imposing an annual tribute of 300 wolves' heads on the Welsh.

EADGAR THE ÆTHELING, a grandson of Eadmund Ironside, chosen king by the English in 1066, after the battle of Hastings. His chief supporters, Eadwine and Morkere, Earls of Mercia and Northumbria, being forced to retreat before the Duke of Normandy, E. headed the deputation which offered William the crown, but afterwards fled to Scotland, where his sister Margaret married Malcolm Canmore. The Northumbrians, in league with Sweyn of Denmark, proclaimed E. king of England, but were unable to cope with William, and E. again sought refuge with Malcolm. He was afterwards a dependent at William's court, and became a friend of Robert, Duke of Normandy. On Malcolm's death, in 1097, he drove Donald Bain from the Scottish throne, on which he placed his nephew Edward as an English fendatory. He is said to have accompanied Duke Robert to the Holy Land, and in the struggle between Robert and Henry I. was taken prisoner, but shortly freed by Henry. William of Malmesbury says he lived to an old age, but the date and manner of his death are unknown.

EAGLE HAWK, a town in Victoria, 4½ miles from Sandhurst, and 105 miles N.W. of Melbourne. It is in the heart of a very important gold-mining district. Pop. (1875) 6590.

EARLY, Jubal A., born in Virginia, in 1818, and graduated from West Point in 1837. He resigned from the army and became a lawyer, rapidly rising to distinction in that profession. He served in the army during the Mexican war, and, at the outbreak of the civil war, entered the Confederate service. He participated in the battles of Bull Run and Gettysburg, and was promoted to the rank of major-general. In 1864 he led an expedition through the Shenandoah Valley, into Pennsylvania; but was subsequently defeated by Sheridan, and compelled to retire. At the close of the war, he resumed the practice of law in his native state.

EAR-SHELL (*Haliotis*), a genus of Gasteropodous molluscs, belonging to the family *Haliotidæ*, in which the shell is ear-shaped, with small whorls, and a large aperture. The outer lip is perforated for a siphon, and in ear-shells new holes are successively formed with the growth of the shell. No operculum exists. These shells are much used in inlaying work, on account of the beautiful tints of their nacreous or mother-of-pearl lining. They abound at the Channel Islands, and familiar species are the *Haliotis tuberculatus*, the Ormer or Guernsey E.-S., and the *H. asininus* or Ass's E.-S.

EARTH-CLOSET SYSTEM. This system of disposing of human excreta has attracted much attention during the past seventeen years, and was originally proposed as a substitute for the pestiferous cesspool and the wasteful and defective system of water-drainage, and as a simple method of enriching the land with valuable manurial matter, commonly carried to the sea or diverted into our rivers to their pollution. The principal of the E.-C. S. is based upon the fact that *dry earth* is one of the best known disinfectants and deoderizers, and that when it is applied in detail to fresh excrement it renders the fæcal matter at once inodorous and innoxious. Moreover, a compound is formed that is valuable as manure, and capable of easy application to the soil. The introduction of the system, which is in successful operation in many parts of England, as well as in India and America, is chiefly due to the zeal, energy and mechanical talent of the Rev. Henry Moule, vicar of Fordington, Dorsetshire. Mr. Moule's patent earth-closet resembles in outward appearance an ordinary water-closet. Under the seat is a watertight vault bedded in cement, or a movable pail or tank, and at the back is placed a hopper or chamber for holding dry sifted earth. On using the closet for the first time a charge—1½ lbs. by weight, or 1½ pints by measure—of earth is thrown into the receptacle, and after use a second charge is cast down either automatically, on the sitter removing his weight from the seat, or by his pulling a plug-handle. The simple mechanical arrangements of Moule's earth-closet admit of easy modification to meet special wants, and the vault may be emptied or the pan removed either from the outside or inside as desired. The night-soil need not be removed till the vault or other receptacle is filled, as it remains altogether inoffensive. If desired, the earth-manure may be redried, and used over again two or three times, the manurial value of the product increasing with each time it is passed through the closet. The organic matter is disintegrated and absorbed by the earth, and it is only when the earth is saturated with liquid and vapor that it fails as a deodorizer. It is essential that the earth be dry and sifted, and that no slops be thrown into the receptacle. Of the advantages of the E.-C. S. in agricultural districts and small communities there can be but one opinion. Wherever dry earth is obtainable, and facilities exist for the ready disposal of the manure, there the system is eminently practicable. In large centers of population its adoption can scarcely be expected, especially where the water-drainage system, with all its defects, is in operation. The labor and expense of preparing and storing large

quantities of earth, and of its subsequent removal, even if facilities existed for the disposal of the manure, render the system impracticable for large cities. The most zealous advocates of the E.-C. S. do not even recommend it as practicable in towns of over 10,000 persons. The system, however, has been found to work well in jails, barracks, factories, hospitals, and schools in England and in prisons and military stations in India.

EARTH'WORK, in engineering construction, consists chiefly of cuttings and embankments for railways, roads, reservoirs, &c. The engineer who projects and lays out a railway has the 'quantities' of E. in cubic yards, both of excavation and embankment, calculated in detail in his office; and finds, by boring or otherwise, the nature of the ground in which the cuttings have to be made, and upon which the embankments are to rest. The work is executed by a contractor, whose price is based upon the quantities and information supplied by the engineer. Before the E. of a railway is commenced, its center line is staked and nicked out (or marked by a little trench on the surface of the ground), its levels having been previously fixed, so that the quantity of land excavated in the cuttings may be, in general, equal to the amount required for making the embankments, in order that no soil may have to be excavated specially for this purpose. This is called 'equalizing E.' The slope or nature of the soil, the nearness of water, and other causes, occasion the special difficulties which occur in the construction of E.

EAST LIVERPOOL, a town of Columbiana Co., O., on the Ohio River and a division of the Cleveland & Pittsburg Railroad, 48 miles west of Pittsburg. It is situated in an agricultural country, and is extensively engaged in the manufacture of white, granite, and yellow ware. With the exception of Trenton, N. J., it produces more pottery than any other place in the United States. Pop. 5568.

EAST NEW YORK, a city of Kings Co., N. Y., and suburb of Brooklyn, with which it is connected by steam and horse cars. Pop. 20,000.

EAST ORANGE, a town of Essex Co., N. J., on the Delaware, Lackawanna & Western Railroad, 40 minutes from New York. It is composed largely of the private residences of New York business men. Pop. 8349.

EAST SAGINAW, a city of Michigan, in Saginaw Co., on the Saginaw River, at the junction of the Flint & Pere Marquette and the Michigan Central railroads. It is a business center and has a large and flourishing trade. The Saginaw Valley is noted for its manufactories of lumber and salt, the annual shipments of which reach 700,000,000 feet of lumber and 800,000 barrels of salt. For a distance of 20 miles the Saginaw River is occupied by over 100 saw-mills and an equal number of salt works. Pop. 26,000.

EAST ST. LOUIS, in St. Clair Co., Ill., on the Mississippi River, directly opposite to St. Louis, Mo. It is the terminus of 13 railroads, has extensive stock-yards and packing-houses, and is connected with St. Louis by bridge. Pop. 9662.

EAU CLAIRE, a city of Eau Claire Co., Wis., at the junction of the Eau Claire and Chippewa rivers, 95 miles E. of St. Paul. It has railroad connections with St. Paul, Milwaukee, and Chicago. It manufactures annually 250,000,000 feet of lumber, besides large quantities of shingles; and is said to be the largest lumber manufacturing city in the West. It is a center of trade for a radius of 75 miles. Pop. 16,000.

E'BERHARD is the name of several members of the Würtemberg dynasty, of whom the first, EBERHARD THE NOBLE (*erlauchte*), ruled from 1279 to 1325, and greatly extended the territorial possessions.—EBERHARD IV., THE QUARRELSOME (*der Greiner*), grandson of the former, became Count of Würtemberg in 1343, distinguished himself in the wars of S. Germany towards the end of the 14th c., and died March 15, 1392.—EBERHARD IM BART, first Duke of Würtemberg, was born in 1445, eight years after the division of the territory between his father, Ludwig the Elder, and his uncle, Ulrich, the founder of the Stuttgart line. He succeeded, with the help of the Elector Friedrich, in consolidating the family inheritance, which he rendered indivisible by the Compact of Münsingen in 1482. The established constitution of Würtemberg is his work, and he also founded the University of Tübingen (1477). E. was the head of the Swabian Bund, and was raised to the ducal rank by the Emperor Maximilian I. at Worms, 1495. He died childless in February 1496. See Pfister, *Eberhard im Bart, erster Herzog in Würtemburg* (Tüb. 1822).

ECBAL'IUM OFFICINAR'UM (*E. agreste; Momordica elaterium;* Fr. *concombre sauvage*), commonly called the squirting cucumber, an annual plant of the natural order *Cucurbitaceæ*, is a native of the hotter parts of Europe, where it grows wild on rubbish-heaps. It is cultivated as a medicinal plant in some parts of Northern Europe, and a few acres are grown at Mitcham in Surrey. It is a trailing plant, without tendrils, rough, and covered with stiff hairs. The fruit, like a small oblong melon, is covered with soft prickles, and is filled with a succulent tissue containing numerous black seeds, which, when the fruit is ripe, are forcibly expelled through the aperture where the stalk is attached to the fruit. This remarkable phenomenon is ascribed by Dutrochet to osmotic action within the fruit. The active principle of the plant is contained in the thick green mucus surrounding the seeds, from which is prepared the drug *Elaterium*.

ECH'ARD, LAURENCE, an English historian, was born at Cassam, Suffolk, about 1671; held two livings in Lincolnshire; became archdeacon of Stowe in 1712; was presented to several benefices in Suffolk; and died August 16, 1730. His chief works are *General Ecclesiastical History* (1702); *History of England* (1707–18); *A Gazetteer; A Description of Ireland*, &c.

ECHINORHYN'CHUS, a genus of intestinal worms found in the digestive organs, and sometimes in the abdominal cavity of vertebrated animals. The body is round, sometimes elongated, and often shortened to a kind of sac. The proboscis is armed with hooks, by which they attach themselves to the coats of the intestines. *E. gigas* is the largest known species; it is found in the hog and the wild boar, and the females are sometimes fifteen inches long. *E. hæruca* is a smaller species, and has been found in the liver of the cat.

ECKH'A, the name for the most common-wheeled conveyance in India. It is a light two-wheeled cart, without springs, drawn by a pony, and covered with a cloth awning on a wooden framework. The E. is rarely used by Europeans, but natives will take long journeys in it. A good pony has been known to take a loaded E. 60 miles in twelve hours.

EC'LOGUE (Gr. *ekloge*, 'a selection'), was at first the name of a poem, or series of poems, chosen on account of their beauty from an author's work; afterwards the term was applied to Virgil's *Bucolics*, or pastoral poems, and hence has become synonymous with a pastoral idyll.

EC'TASIS (from the Gr. *ekteino*, 'I stretch out'), a term used to indicate aneurismal distension of the walls of the pulmonary artery or capillaries, as seen in the air-cells.

EDG'ING IRON an implement of crescent form, with a spade-handle, used for cutting the sides of drains.

EDISON, THOMAS ALVA, a distinguished American inventor, born in Ohio, in 1847. Beginning life a poor boy, he learned telegraphy, and became an expert operator. In 1876 he located at Menlo Park, N. J., and since that time has devoted himself to a series of experiments in electricity. The result has been a series of brilliant discoveries and inventions. He has perfected a system of electric lights, and has invented the carbon telephone, the phonograph, and numerous other apparatus for the useful employment of electricity. He has also invented a system of telegraphing by means of which several messages may be sent over the same wire at once.

EDMONDS, JOHN WORTH, a distinguished American jurist, born at Hudson, N. Y., March 13, 1799, and graduated from Union College in 1816. In 1820 he began the practice of law at Hudson, and rapidly gained high rank in that profession. After holding various important positions of public trust, he was in 1845 made circuit judge; in 1847, a judge of the supreme court; and in 1852, he was elevated to a seat upon the bench of the court of appeals. In 1851, Mr. Edmonds was converted to Spiritualism, and from that time forwards was its ardent advocate. He believed himself to be a medium and in almost constant communication with spirits. He published *Spiritualism* and several other works upon the subject. Died April 5, 1874.

EDMUNDS, GEORGE F., an American statesman, born at Richmond, Vt., Feb. 1, 1828. Early in life he began the practice of law, and soon became eminent as a lawyer. After filling various political positions in his own state, he was, in 1866, made a member of the U. S. Senate, of which body he has continued to be a member down to the present time (1885). In 1884 he was a prominent candidate for the presidential nomination, before the convention of the Republican party, but was defeated by James G. Blaine.

EDWARDES, SIR HERBERT, a distinguished lieutenant of the Lawrences in their administration of the Punjaub, and a hero of the Indian Mutiny, was born 12th November 1819. In 1857 he was Commissioner of Peshawur, perhaps the most important military post in India, where he not only maintained order throughout the Sepoy war, but was able to send down reinforcements, both of Europeans and staunch native troops, to the camp before Delhi. To him, as much as to any single man, was due the tranquillity of the Punjaub in this crisis, and thus directly the safety of India. He died in England, 23d December 1868.

EDWARDS, BELA BATES, D.D., born at Southampton, Mass., July 4, 1802; graduated from Amherst College in 1824; and pursued his theological studies at Andover. He was secretary of the

American Educational Society, editor of the *American Quarterly Observer*, and afterwards of the *Bibliotheca Sacra;* and, in 1837, was made professor of Hebrew at Andover. In 1848 he became professor of biblical literature in the same institution. A memoir of his life has been published by Dr. E. A. Park. Died April 20, 1852.

EGGLESTON, EDWARD, D.D., an eminent American divine and author, born at Vevay, Ind., in 1837, and began to preach in the Methodist Church when only 19 years of age. In 1866 he became engaged in literary work, and in 1870 removed to New York City and became one of the editors of the *Independent*. He was for several years pastor of the Church of Christian Endeavor, Brooklyn, N. Y., but was compelled to resign on account of ill-health. Among his best known works are the *Hoosier Schoolmaster, End of the World, The Mystery of Metropolisville*, and *Roxy*. Dr. Eggleston's works have had a large circulation, and their literary merit entitles him to high rank as an author.

ELAMBAZAR', a trading town in the district of Birbhum, province of Bengal, on the navigable Ajai, and is noted for its manufacture of lac ornaments, and has an extensive trade in rice. Pop. 3000.

ELASTICITY, in physiology. Many of the structures of the body possess the property of E., by which movements are effected without the expenditure of force in muscular contraction. Thus there is a strong elastic band termed the *ligamentum nuchæ* in the back of the neck of the large ruminants and pachyderms, stretching from the spinous processes of the dorsal vertebræ to the occiput, by which the heavy head is sustained without muscular fatigue. The larger arteries of the body possess a highly elastic coat, by the agency of which the jet-like pulsation communicated by the heart to the blood is converted into a continuous uniform motion. The lungs and walls of the chest, by their E., assist in ordinary expiration without any muscular action. Muscles are highly elastic, so that after contraction they return to their former length. Finally, elastic structures are found in the neighborhood of all joints, so as to break the shock in such movements of the body as walking, running, leaping, &c.

ELAT'ERITE, or ELAS'TIC BITU'MEN, is a flexible or elastic mineral substance allied to bitumen, possessed of a blackish-brown color and a resinous lustre. It burns readily with a yellow flame, giving out a bituminous odor, and as it effaces pencil-markings, it has been called mineral caoutchouc. It was found originally in an old lead-mine in Derbyshire, but it is nowhere abundant.

ELECTROTO'NUS, in Physiology, is the condition into which a living nerve passes while it is traversed by a continuous electrical current. While in this condition its properties are changed, so that in the neighborhood of the positive pole its irritability and rate of conductivity are diminished, and its power of producing a current of electricity is increased, while in the neighborhood of the negative pole the reverse is the case. The part near the positive pole is said to be in an *anelectrotonic*, and that near the negative pole in a *cathelectrotonic* state.

ELEPHANT FISH, a name given to the *Callorhynchus antarctica*, an Elasmobranchiate fish, nearly allied to the *Chimæra* or 'king of the herrings,' and included in the division *Holocephali* of the above order of fishes. It derives its name from its long snout, the tip of which is bent backwards like a hoe.

ELEPHANT-GRASS (*Typha elephantina*), a species of bulrushes belonging to the *Typhaceæ* or Bulrush order. This plant affords a large quantity of pollen which in Scinde is used for making a kind of bread, to which the name of *boor* or *booree* is given. The familiar name of the grass is derived from the fact of elephants feeding largely upon it.

ELEPHANT HAWK-MOTH (*Deilephila elpenor*), a genus of Lepidopterous insects belonging to the *Sphingina* or hawk-moths, which are distinguished by the antennæ being thickened in the middle or at their tips. The wings are long and narrow, and the trunk or proboscis is well developed. This moth has the body tinted rosy red, varied with light-green. The light green of the wings is prettily contrasted with rose-colored bands; and the hinder wings have a black base fringed with white. The E. H.-M. is known in France as the 'vine sphinx.' It produces two broods annually, the larvæ making a cocoon on the ground by binding mosses and leaves together.

ELEPHANT'S EAR, a name popularly applied to the species of *Begonias*—plants belonging to the natural order *Begoniaceæ*—from the appearance of their oblique stipulate leaves. These plants occur in the E. and W. Indies and in S. America.

ELEPHANT-TUSK SHELL (*Dentalium*), a genus of Gasteropodous mollusca belonging to the family *Dentalidæ*, in which the shell is tubular and curved, shaped like an elephant's tusk, open at both ends, and possessing a circular aperture. The foot is pointed, and has symmetrical side lobes, from the presence of which Huxley inclines to place the *Dentalium* among the Pteropodous molluscs. The head is rudimentary, and the intestine has a neural flexure. *Dentalium arcuatum* is a familiar species.

ELEPHANT, WHITE, an ancient and exclusive Danish order of knighthood, in which the number of knights, other than those of the Danish royal family, was only thirty.

ELGIN, a city of Kane Co., Ill., on the Fox River, 38 miles from Chicago. It has fine water-power, which is employed in various manufacturing enterprises. It contains the works of the Elgin National Watch Company, and a milk condensing factory. It is the center of a fine dairy district, and carries on a large trade in butter and cheese. It is the seat of the Northern Insane Asylum. Pop. 12,000.

ELIOT, JOHN, the 'Apostle of the Indians,' was born at Nasing, Essex, in 1604, educated at Cambridge, and emigrated to Massachusetts in 1631. He became pastor of the church in Roxbury near Boston, and applied himself to the Indian languages. In 1646, with a few friends, he went to a company of Indians and explained to them the Christian religion. Encouraged by the interest they evinced, he obtained a grant of land from the colonial government on which the Indians might settle and become civilized. By 1674 there were fourteen such settlements, to all of which E. preached. Though still pastor of Roxbury, he regularly traveled through forests and swamps to visit his dusky converts. In 1660 the important Indian church of Natick was formed. About this time E. published the New Testament in the Indian language, and three years after the Old Testament, the first Bible printed in America—a work of great philological interest. E. also instituted schools and wrote school books for the Indians. He died May 20, 1690. See biography by Small, prefixed to facsimile of his *Indian Primer* (Edinb. 1878).

EL'IOT, SIR JOHN, an eminent English statesman and orator, in whom it has been well said 'centers the earlier struggle for parliamentary liberty,' was born of an old Devonshire family (since ennobled by the title of Earl of St. Germains) in Cornwall, 20th April 1592. From an early age he showed a high and fearless spirit, and a vehement temper. After a careful education at Oxford he traveled for some time, and in 1614 entered public life as member for St. Germains. E. obtained the favor of Buckingham, and from 1619 to 1623 held the office of Vice-Admiral of Devonshire, receiving the honor of knighthood. E.'s activity, however, in the suppression of piracy, out of which Buckingham wished to make profit, caused him to lose ground with his patron, and he was even thrown into prison. Early in the reign of Charles I. E., now member for Newport, became prominent as the leader of the Parliamentary or Country party, and the uncompromising opponent of Buckingham. Fixing upon the responsibility of the king's ministers to Parliament as the leading principle of constitutional government, he led the House of Commons by a series of remarkable speeches to impeach the minister, and in this course he persisted, although he was thrown into prison for ten days. He was the prime mover of the first Grand Remonstrance on the 'state of the realm,' which preceded the assassination of Buckingham, and in the third Parliament of Charles denounced the dissolution which the infatuated monarch had determined on, saying, 'Some have gone about to break Parliaments, but in the end Parliaments have broken them.' In 1629 he was, along with two other leaders of his party, thrown into the Tower on the charge of disobedience to the royal commands, and ordered before liberation to pay fines of £2000, £1000, and £500. He refused, and his confinement was so rigorous that his health broke down, and he died 27th November 1632. He had spent his time in prison in corresponding with his family and political friends, and in writing—among his works being a fragmentary *Memoir*, and an *Apology for Socrates*. The only complete biography of E. is that by the late Mr. John Forster (2d ed. 1872).

ELIZABETH OF VALOIS, QUEEN OF SPAIN, born at Fontainebleau 13th April 1545, was the daughter of Henri II. and Catherine de Médicis. 'The Princess of Peace' was promised in marriage first to Edward VI. of England, then to Don Carlos, but was ultimately married to Philip II. in 1559, the Duke of Alva appearing as proxy at Notre Dame. She met her husband at Guadalavara, and Brantôme says stared at him so much that Philip said, 'What are you looking at? Is my hair white?' After a short and unhappy life E. died at Madrid, 3d October 1568. See Brantôme's *Vie des Dames Illustres*.

ELIZABETH, QUEEN OF SPAIN, born 22d November 1602, was the daughter of Henri IV. and Marie de Médicis. She married Philip IV. of Spain in 1615, the Infanta Anna Maria of Austria being at the same time given to Louis XIII., a proceeding most distasteful to the Huguenots. E. had an enemy in the Minister Olivarez. She displayed political energy, and a strong love of her adopted country. She died 6th October 1644.

ELIZABETH CHRISTINE OF BRUNSWICK-WOLFENBÜTTEL, born 28th April 1691, was the daughter of Ludwig-

Rudolf of Brunswick-Blankenburg. Her grandfather, Anton Ulrich, who wrote novels—'six vols. in 4to'—brought about her marriage with the Archduke Karl, who had been previously refused by Caroline of Anspach. This event in 1707 caused the elder Brunswick family to become Catholic. E. was proclaimed Queen of Spain at Barcelona, and after her husband's election as Emperor acted as regent there till the Peace of Utrecht (1713). She was then crowned at Presburg Queen of Hungary. On her husband's death in 1740, E. devoted herself to the cause of her daughter, the famous Marie-Theresa. She founded the order of the Red and White Star, to be conferred by the Aulic Council of War on twenty-one superior officers, who should have served Austria for thirty years. E.'s sister Charlotte married Alexius, the Czarovitch, and had a 'fabulous end.' Her sister Antoinette married Ferdinand Albrecht of Brunswick-Bevern, and became the mother of Friedrich the Great's wife. E. died 21st December 1750.

ELIZABETH FARNESE, Queen of Spain, born 25th October 1692, was the daughter of Odoardo II. of Parma. She was ill-treated by her parents, and was a singularly ugly and obstinate child. In 1714, on the suggestion of Alberoni and the Princess des Ursins, *camarera mayor* or first maid of honor at the Spanish court, she married Philip V., then a widower. Her first act was to drive Des Ursins from Spain. Her active mind at once assumed the mastery over Philip, whom she reconciled with the Duc d'Orleans. She supported the Inquisition, and substituted D'Aubenton for Robinet as the King's confessor. The Spaniards resented the increase of Italian influence at the court. The temporary abdication of the jealous and hypochondriac Philip and the reign of her stepson Louis interrupted her schemes, pursued in the European alliances, the Congress of Cambrai, the Congress of Soissons, &c.; for securing the Two Sicilies and the Duchies of Parma and Piacenza to her son Carlos, who became King of Naples in 1734 and Charles II. of Spain in 1759. E. survived her husband until 1766. The 'tenacious termagant,' as Carlyle calls her, had great political ability; she spoke fluently in Spanish, Latin, German, and French. Among her younger children were Maria Anna, married to Joseph, King of Portugal, and Marie-Antoinette, married to Victor Amadeus, King of Sardinia. E.'s *Memoirs* were published in 4 vols. at London, 1746. See also Peralla, *Historia Civil*, and the innumerable private memoirs of the time (Noailles, Saint Simon, Duclos, &c.).

ELIZABETH, Queen of Hungary and Poland, the daughter of Stephen, Ban of Bosnia, married in 1363 to Louis the Great, King of Hungary and Poland. After her husband's death E., as regent, assisted by the Palatine Nicolas of Gara, oppressed her subjects until the arrival of a Neapolitan prince, Charles of Durazzo, who was crowned in 1385, and soon after was murdered. E. was herself murdered in 1387 by the Ban of Croatia.

ELIZABETH OF POLAND, Queen of Hungary and Transylvania, born in 1518, daughter of Sigismund I. of Poland, married to John Zapolski, whose death in 1540 left her in a difficult position between Ferdinand I. on the one hand, and the Sultan Solyman, who took possession of Hungary, on the other. E. offered to cede Transylvania to Ferdinand for Ratibor and Oppelu in Silesia, but the bargain was not carried out, and the Turks helped her to drive the Austrians from Transylvania. She died 20th Sept. 1558, leaving a son Stephen, or John Sigismund.

ELKHART, in Elkhart Co., Ind., on the St. Joseph's River. It is the terminus of the Cincinnati, Wabash & Michigan Railroad, and two other railroads pass through it. It has good water power, which has been partially developed for manufacturing. Pop. 9000.

ELLESMERE, Lake, in the province of Canterbury, New Zealand, 20 miles S. of Christchurch, has an area of 125 sq. miles. It receives the Selwin, but has no outlet, except in wet seasons, when it overflows into the sea.

ELL'ICHPOOR, the chief town of the Berars, or assigned districts of the Nizam, 275 miles N. of Hyderabad, and 100 E. of Nagpur. It is a walled cantonment, and has a beautiful well and many fine tombs, surrounded by gardens. The trade is in local products. There are manufactures of cotton and silk fabrics, carved articles, lac ornaments, &c. Pop. (1867), 27,782.

ELL'IOT, an ancient Scottish border family, which has produced several distinguished men. The first really notable E. was Gilbert, 'the laird of Stobbs,' in Roxburghshire, who married a daughter of Scott of Harden, and was the grandfather of the Gilbert E. who was made a baronet in 1666. From the latter's younger son are descended the Earls of Minto; while his elder son was father of George Augustus E., the defender of Gibraltar, who was born in 1718, entered the army at the age of fifteen, and distinguished himself at the battle of Dettingen and in the Seven Years' War. After the peace, he was made lieutenant-general, and having being appointed Governor of Gibraltar in 1775, he, in 1782, repelled the prolonged attacks of a Franco-Spanish force of 30,000 men, supported by ten floating batteries, and compelled the enemy to change the siege into a blockade, which ended in the Peace of Versailles, 20th Jan. 1783. E. received the Order of the Bath, and afterwards the title of Lord Heathfield. He died 6th July 1790.—Sir George E., brother of the first Earl of Minto, was born 12th Aug. 1784, entered the navy, rose rapidly in the service, and in 1837 was appointed one of the Lords of the Admiralty, and Commander of the Fleet at the Cape of Good Hope. In 1840 he was appointed to the chief naval command in Chinese waters, and on the 5th of July he captured the island of Chusan. He was promoted vice-admiral in 1847, admiral in 1853, and died at Kensington, 24th June 1863.—Sir Charles E., K.C.B., nephew of the preceding, was born in 1801, entered the navy in 1816, served in India, on the African coast, and in the W. Indies. In 1835 he was appointed Chief Commissioner and Plenipotentiary in China. He was in the center of the diplomatic operations leading up to the ransom of Canton in Aug. 1841, and was subsequently in succession Chargé d'Affaires in Texas (1842–46), Governor of Bermuda (1847–52), of Trinidad (1853–56), of St. Helena (1863–69). He died at Withycombe, Devon, Sept. 9, 1875.—Sir Henry Meiers E., son of John E. of Pimlico, was born in 1808, educated at Winchester, and entered the Indian civil service, the first of the competition set, in 1827. He became Secretary to the Government of India in the Foreign Department, and died at the Cape of Good Hope in 1853. His chief work was his posthumous *History of India as told by its own Historians* (6 vols. Lond. 1867). He also wrote a *Supplement to the Glossary of the Indian Terms*, from which was compiled *Memoirs on the Races of the North-Western Provinces of India* (Lond. 1859).

ELLIS, George, F.R.S., F.S.A., one of the earliest, soundest, and most tasteful of the scholars who have devoted themselves to Early English Literature, was born in London in 1745. He was educated at Westminster school and at Cambridge, was one of the authors of the *Rolliad*, a satire on Pitt, with whom he afterwards became reconciled; accompanied Lord Malmesbury as secretary to Lisle in 1797; became a contributor to the *Anti-Jacobin*, and died April 15, 1815. Walter Scott said E. was the best converser he had known. E.'s works are *Specimens of the Early English Poets* (3 vols. 1790); *Specimens of English Metrical Romances; Essay on the Formation and Progress of the English Language;* and a preface, notes and appendix to Le Grand's *Fabliaux*. E. renders the quaint language of mediæval poets into modern English with a graceful ease which is made doubly charming by a curious combination of genuine sympathy with mocking humor. He was a worthy forerunner of the new school of critics and historians who have revived an interest in our early literature.—William E., born in London, 29th August 1794, worked as a missionary in the South Sea Islands from 1816 to 1824, when he returned to London. He was Foreign Secretary of the London Missionary Society from 1838 to 1840. In 1853 he visited Madagascar to examine the state of Christianity there. The results of this journey were embodied in his *Three Visits to Madagascar, 1853–56, with Notices of the People, Natural History, &c.* (1859), an excellent work, from which our knowledge of Madagascar has been mainly derived. His other works are—*Narrative of a Tour through Owhyhee* (1826); *Polynesian Researches* (1829; *History of Madagascar* (1839); *Vindication of the South Sea Missions* (1831); and *Madagascar Revisited* (1867). E. died June 9, 1872.—Sarah Stickney E., born about 1800, married William E. in 1837. She is the authoress of many well-known works, among which are *Women of England* (1838); *Daughters of England* (1842); *Wives of England* (1843); *Hearts and Homes* (1848); *Mothers of Great Men* (1859); and several tales, *The Sons of the Soil, Family Secrets*, &c.

ELL'WOOD, Thomas, a Quaker writer, born at Crowell, Oxfordshire, in 1639, now remembered for his relations with Milton, to whom he became reader in 1661. In 1665 he visited Milton at Chalfont, St. Giles, Buckinghamshire, and the poet gave him the MS. of *Paradise Lost*, asking him to criticise and return it. E. tells us he read the poem, and took it back to Milton:—'He asked how I liked it and what I thought of it, which I modestly but freely told him; and after some further discourse about it, I pleasantly said to him, "Thou hast said much here of paradise lost; but what hast thou to say of paradise found?"' Milton, says E., sat some time musing, then changed the subject, but on E. visiting him after the Great Plague, he showed him *Paradise Regained*, and said, 'This is owing to you; for you put it into my head by the question you put to me at Chalfont, which before I had not thought of.' E. died in 1713. See his *Autobiography* (2d ed. 1714).

EL'PHINSTONE, Mountstu'art, an East Indian statesman and administrator, the fourth son of the eleventh Baron E., was born at Edinburgh in 1779. He entered the East India Company as a cadet (1796), and after some diplomatic service under the Duke of Wellington was nominated first envoy to Cabul in 1808. On the apprehension of a Franco-Russian invasion of British India he concluded a treaty of alliance with Shah Sujah, which was the

first step in England's eventful relation to Afghan affairs. He published an *Account of the Kingdom of Cabul* (Lond. 1815. 3d ed. 1842). In 1816 he took up his residence at the court of the Peishwa, and in 1817 was actively engaged in the battle of Kirkee—the deathblow of the Mahratta power. He was governor of Bombay from 1820 to 1827, and his rule was marked by great public works and vast reforms, and was crowned by the enactment of 'the E. Code,' which, for comprehensive clearness and brevity, is comparable to the *Code Napoleon*. The E. College in Bombay was founded in his honor (1827). On his return to Europe he devoted his leisure to his *History of India, the Hindu and Mohammedan Periods* (2 vols. Lond. 1841, 4th ed. 1864), a work which has gained him the title of the Tacitus of Indian history. He died at his estate of Hookward, in Surrey, 29th November 1859. See Colebrooke's *Memoir of E.* (Lond. 1861), and Sir J. W. Kaye's *Lives of Indian Officers* (Lond. 1867).

ELYRIA, in Lorain Co., O., on the Black River, 25 miles from Cleveland. It has two railroads, and is engaged in manufacturing shears, screens, &c. Pop. 6000.

EMBURY, PHILIP, an eminent preacher of the Methodist Church in America, born at Ballygarane, Ireland, in 1728; came to America in 1760; and a few years later organized a Wesleyan society in New York, and began to preach. He subsequently labored in and about Troy, N. Y., where he died in 1775. He has sometimes been called the 'founder of American Methodism.'

EMERALD HILL, a town in Victoria forming one of the suburbs of Melbourne, but under distinct municipal government. It occupies very nearly the site of the 'Canvas Town' of the early days of Victorian gold-discovery. Pop. 19,500.

EM'ERSON, REV. WILLIAM, a descendant of a chaplain in the Army of Independence, was born at Concord, Massachusetts, May 6, 1769, graduated at Harvard College in 1789, became minister of a Unitarian Church in Boston, published several discourses, a *Selection of Psalms and Hymns* (1808), and a *History of the First Church of Boston* (1812), and died May 12, 1811.

EMM'ETT, THOMAS ADDIS, son of a physician, was born at Cork, 24th April 1764. He was educated for the law, which he abandoned to become a leader of the 'United Irishmen.' On the Irish insurrection of 1796–98 being suppressed, he was arrested; but his sentence of imprisonment was commuted to exile, and removing to New York, he became a distinguished lawyer. He died November 14, 1827.—ROBERT E., younger brother of the above, was born in Dublin 1778; was intended for the bar, but joined the Irish insurgents; was captured, and executed September 20, 1803. His death and his love for Miss Curran are the subjects of two of Moore's *Irish Melodies*,

EMMONS, NATHANIEL, D.D., an American theologian, born at East Haddam, Conn., April 20, 1745, graduated from Yale College in 1767, and entered the ministry of the Congregational Church in 1773. From this time until the time of his death he remained pastor of the Congregational Church at Franklin, Mass. His discourses were very logical, and dealt largely with the most abstruse themes of theology. His works have been published in an edition of six volumes. Died Sept 23, 1840.

EMORY COLLEGE, an educational institution at Oxford, Newton Co., Ga., organized in 1837, and under control of the Methodist Church. It maintains classical and scientific courses, and special attention is devoted to the evidences of Christianity.

EMPORIA, a city of Lyon Co., Kan. It has three railroads and is a commercial trade center. It has growing manufacturing interests; the Holly system of water works, and gas works. Pop. 7,000.

EM'YDIN, a substance found in the yolk of turtles' eggs. It is probably derived from the decomposition of some more complex albuminous substance. A somewhat similar substance called *ichthin* has been found in the eggs of fishes.

ENCEPHALI'TIS, or CEREBRI'TIS, inflammation of the brain substance, or of the structures generally within the cranium, is often associated with *meningitis*, and followed by softening or induration. There are two varieties of softening of the brain—(1) Inflammatory *red softening*, or acute ramollissement; and (2) *white softening*, the result of an atrophic process. Red softening is frequently followed by abscess, and is essentially a fatal disease. In induration, the texture of the brain resembles the white of egg boiled hard, the convolutions being flattened, and there is an absence of blood and serum in the encephalon. Causes:—Morbid poisons, associated with zymotic or constitutional diseases; intemperance; *coup de soleil;* great mental excitement, and uncontrolled moral feelings, &c. E. may be *traumatic*, resulting from injury; or *idiopathic, acute* or *chronic*. In acute E. there is usually delirium, followed by a loss of mental power terminating in dementia. In chronic E. the mental symptoms may be slight; but there is always loss of intellectual vigor, failure of memory, confusion of ideas, and irritability of temper. The disease often ends in general paralysis, or death from apoplexy. Treatment:—General measures must be adopted to remove the exciting cause, and the brain must have perfect rest. Hygienic measures and a change of scene are of primary importance.

ENCEPH'ALON, a term sometimes applied to that part of the nervous system within the skull.

ENDICOTT, JOHN, one of the early colonial governors of Massachusetts, born at Dorchester, England, in 1589, and came to America in 1628. He was elected governor of the colony for several terms. He was a zealous Puritan, and during the period when he was governor, four Quakers were executed in Boston. Died March 15, 1665.

ENDOCAR'DIUM (Gr. *endon*, 'within,' and *kardia*, 'the heart'), the lining membrane of the heart.

ENG'LISH BAZAR' (Angrazabad), the chief town of Maldah district, province of Bengal, British India, on the Mahanunda river, close to the ruins of Gaur, and 188 miles N. of Calcutta. E. consists of a series of trading villages lining the river bank. It has some silk-weaving industry, and the vicinity is very productive in the silkworm mulberry. Pop. (1872) 12,859.

ENGLISH, GEORGE BETHUNE, an American author and adventurer, born at Cambridge, Mass., March 7, 1787. After graduating from Harvard College, in 1807, he studied law, and afterwards divinity. After editing a paper for a short time at New Harmony in the West, he entered the U. S. marine service, as lieutenant, and, going to the Mediterranean, there resigned, abjured Christianity, became a Mohammedan, and entered the Turkish army. In 1827 he returned to America. He published, among other works, *Grounds of Christianity Examined*, and *Narrative of the Expedition to Dongola*, &c. Died at Washington, D. C., Sept. 20, 1828.

ENGLISH, WILLIAM H., an American lawyer, born in Indiana, in 1822. He studied law and soon became prominent in the Democratic party. He has held numerous positions of public trust, and in 1880 was nominated for vice-president, by his party, but was defeated.

ENSILAGE, a prepared fodder for cattle. A pit, or silo, is prepared, as nearly air-tight as possible; into this green fodder (corn, oats, rye, grass, or millet) is tightly compressed; and then the silo is securely sealed. By this process green food-stuffs are kept in a juicy condition. E. is highly relished by cattle, and is said to be an excellent fodder.

EPHE'LIS (Gr. 'a sun-freckle'), is the scientific name for sunburn. E. can be removed when recent by an emulsion of bitter almonds with spirits of wine, or the benzoated oxide of zinc, beaten into a cream with orange or elder-flower water, and when chronic by a lotion of bichloride of mercury, or nitro-muriatic acid.

EPIG'ONI (Gr. *Epigonoi*, 'the afterborn'), the term used in mythic story to denote the sons of the seven heroes—Adrastus, Polynices, Tydeus, Capaneus, Parthenopæus, Amphiaraus, and Hippomedon—who, with the exception of the first named, perished in the war against Thebes. To avenge the death of their fathers, the E., ten years thereafter, under the leadership of Alcmæon, who had collected a band of Argives, marched against Thebes. The Thebans, under Laodamas, were routed near Glissas in Bœotia, while Ægialeus, on the side of the E., was slain. Thebes was at last taken by the E., and leveled with the ground. The common list of the E. contains Ægialeus, Alcmæon, Diomedes, Euryalus, Promachus, Sthenelus, and Thersander. The war of the E. was the subject of many epic and tragic poems, not one of which has survived.

EP'ISODE (Gr. *epi*, 'besides,' and *eisodos*, 'a coming in'), an incidental narrative introduced by writers to give variety to their subject. In epic and didactic poetry, the E., if fitly chosen and skillfully introduced, affords a pleasant relief to the reader. The parting of Hector and Andromache in the Iliad, of Aristæus and his bees in the Georgics, of Dido in the Æneid, of Ariadne in the *Peleus and Thetis* of Catullus, of Francesco da Rimini in Dante's *Inferno*, of Pastorella in Spenser's *Faery Queene*, of Damon and Musidora in Thomson's *Seasons*, of Margaret in Wordsworth's *Excursion*, and Glaucus in Keat's *Endymion*, are familiar examples of the E. in ancient and modern poetry.

EPISTAX'IS, or bleeding from the nose, is very common in children and young people, and usually depends on congestion of the mucous membrane. Cold applications to the forehead and bridge of the nose, with a brisk purgative, generally arrest E. In severe cases it may be necessary to plug the nose with a pledget of lint, or a sponge soaked in some astringent, as muriate of iron. When E. is copious, caused by the rupture of a vessel from violence, it may be necessary to plug both the posterior and anterior nares, but this can only be done by a surgeon.

E'QUAL TEM'PERAMENT, in music, the system of tuning by which the octave is divided into twelve equal semitones, as in the pianoforte, &c.

EQUATIONS, CHEMICAL. These represent by means of symbols and formulæ chemical reactions. Thus $2H_2 + O_2 = 2H_2O$ represents the reaction which takes place when hydrogen and oxygen combine to form water.

E'RATO ('the lovely'), in Greek mythology, one of the Nine Muses. She presided over erotic poetry and mimic invention, and is sometimes represented as the Muse of the lyre.

EREC'TILE TISS'UE, a kind of tissue found in certain organs which are sometimes rendered turgid by distension with blood. It consists of a network formed of fibrous, elastic, and perhaps contractile bands, called *trabeculæ*, in the meshes of which there are numerous blood-vessels, chiefly veins. These veins communicate with small arteries, and under certain nervous conditions, become distended with blood, causing the organ to swell and to be erected.

ER'IACH. By the Irish Brehon Law, in a case of murder, the brehon or judge caused the murderer to give the wife or child of the murdered man a recompense, called an E. The term corresponds to the ancient *were* in England.

ERIE, LAKE, BATTLE OF, an important naval engagement on Lake Erie, between an American fleet, commanded by Com. Perry, and an English fleet, commanded by Barclay, on Sept. 10, 1813. The result was a brilliant victory for Perry, and the capture of the entire British fleet. It was the occasion of Perry's famous dispatch to Harrison, 'We have met the enemy, and they are ours.'

ERIE CANAL, a water route, connecting the Hudson River with Lake Erie. It extends from Troy, N. Y., to Buffalo, N. Y., and was begun in 1817, and finished in 1825. This gigantic enterprise cost over seven million dollars, and its construction was largely due to the energy of De Witt Clinton, at that time governor of New York. Providing a cheap commercial route through the central part of the 'Empire State,' it has proved of inestimable value to trade.

ERRAN'TIA, an order of *Annelida*, or worms, represented by such genera as *Nereis*, *Eunice*, *Aphrodite*, &c. This group includes those forms which typically represent the *Annelida*, and which comprise the greater number of large active marine worms. The sides of the body are well provided in E. with the lateral appendages, consisting of *setæ*, or bristles, &c., which assist locomotion. Each joint or segment of the body bears two pairs of appendages, known respectively as *notopodia* and *neuropodia*. The gills or breathing organs are borne on the back or dorsal aspect of the segments. These animals are unisexual. The integument is soft.

ERSKINE, HARRY, son of the tenth Earl of Buchan, and elder brother of Lord Chancellor E., was born at Edinburgh 1st Nov. 1746, and called to the Scotch bar in 1768. Though not a great lawyer, his other gifts soon put him in the front rank of his profession, and made him one of the most popular men in Scotland. He was honorably distinguished for the attention he gave to the cases of poorer clients, and by the independence and consistency of his political principles. He acted as Lord Advocate under the short-lived Rockingham administration, and again under the Grenville ministry of 1806. In 1812 he retired from public life to Ammondell, in W. Lothian, where he died on 8th Oct. 1817.

ER'SKINE, JOHN, BARON OF DUN, a Scottish theologian, born near Montrose in 1508 or 1509. He was educated at Aberdeen University, and was the first to encourage the study of Greek in Scotland. Buchanan called him 'a man of great learning.' He early embraced Protestantism, was both a preacher and soldier, and was one of the commission appointed in 1577 to arrange the scheme of Church government known as the *Second Book of Discipline*. E. died March 21, 1591.

ERSKINE, THOMAS, OF LINLATHEN, born 13th Oct. 1788, was the grandson of John E. of Carnock, and nephew of the Evangelical leader the Rev. John E. He was called to the Scotch bar, but did not practise. His life, which was private but not retired, was spent chiefly at Linlathen and Edinburgh with occasional visits to Paris and Geneva. He died in March 1870. E.'s first literary effort was assisting in the Scotch editions of the works of Richard Baxter and John Gambold (1822). In his *Remarks on the Internal Evidence of Revealed Religion* he represents the incarnation as something contrived to produce a certain vivid effect, not otherwise producible, on the human mind, viz., a perception of God's infinite love. From this follows salvation, or the conscious habitual surrender of the human will to the divine. His *Unconditional Freeness of the Gospel*, a book warmly praised by Dr. Chalmers, is still much read. He insists on the universality of the offer of pardon through Christ, which on the stricter Calvinistic view is inconsistent with election. Hence in his *Doctrine of Sacrifice*, he represents that the quickening Spirit of God has passed into every corrupt soul of man, and that there is a real freedom, or power of choice, to follow or to resist its suggestions. E.'s latest meditations are contained in a posthumous volume, *The Spiritual Order*. What attracted men towards E. was his sweet and earnest simplicity of religious faith. He formed a link between Scotland and the finer minds in the English Church. See Dr. Hanna's *Letters of T. E.*, 1800–40 (Edinb. 1877).

ESCH'WEILER ('Ash-tree dwelling'), an important manufacturing town in Rhenish Prussia, on the Inde, 9 miles E.N.E. of Aachen. Pop. (1871) 15,490. The principal industries are the manufacture of iron and tinned ware, machines, needles, iron-wire, silks, ribbons, leather, and waxcloth. E. has besides breweries, rolling-mills, copper forges, and lead and coal mines. Some of the coal-mines are 200 fathoms deep. In 1872 there were forty-eight pits with 5700 workmen, who produced 1,050,000 tons. Tin and silver are also found.

ES'CUAGE (Old Fr. *escut*, 'a shield,' from Lat. *scutum*), in English feudal law, meant service of the shield, a kind of service by which the tenant was bound to follow his lord to war at his own charge. It also denoted compensation for military service.

ES'CULIN, an alkaloid obtained from the capsules of the fruit of *Æsculus hippocastanum* (horse-chestnut). E. is slightly bitter, almost insoluble in cold water, soluble in 12 parts of boiling water, and more soluble in alcohol. E. has been introduced in Lyon for the cure of ague and periodic neuralgia, in place of quinine. Dose, 15 grains twice a day. The bark was used for the same purpose in 1720, and during the wars of the French Republic, when the importation of cinchona was interrupted.

ESDRAE'LON is the Greek form of the Hebrew Jezreel, occurring only twice in the Apocryphal Book of Judith, iii. 9 and iv. 6. In Judith i. 8 the form is Esdrelom, and in chap. vii. 3, Esdraelom. The Plain of E. is triangular in shape, the mountains of Gilboa on the E. forming the base, the mountains of Galilee on the N. the one side, and Mount Carmel on the S.W. the other. Owing to its natural features it has been from time immemorial the battlefield of Syria, and from its position between Asia Minor and Egypt almost the battlefield of the East. It was the scene of the battle between Barak and Jabin (Judges iv.), Gideon and the Midianites and Amalekites (Judges vi., vii.), Saul and the Philistines (1 Sam. xxix. 1), Ahab and Benhadad (1 Kings xx.), and between Josiah and the Egyptians (2 Kings xxiii., where it is called Megiddo, from the town of that name which stood on its southern border). Here the Assyrians and Persians, the Crusaders and Saracens, the Egyptians and Turks, the Arabs and Franks have fought, and here Bonaparte gained one of his victories.

ESS'LING, a village of Austria, 5 miles E. of Vienna, together with Aspern the site of a fierce but indecisive battle between Napoleon and the Austrians, May 21–22, 1809. From it Massena got his title of 'Prince of E.'

ETH'EREGE, SIR GEORGE, one of the Restoration Dramatists, was born about 1636 in Oxfordshire. He was educated at Cambridge, traveled on the Continent, and on his return became the associate of Sedley, Rochester, Villiers, and other courtiers of Charles II. He was knighted about 1683, and sent as English minister to Hamburg and Ratisbon, where he died about 1694, from falling down stairs after a carouse. E. has left three comedies—*The Comical Revenge, or Love in a Tub* (1664); *She would if she could* (1668); *The Man of Mode, or Sir Fopling Flutter* (1676). Dryden (*Epistle to E.*) speaks of his terse comic wit, but his characters are flimsy, his dialogue generally trifling, and his plays only interesting from the swift succession of incidents. E. was imitated by Cibber. See Ward's *English Dramatic Literature*, vol. ii.

ETHERS are compounds of hydrocarbons, or of hydrocarbon radicals with elements or acids. Compounds of hydrocarbons and their radicals with elements are called *simple* E., while their compounds with acids are called *compound* E. Many of the latter occur in nature, and of these the fats and many fruit essences are important examples.

ETSCHMIAD'SIN, a fortified monastery in the Russian government of Erivan, on a tableland 20 miles N. of the town of E., ceded to Russia by Persia in 1828. Famous as the seat of the Armenian Katholikos or patriarch since 1441, and the meeting-place of the synod of the Armenian Church, it has been called the 'Rome of Armenia.' It has splendid buildings and gardens, several churches, a library (once much richer in Armenian literature than it is now), and some notable relics; among others a bit of Noah's ark, the point of the spear which pierced the Saviour on the cross, the hand of Jacobus of Nisibis, and of St. Gregory himself.

EUGLE'NA, a microscopic organism occurring in infusions of decayed organic matter, and generally believed by naturalists to

be an infusorian animalcule. Some authorities consider it to be a lower plant-form. The body is provided with a single lash-like filament or *flagellum* used for locomotion, and a pigment-spot is also developed in the body. The E. may be colored green with the same substance (*chlorophyll*) which imparts the green color to plants. *E. viridis* is a familiar species.

EU'LENSPIEGEL ('Owlglass') TYLL, the hero of a great number of German popular stories, who, as a wandering journeyman, travels over the country, indulging, under the guise of a simpleton, in knavish tricks and wild frolics. E. is most probably an imaginary character, but some assert that he was born at Kneittingen, Brunswick, that he roved through the N. of Germany, visited Rome and Poland, finally settled at Mölln, near Lübeck, and died there in 1350. A tombstone is shown at Mölln, with a looking-glass (*spiegel*) and an owl (*eule*) on it; but Damme, in Belgium, also claims to be the place where E. was buried. It is not known when or in what dialect the jocose tales in which E. figures were first written. Most probably they were composed in Low German, and from this were translated into High German by the Franciscan Thomas Murner, who collected and edited them in 1519. There is a new edition by Lappenberg in 1859. The stories are very indecent, but have been popular not only in Germany but in other parts of Europe, and have been translated into French, English, Latin, Dutch, Danish, and Polish.

EU'NICE, a large genus of Errantia or marine worms, the species of which live in the sand of our own and other coasts. One of the largest is *E. gigantea*, measuring 4 feet or more. These worms possess prominent side bristles or *setæ*, and the mouth is provided with a protrusible proboscis, armed with several pairs of horny jaws. The gills or branchiæ are large.

EUPHO'NIUM, a bass instrument of the bugle class, used in brass bands.

EUREKA, a town of Humboldt Co., Cal., on Humboldt Bay, 7 miles from the sea, and 225 N. of San Francisco. It is engaged in agriculture and the lumber trade. Pop. 5000.

EUREKA SPRINGS, a town of Carroll Co., Ark. It contains famous healing springs, which form the chief source of the prosperity of the town. At the height of the season, the population reaches 25,000. Pop. 5,000.

EURO'PA is the ancient name of the continent of Europe. It is commonly supposed to have been derived from E., the daughter of Agenor, king of Phœnicia, but Hermann has plausibly suggested its derivation from two Greek words, meaning the 'broad land.' The E. of the ancients at no time equalled in extent the modern continent. The primitive E. of Homer was comprised within very narrow dimensions, and at its greatest size the E. of the Greeks was bounded by the chain of mountains N. of Thrace, Italy and Iberia, and did not comprehend more than a third of modern Europe. The geographical knowledge of Southern E. was obtained by the successive victories of the Roman arms, especially by the Gallic campaigns of Cæsar. The traders who followed the advancing legions of the Empire penetrated beyond the Elbe, the Weser, and the Vistula, but the conquerors possessed little, if any, knowledge of the races who roamed through the remoter regions of the N. Subsequent additions to the geography of E. are chiefly due to the Scandinavian pirates, to the Christian missionaries who explored Scythia and Sarmatia, and to Karl the Great, Ælfred the Great, and the Teutonic knights, by whom, in the annexation of Prussia, the long series of geographical discoveries was completed.

EURO'TAS, the classic name of the modern *Basilipotamo*, a famous river of Greece, which flows through the ancient Laconia, down a beautiful vale with dark gorges, and through a fertile plain into the Gulf of Kolokythia, the ancient *Laconicus Sinus*. Sparta stood upon the right bank of the E., near its confluence with its only important tributary, the Œnus.

EURYALE, a genus of starfishes (*Echinodermata*) belonging to the order *Ophiuroidea*, which also includes the sand-stars and brittle-stars. In E. the body exists in the form of a globose disc, with five obtuse angles, from which the prehensile arms are given off. The arms are long and contorted, but are even more so in the nearly-allied *Asterophyton*, or 'Medusa-head' starfish.

EUTAW SPRINGS, BATTLE OF, an engagement of the war of the Revolution, between a British force, commanded by Col. Stewart, and an American force, commanded by Gen. Greene, on Sept. 8, 1781, in South Carolina. The former were compelled to retreat with a loss of over 600. Gen. Greene's loss was nearly as great.

EVANS, AUGUSTA J., a popular American novelist, born near Columbus, Ga., in 1835. In early life she removed, with her father, to Texas, and in 1868 was married to L. M. Wilson, Esq. Her works have had an extensive circulation. The following are among the best known: *Inez, a Tale of the Alamo; Beulah; Macaria; St. Elmo;* and *Vashti.*

EVANS, FREDERICK WILLIAM, born in England, in 1808. In early life he came to the United States, with his father, where he learned the hatter's trade. He became interested in socialism, and eventually joined the Shakers, among whom he at once became prominent as a preacher and thinker. He has published numerous works relative to the doctrines and practices of Shakerism and *Life of Ann Lee.*

EVANS, OLIVER, born at Newport, Del., in 1755. In 1772 he was led to seek a substitute for animal power in moving wagons. The result of these investigations was two of the most important inventions of the world, the automatic flour-mill and the high-pressure steam-engine. The former was first introduced in the Ellicott Mills, near Baltimore, Md., and is now employed throughout the world. In 1801 his high-pressure engine was perfected, the essential principle of which is now used in all locomotives and road engines. Mr. Evans prosecuted his work in the face of many obstacles and discouragements, but lived to see its full utility recognized. Died in New York, April 25, 1819.

EVANSTON, a town of Cook Co., Ill., on the Chicago & North-Western Railroad, 11 miles from Chicago. It is the seat of the North-Western University and the Garret Biblical Institute. Pop. 6707.

EVARTS, WILLIAM MAXWELL, LL.D., a distinguished American statesman and lawyer, born at Boston, Mass., Feb. 6, 1818, and graduated from Yale College in 1837. He studied law and began the practice of that profession in New York City in 1840. He rapidly gained distinction by his legal acumen and eloquence. When President Johnson was impeached before the U. S. Senate, Mr. Evarts, assisted by others, successfully conducted his defence. During parts of the years 1868–69, he was Attorney-General of the U. S., and in 1871 he was one of three, appointed by President Grant, to represent the United States before the Alabama Claims tribunal at Geneva, Switzerland. He still resides in the city of New York, where he conducts a large practice, and has the reputation of being one of the most brilliant advocates in the U. S. In Jan., 1885, he was chosen U. S. Senator from New York.

EWELL, RICHARD STODDARD, a Confederate general, born in the District of Columbia, in 1816, and graduated from West Point in 1840. He served with distinction during the Mexican war, and was engaged at Vera Cruz, Cerro Gordo, Contreras, Churubusco, Molino del Rey, and Chapultepec. At the outbreak of the civil war, he resigned from the U. S. army, and entered the Confederate service. During 1861–62 he participated in numerous engagements, and in 1863 was made lieutenant-general, and succeeded Stonewall Jackson, upon the latter's death. He commanded the Second Corps at Winchester, Gettysburg, and the Wilderness. Died at Spring Hill, Tenn., Jan. 25, 1872.

EWING, THOMAS, LL.D., an American statesman, born in Virginia, Dec. 28, 1789. By his own exertions he acquired an education, and removing to Ohio, was admitted to the bar, and began to practice law. He soon became eminent in his profession, and in 1831 was made U. S. Senator. In 1841 he was appointed Secretary of the Treasury by Harrison. He held other positions of public trust, and in 1850 was again made U. S. Senator. E. retired from public life in 1851, and died Oct. 26, 1871.

EXCHANGE, STOCK. In former times the business now carried on in the S.-E. of London was transacted in the Bank of England; but about the year 1700 the dealers in public securities changed their place of meeting to what is now called *Change Alley.* In 1773 some of the brokers hired rooms for business purposes in Sweeting Alley. To these they gave the name of *S. E.* Subscriptions were subsequently raised to erect a building for the special purpose of dealing in stocks. The site chosen was Capel Court, so called after William Capel, Lord Mayor of London, who had resided there. Admission to the society of the brokers, which had formerly been free, was now appointed to be by ballot and subscription. The old building was removed and the present one opened in 1854. Members are governed by a committee, who have power to suspend or expel any member 'guilty of dishonorable or disgraceful conduct.' A member is not allowed to transact business with any one who is not a member, and all transactions must be according to the custom of 'the house.' Members of the E. are either 'jobbers' or 'brokers.' A jobber deals on his own account. A broker acts for a client, deals with the jobber, and is paid by commission. A 'bull' buys for settlement at a future date on the speculation of a rise in price in the interval. A 'bear' sells for future settlement, on the speculation of a fall in price in the interval. Hence what are called *bull* transactions and *bear* transactions are speculations for the 'rise' or 'fall' of stocks. What is called the 'making-up' price of stocks is their average prices during the day, and the difference between this and the prices at which business is actually done is received and paid by the bulls and bears, or accounts are carried over on this principle. Such is the nature of what are called *time bargains.*

Stock exchanges have been organized in many of the leading cities of America, and that of New York is one of the largest of the world. Their method of business is much the same as that of the London Stock Exchange, the general principles of business being of course essentially the same. There are some slight differences in terminology.

EXONERATION (Lat. *ex*, 'out of,' and *onus*, 'a burden'), in law, signifies the legal act which frees one from an obligation.

EXOPHTHALMIA (Gr. *ex*, 'out,' and *ophthalmos*, 'the eye'), protrusion of the eyeball, may be caused by disease of the eye, or by any kind of growth within the orbit. If the case is left to itself, the protruded eye sometimes inflames and bursts.

EXOSTO'SIS (Gr. *ex*, 'out of,' and *osteon*, 'a bone'), an unnatural protuberance or morbid enlargement of a bone. E. is predisposed to by syphilis, scrofula, and cancer, and is sometimes hereditary; but in general, it occurs without any distinct or appreciable exciting cause.

EX PAR'TE. In judicial proceedings a step is said to be taken *ex parte* when the opponent, by neglect or refusal to appear, has not been heard in opposition.

EXPLO'SIVES, the name given to substances which, under the influence of heat, electricity, or percussion, are suddenly converted from a solid or liquid state into a gaseous form, producing an explosion whose force is proportional to the volume of the gas and its rapidity of disengagement. These substances are either chemical compounds or intimate mechanical mixtures. In the former the explosion results from the violent dissociation of the combined elements, as, for example, when the liquid chloride of nitrogen is resolved into its two component gases, chlorine and nitrogen; and in the latter the explosion arises from the combination or rearrangement of the elements composing the mixture, of which gunpower is the type.

Gunpowder and analogous preparations have long been used for purposes of war and pyrotechnic display, but the bulk of the substances embraced under the term E. have only of late years been discovered, and already their manufacture and utilization in mining and blasting operations have made wonderful progress. In their respective places in this work, the composition and character of the most important E. have been dealt with; here we only can enumerate those kinds which have been commercially prepared, or practically used, and for convenience of arrangement we shall classify them as mixtures and compounds. In mechanical mixtures a nitrate or a chlorate is the predominant ingredient, and with heat it freely gives off oxygen, which in a nascent condition combines with the other ingredients, generally carbon and sulphur, forming gaseous products. The nitrate mixtures embrace gunpowder, pyrolithe (nitrate with carbonate of soda, sulphur, and sawdust), and poudre-saxifragine (nitrate of baryta, saltpetre, sulphur, and charcoal). The chlorate mixtures comprehend Horsley's blasting-powder (chlorate of potash, charcoal, powdered nutgalls, &c., soaked with nitro-glycerine), Brain's blasting-powder (resembling that of Horsley), Ehrhardt's powder (chlorate and nitrate of potash, powdered coal and tannin), teutonite, chlorated gun-cotton, &c. The chief chemical compounds constituting E. are—nitro-glycerine, and bodies prepared from it—dynamite, dualine, lithofracteur; glyoxiline (gun-cotton pulp and saltpetre saturated with nitro-glycerine and methylic nitrate), gun-cotton, cotton-gunpowder, Schultze's powder (woody fibres treated with nitric and sulphuric acid and hot alkalies, and afterwards saturated with nitrate of potash solution), nitro-mannite, picric powder, the chloride and the iodide of nitrogen, and the fulminates of mercury, silver, &c.

EX POST FAC'TO is a legal term denoting an act done to affect a right previously questioned or a demand previously made. An *ex post facto* law operates retrospectively. It is only in extraordinary circumstances that this effect is given to a penal measure.

EXTRAJUDI'CIAL. The term is usually applied in law in contradistinction to *judicial*. E. matter is that which is not intended to form any part of the record, or of the judicial pleadings, or admissions of the parties, such as communings or correspondence with a view to a private settlement of the case.

EXTRIN'SIC EV'IDENCE is evidence beyond (Lat. *extra*) that of the deed or document under consideration. The general rule of law is that it is incompetent to contradict or modify the terms of formal writings unless fraud be alleged and proof offered; but in certain circumstances, as where there is ambiguity in the writing, such evidence is admitted in explanation.

EXUDA'TION (Lat. *ex*, 'out,' and *sudatio*, 'a sweating') is the escape of a portion or constituent of the fluids of the living body from their vessels, and is not necessarily the result of disease or injury. E. never results from the rupture of a vessel, and in this respect it is distinguished from extravasation. When E. occurs, the vessels may be entire, or their coats may be in a relaxed condition, or a part may be weakened from disease or injury; and the effusion takes place by mechanical filtration.

EYE-AG'ATE, the name applied to any banded agate with a prominent central spot like the pupil of the eye. The name *eyestone* is given to stalactitic limestone, which presents a similar appearance.

EYE'MOUTH, a market-town in Berwickshire, Scotland, is situated on the river Eye, and is a sub-port to Leith. It is 7½ miles N.N.W. of Berwick-on-Tweed, is irregularly built, and the only buildings of note are the churches. It has profitable herring and haddock fisheries. Windbound vessels resort to the harbor, which is sheltered from all winds except the N. and N.E. Pop. (1881) 2296.

EZZELI'NO, or ECCELI'NO, DA ROMANO, an Italian family, of German origin.—E. I. came to Italy about the middle of the 11th c., in the suite of Konrad II., from whom he received the castle of Romano near Padua, and several fiefs.—E. II. enlarged the family's lands, and commanded the forces of the Lombard league against Friedrich I. He died about 1183.—E. III. son of E. II. became podesta of Vincenza about 1150, and was a conspicuous Ghibelline chief. He died in 1135.—E. IV., surnamed the Tyrant, was born April 25, 1194, supported the Ghibelline cause, and in 1236, being hard pressed by the Marchese d'Este, sought aid from Friedrich II., was made captain of the imperial party, and extended his authority over Verona, Vicenza, Padua, Feltre, and Belluno. He contributed greatly to the Ghibelline victory at Cortenuova; in 1238 he married Selveggia, the emperor's natural daughter; and finally spread his power from the Adriatic to the neighborhood of Milan. He consolidated his tyranny by horrible atrocities; and in 1252 he was excommunicated, and a league made against him by the chief Lombard towns, but without success. His career of aggrandizement continued until 1256, when, Alexander IV. having preached a crusade against him, a new alliance, joined by Venice, was formed to oppose him. In 1259, when marching on Milan, he was defeated and captured, whereupon he refused food, tore the dressings from his wounds, and died. His son Alberico was shortly afterwards killed, and E.'s lands were shared among his enemies. E. was a man of rare energy, ability, craft, and monstrous cruelty. Indifferent to pleasure, he was possessed by a lust for murder which has made him the center of hideous legends. His barbarities, says Mr Symonds, 'laid a deep hold upon the Italian imagination, and proved in the end contagious.' See Verci's *Storia degli Eccelini* (1844), and Symonds's *Renaissance in Italy* (1875).

F.

FABRICIUS LUSCI'NUS, CAJUS, figures in Roman history as a model of antique simplicity, courage, and patriotism. When consul in B.C. 282, he delivered the city of Thurii, which was besieged by the Lucanians and Bruttii, and subsequently defeated the Samnites. When Pyrrhus came over from Greece to assist the Tarentines, F. was sent to confer with him, after the defeat at Heraclea (280), about a ransom of captives. The Greek monarch offered him gold if he would try to induce the senate to make peace, but F. was proof against both his bribes and his threats. Pyrrhus was so much impressed with his patriotic fidelity that he restored the prisoners without ransom. During F.'s second consulship, in 278, the physician of Pyrrhus secretly paid him a visit, and treacherously offered to poison his master for a reward. F. indignantly handed him over to the king, who again expressed his thanks by setting free all his Roman prisoners. While Pyrrhus was absent in Sicily, F. was victorious over the peoples of Lower Italy. He died poor, about 250, but the state charged itself with the upbringing of his only child.

FA'BYAN, Robert, an English chronicler, born of a good Essex family in London, in the second half of the 15th c. He was a member of the Drapers' Company, and took an active part in civic affairs, becoming sheriff and alderman, and afterwards assessor of the London wards to Henry VII. He died February 28, 1512. He wrote a *Concordance of Histories* (first printed in 1516), compiled from monkish annalists, and marked by a strong ecclesiastical bias. It gives the history of Britain from Brut to 1504, in English prose, and has a prologue and seven episodes in verse.

FAIDHERBE, Louis Leon Cesar, a French general, born at Lille, June 3, 1818, served in Algeria, and as Governor of Senegal; commanded the *Armée du Nord* in the Franco-Prussian war, and was beaten, greatly through the want of artillery, at St. Quentin, January 17, 1871. He joined Gambetta's party, and was elected by the central canton of Lille to the National Assembly in 1871, but retired into private life on the success of the Thiers government. Besides proving himself an able soldier, F. has written valuable scientific articles—a *Notice sur la Colonie du Sénégal* (1859), and *Campagne de l'Armée du Nord* (1871).

FAILL'Y, Pierre-Louis-Charles-Achille de, a French general, born at Rozoy-sur-Serre, Aisne, January 21, 1810. He served in Algeria, distinguished himself in the Crimean war, and in 1867 won unenviable notoriety as the conqueror of Mentana. He held a command in the Franco-Prussian war, and was captured at Sedan. F. was severely censured for incapacity by his countrymen.

FAIRBAIRN, Robert Brinkerhoff, D.D., an eminent scholar and clergyman of the Episcopal Church in America, born in the city of New York, May 27, 1818, and graduated from Trinity College, Conn., in 1840. He entered the ministry in 1843, and after filling the pastorate of several churches, became, in 1862, professor of mathematics and natural philosophy at St. Stephen's College, Annandale, N. Y. He was subsequently made warden of the college. He has published numerous sermons and essays of much merit.

FAIRBANKS, Erastus, LL.D., an American manufacturer, born at Brimfield, Mass., Oct. 28, 1792. In 1825 he entered into partnership with his brother, and the firm erected extensive works at St. Johnsbury, Vt., for the manufacture of Fairbanks' scales. He held various political positions, and was twice Governor of Vermont. F. accumulated a large fortune, and gave largely for charitable and religious objects. Died at St. Johnsbury, Vt., Nov. 20, 1864.

FAIRCHILD, James H., D.D., an American educator, born at Stockbridge, Mass., in 1817, entered Oberlin College, O., in 1834, and has been connected with that institution ever since. He was first student, then tutor, then professor, and in 1866 became its president. He has published a valuable *Moral Philosophy*, and numerous essays.

FAIRFIELD, Sumner Lincoln, an American poet, born at Warwick, Mass., June 25, 1803, and was educated at Brown University, Rhode Island. In 1825 he traveled abroad, and, returning to the U. S., became principal of Newton Academy, near Philadelphia, Pa. The following are among his publications: *Lays of Melpomene* (1824), *Cities of the Plain, Percè la Chaise, Westminster Abbey, The Sisters of St. Clara* (1826), *The Heir of the World* (1829), *Abaddon*, and *The Last Night of Pompeii* (1832). Died at New Orleans, La., March 6, 1844. His life has been written by Mrs. Fairfield, 1846.

FAIR OAKS, Battle of, an important engagement of the civil war, at and near a locality of the same name, in Henrico Co., Va. The Union army under Gen. McClellan, having crossed the Chickahominy, and moved southward, was attacked by the Confederates, under Gen. Johnston, May 31, 1862. There was desperate fighting all along the line, and at the close of the day, the results were slightly in favor of the Confederates. Gen. Johnston, having been seriously wounded, the command of the Confederates devolved upon Gen. G. W. Smith. On the morning of June 1, the attack upon the Union lines was fiercely renewed, but at every point was repulsed, and the Union forces assuming the offensive, the Confederate lines were broken, and Smith's army fled in confusion towards Richmond. The Union loss in killed, wounded, and missing was 5739, and that of the Confederates was probably greater. It is generally believed that if McClellan had followed up his advantage, and had sharply pressed the defeated army of his opponent, he might have captured the city of Richmond. As it was, the victory was undecisive, and had no appreciable effect upon the war.

FANFISH, or SAILFISH, the name given to the *Histiophorus immaculatus*, a species of Teleostean fishes belonging to the family *Hiphiidæ* or swordfishes. The name is derived from the great height and size of the dorsal fin, which the fish appears to raise or depress at will. The ventral fins are very small, and the tail is deeply forked, its lobes being of equal size. The F. inhabits tropical seas, and is common around the coasts of Ceylon.

FAN'TI or FANTEE, a country of W. Africa, on the Guinea coast, lies between the rivers Sakuru on the E., and Kaku on the W., and is separated from Ashanti on the N. by dense forests. It is a rich strip of coast-land, yielding much gold-dust, and supporting a numerous people. The Fantis are closely allied in race to the Ashantis, who conquered them and greatly destroyed their country in 1807. See Captains Brackenbury and Wilson, *Fanti and Ashanti* (1874).

FARAI'ZI, a name derived from the Arabic *farz*, 'a command,' and applied in India, and especially in Bengal, to the reformed sect of Mohammedans who are generally known as Wahabs. About the year 1827, a pilgrim from Mecca, on returning to his native village in the district of Furreedpore near Dacca, taught the new faith to his neighbors. It is supposed that the majority of the Mussulmans in Eastern Bengal, who there outnumber the Hindus, now belong to the F. sect. In 1831 the propagandism gave rise to serious riots, and again in 1870 the villagers of the Gangetic delta were found to be carrying on intrigues with the armed rebels on the frontier of the Punjaub; but at the present time there is no reason to doubt the loyality of this portion of the Indian community.

FARGO, a city of Cass Co., Dakota. It is an important railroad center, and is at the head of navigation of the Red River. It is a shipping point and a center of trade of the Red River Valley. Pop. 8000.

FARIBAULT, a town of Rice Co., Minn., 65 miles from St. Paul. It has 3 railroads, several institutions of learning, and the State School for the Deaf, Dumb, Blind, and Feeble-minded. The surrounding country is engaged in agriculture. The town has seven flouring mills and other manufactories. Pop. 5415.

FARNHAM, Eliza Woodson, Mrs., an American writer and philanthropist, born at Rensselaerville, N. Y., Nov. 17, 1815, went to Illinois, and became the wife of Thomas J. Farnham, Esq. During her life she was interested in prison reform, the assistance of destitute women, and the amelioration of the condition of the blind. She published *Life in Prairie-Land; California Indoors and Out; My Early Days*, and *Woman and her Era*. Died in New York City, Dec. 15, 1864.

FARN'WORTH, a town of Lancashire, 12 miles S.E. of Liverpool, and a station on the Manchester and Bolton Railway. It has a chapel of the 15th c., a free grammar-school, and manufactures of watches, canvas, and iron tools. Pop. (1871) 9226.

FARR'AR, The Rev. Frederic William, M.D., F.R.S., son of a clergyman, was born at Bombay in 1831, and studied at Trinity College, Cambridge, of which he was made a Fellow in 1856. He was appointed assistant-master at Harrow in 1855, master of Marlborough School in 1869, and chaplain in ordinary to the Queen in 1873. F. has been a prolific author. Among his works are *Eric, or Little by Little*, and *Julian Home*, successful tales; *The Fall of Man* (1865); and *The Life of Christ* (1874). Also *Life and Epistles of St. Paul* (1882).

FA'SA, a town in the province of Fars, Persia, 77 miles E.S.E. of Shiraz. It has manufactures of silk, wool and cotton. The pop. has been estimated at 18,000. The *district* of F. is 45 miles long by 9 to 15 broad, and is generally known as the *Garm Sar*, or 'warm region.' It produces rice, Indian-corn, millet, cotton, and fine tobacco, and contains thirty-three villages.

FAU'CIT, Helen, an English actress, born in 1816, made a successful *début* as Julia in the *Hunchback*, at Covent Garden, London, in 1836. She soon rose to the summit of her profession, became a member of Macready's companies at Covent Garden and Drury Lane, and won wide repute for her refined, powerful rendering of Juliet, Beatrice, Imogen, Rosalind, Lady Macbeth, and other Shakespearian characters, and as the heroine in various pieces by Lytton, Browning, and Westland Marston. Her representation of Antigone was a remarkable success, and called forth an eloquent tribute from De Quincey. After her marriage with Theodore Martin, in 1851, this gifted actress continued to appear at intervals on the stage, from which she has now retired.

FAVOSPON'GIA, a well-known genus of fossil sponges occurring in the Upper Silurian rocks. This genus belonged to the section *Calcarea*, or that of the calcareous or limy sponges.

FEATHER STAR (*Comatula* or *Antedon rosacea*), a species of *Crinoid Echinodermata*, which in its earlier stages exists in a stalked condition, but in the adult state is met with as a free starfish form. The F. S. derives its name from its ten arms or rays being provided with numerous little *pinnæ* or processes, which give the arms a feathered appearance. The F. S. was formerly included in the order *Asteroidea* with ordinary starfishes, its early history being then unknown to naturalists. When first discovered in its young and attached state, it was thought to be a new form of *crinoid*, and as such was named *Pentacrinus Europæus*. But when

this new crinoid was observed throughout its entire history, the star-like head was seen to detach itself from its stalk, and afterwards (as the F. S.) to live a free existence. The discovery of its early and attached condition at once showed that the F. S. was a true crinoid, and not an ordinary starfish, which is free and unattached throughout its entire existence. The arms are used by the F. S. as locomotive organs; and the internal organs are confined to the central body or *disc*, and do not, as in ordinary starfishes, send prolongations into the rays. The young or larva of the F.S. is an ovoid creature with four ciliated and transverse bands, and a small mouth and anus. The young F. S. is developed within this primitive embryo, or *pseudembryo* as it is called. The F. S. is widely distributed; it occurs in certain localities on the British coasts.

FECH'NER'S PSYCHO-PHYSICAL LAW. This is as follows:—'Sensations increase proportionately to the logarithms of the strength of the stimulus.'

FECIA'LES, an order of priests among the Romans appointed to proclaim war and to negotiate peace. The *jus feciale* was the only principle recognized by the Romans corresponding to modern international law.

FELICIANS, the adherents of Felix, Bishop of Urgelles, in the Adoption Controversy.

FELLATA' (also called by the various tribes Fula, Fellani, Fulbe, &c.), the most intelligent of all the African races, now occupies a wide area in the W. of the Sudan, and includes many powerful states, as Flausse, Futa-Djalon, Senegal Futa, Massina, &c. The F. advanced from Senegal in an easterly direction, and already in the 16th c. had spread beyond the Niger and comprised several large tribes. It was only, however, in the beginning of the 19th c. that they were stirred to conquest and to the spread of the Mohammedan religion by the Imam and reformer, Othman of Benue, on whose death (1816) the F. territory had increased to an area of 327,140 sq. miles. The people, who are of a reddish color, and of great variety of type, are industrious and clever, but they are oppressed by a grasping aristocracy. The pop. is estimated at about 8,000,000.

FEL'TON, Cornelius Conway, LL.D., a distinguished American scholar, was born at West Newbury, Mass., November 6, 1807. He graduated at Harvard in 1827. In 1832 he became Professor of Greek in Harvard, and in 1860 President of the College. In 1853 he paid a visit to Europe, and published his *Familiar Letters from Europe* in 1865. He died February 26, 1862. F.'s chief works are—*Homer* with English notes (1833), a translation of Menzel's *Deutsche Literatur* (3 vols. 1840), *Panegyricus* of Isocrates (1849), *Birds* of Aristophanes (1852). Along with Sears and Edwards he published *Ancient Art and Literature* (1843).

FENTON, Reuben E., an American statesman, born at Carroll, Chautanqua Co., N. Y., July 11, 1819. After studying law, he engaged in mercantile pursuits. He was a member of Congress from 1857 to 1865, governor of New York from 1865 to 1869, and in that year was chosen U. S. Senator. He has been a member of the Republican party since the time of its organization, and was for many years its recognized leader in his own state.

FER DE LANCE (*Craspedocephalus lanceolatus*), a well-known and most virulent species of Viperine snakes, included in the Rattlesnake family (*Crotalidæ*). It inhabits Brazil and some islands of the W. Indies, and is commonly found in sugar plantations. A large pit exists in each side of the head between the eye and nostril, as in other members of the family *Crotalidæ*. The usual length is 5 to 6 feet. The color is olive above, with cross markings of darker hue, and whitish grey below, the head being of a brown color. The tail has no 'rattle,' but is provided with a spinous process. The bite of the snake is fatal usually within a few hours; and even where recovery takes place, the effects of the poison may persist for long periods.

FERDINAND I., the Upright, King of Aragon and Sicily, the son of Juan I., of Castile, was born in 1373. His disinterested treatment of his nephew, Juan II. of Castile, and his successes against the Moors (especially in taking the city of Antequera), secured his election from a number of competitors to the throne of Aragon in 1412. His intervention in Sicily on behalf of Blanca, widow of Martin I., was marked by the same spirit of justice and courage; and in the Church he exerted himself on the side of peace, entreating Benedict XIII. to retire, and so end the schism. F. died in 1416, and was succeeded by his son, Alfonso V. the Wise. *Castile.*—Ferdinand I., the Great, was a son of Sancho III., King of Navarre, who first liberated Castile from the rule of Bermuda, or Veremund, III. of Leon. F. afterwards annexed Leon and Asturias to Castile. He confirmed the ancient *fueros* of the people, and collected the code of Visigothic law. A victory gained over his brother on the 'Field of Murder' confined the power of Navarre to a territory beyond the Ebro. F. then made a brilliant campaign against the Moors. He was the founder of Castile, and styled himself Emperor. This alarmed Heinrich the Swart, German Emperor, and the Pope was called in. The 'Cid' belonged to this reign. F. died in 1065.—Ferdinand III., the Pious, was born in 1199, succeeded his mother as sovereign of Castile in 1217, and his father, Alfonzo IX., as King of Leon in 1230. He suppressed the revolt of the Lara family in Castile, and then attacking the Moors in Andalusia, captured Cordova in 1236. Twelve years later Seville fell, and the Emir of Granada was compelled to pay tribute. F. died in 1252. He burned the Albigenses who had fled to him for protection, but did much to check lawlessness and founded the famous University of Salamanca. The Archbishop Rodrigo Ximenes of Toledo wrote his biography, *Cronica del Santo Rey Don. F. III.*—Ferdinand IV., the son of Sancho IV., the Brave, reigned over Castile from 1295 to 1312. A great war with Portugal and Aragon, each supporting a claimant to the crown, in which the heroic Perez de Guzman fought for F., was ended by double royal alliances. In his Moorish campaigns, (1305–6) F. captured Gibraltar. He was on good terms with Pope Clement V., who gave him the right to levy a tithe on Church property, and to confiscate the property of the Templar order.

Ferdinand I., of Naples, born in 1423, was the natural son of Alfonso V. the Magnanimous, of Aragon, who bequeathed Naples to F., Sicily with Aragon going to Juan. Though Pope Nicholas V. had bound himself to recognize F., Calixtus III. refused the investiture on the ground that F. was born of adultery. By a bull he also forbade recognition by any other state. The next pope, Pius II., was, however, bribed to keep his predecessor's word by the gift of the town of Beneventum. The turbulent barons, the Count Piccinino, Jean d'Anjou, Duke of Calabria (whom Charles VII. of France had made Governor of Genoa), and the Prince of Tarentum, made war on F. in 1460, and gained a decisive victory near Nola in that year. This was compensated by the victory of Troja in 1462, for which F. was indebted to Scanderbeg of Albania. In 1480 F. retook the town of Otranto from Mohammed II. He died 25th January 1494.—Ferdinand II. was the son of Alfonso II., and the grandson of the preceding. When Charles VIII. marched into Italy, F., deserted by Trivulzio, was beaten at Faenza and San Germano (1495) by D'Aubigny and Armagnac, and compelled to retire to Sicily. Next year the influence of F. the Catholic in the Holy League caused the French evacuation of Naples, and the re-entry of F. He died 7th October 1496.

FERGUS FALLS, in Otter Tail Co., Minn., on the Red River of the North, 200 miles N.W. of Minneapolis. It has excellent water power, and is surrounded by forests of pine and hardwood lumber. It is the center of the 'Park Region' of Minnesota. Pop. 7000.

FERGUSSON, Sir William, Bart., F.R.S., a distinguished surgeon, was born at Prestonpans, East Lothian, March 20, 1808. Educated at Lochmaben grammar-school and at the High School and University of Edinburgh, he became assistant to Dr. Knox and Dr. Turner in the Edinburgh College of Surgeons, of which institution he was made a Licentiate in 1828 and a Fellow in 1829; began to lecture on surgery in 1831, was made Assistant-Surgeon in the Royal Infirmary in 1836, Fellow of the Royal Society, Edinburgh, in 1839, and Professor of Surgery in King's College, London, in 1840. F. was for five years Examiner in Surgery at London University, was made a baronet in 1865, and President of the Royal College of Surgeons of England in 1870. He was a Fellow of the Royal Society of London, and Sergeant-Surgeon to the Queen. F. wrote several treatises on lithotomy, aneurism, &c., and an admirable *System of Practical Surgery*, and invented many surgical instruments. He died 10th February 1877.

FERNAN'DO DE NORONHA, a wooded island, about 8 miles long, in the S. Atlantic, 220 miles N.E. of Cape St. Roque. It belongs to the empire of Brazil, and is used as a convict establishment. In one place the surface attains an elevation of 1000 feet.

FEROZ SHAH, an Indian emperor of the Toghluk dynasty, reigned at Delhi from 1351 to 1388. In his reign the administration was improved and public works were lavishly undertaken. Of these last, the Feroz-Canal is the most celebrated; but F. is said to have constructed altogether 50 dams across rivers, 30 reservoirs, 100 caravanserais, as many hospitals and public baths, and 150 bridges. See the chronicle *Tarikh-i-Firoz Shahi* in Elliot's *History of India*, vol. iii. (Lond. 1871).

FERR'ALUM, a mixture of the sulphates of iron and alumina, carbolic acid and terebine, has recently been introduced for crude deodorizing purposes, where the coarser results of decomposition, such as sulphuretted hydrogen and ammonia, have to be neutralized, as in purifying drains, sewers, cesspools, urinals, stables, &c. See article by Dr. Bond, *On Some New Forms of Disinfectants* (*British Medical Journal*, February 20, 1875).

FESSENDEN, Thomas Green, an American author, born at Walpole, N. H., April 22, 1771, educated at Dartmouth College, and studied law, but soon renounced the legal profession to devote himself to literary pursuits. His principal work, a satire on the medical profession, was *Terrible Tractoration*. For many

years he edited the *New England Farmer*. Among his works are *Democracy Unveiled* and *The Ladies' Monitor*. Died at Boston, Mass., Nov. 11, 1837.

FESS'ENDEN, WILLIAM PITT, was born at Boscawen, N. H., October 16, 1806. He graduated at Bowdoin College in 1823, established himself as a lawyer in Portland, Maine, in 1829, and soon acquired a high reputation in his profession. F. entered political life as a Whig, and was elected to the state legislature in 1832. In 1841 he was sent as representative to Congress; entered the United States Senate in 1854, and signalized himself by an able speech against the Nebraska bill. He became a leading Republican, and as chairman of the finance committee rendered invaluable service during the war. In 1864 he became Secretary of Treasury, but returned the following year to the Senate, where he voted for the acquittal of President Johnson. After suffering long from ill-health, he died September 8, 1869. F. was an eloquent debater, a skillful tactician, an able statesman, and a man of strict probity and honor.

FESZ'LER, IGNAZ AURELIUS, a Hungarian novelist and historian, born at Czorendorf in July 1756, joined the Capuchins, but afterwards became a Protestant, was reader to the Emperor Joseph in 1784, and from 1785–87 Professor of Oriental Languages at Lemberg. Being accused of atheism, he betook himself to Silesia, and finally to St. Petersburg, where he received the chair of Eastern languages in 1809, and died December 15, 1839. He wrote various novels, treatises, &c.; but his chief works, which are all in German, are *Marc-Aurel*, a romance (1790–92), *Mathias Corvinus* (1793), *Attila* (1794), and *Geschichte der Ungarn* (Leips. 1812–25). F. was a deep scholar and graceful writer. See his interesting autobiography, *Rückblicke auf meine 70 jährige Pilgerschaft* (Bresl. 1826).

FEUILL'ET, OCTAVE, a French novelist, was born at St. Lô in Manche, 11th August 1812. He was educated at the college of Louis-le-Grand in Paris, and appeared for the first time as a writer in the columns of the *National* (1845). Since then he has sent forth an incredible number of tales, of which the best known are *Rédemption* (1849), *Bellah* (1850), *Le Cheveu Blanc* (1853), *La Petite Comtesse* (1856), *Le Roman d'un Jeune Homme Pauvre* (1858), *Histoire de Sibylle* (1862), *M. de Camors* (1867), and *Un Mariage dans le Monde* (1875). These are mainly distinguished by skillfully entangled plot, somewhat ambiguous morality, richly poetical descriptions, and lively satiric sketches of Paris society, not omitting its undercurrent of intrigue. F. is also the author of many successful comedies. In 1862 he was made a member of the Academy in place of Eugène Scribe, and in the following year officer of the Legion of Honor.

FI'BRO-SE'ROUS, a term used in anatomy to denote certain membranes, such as the pericardium, which are double, being composed of a layer of fibrous tissue lined by a layer of endothelial cells constituting a serous coat.

FIELD, DAVID DUDLEY, D.D., father of Cyrus W., David D., and Henry M., a Congregational minister, who preached at Haddam, Conn., and Stockbridge, Mass. He was the author of several local histories. Born in 1781, and died in 1867.

FIELD, DAVID DUDLEY, an American lawyer and brother of Cyrus W., born at Haddam, Conn., Feb. 13, 1805, and educated at Williams College. In 1828 he was admitted to the bar and began to practice law in New York City, where he soon rose to prominence in his profession. He early turned his attention to the question of codifying the English common law. In 1847 he was appointed one of a commission, by the New York legislature, to codify the practice of that state. The code presented was adopted by the state, and subsequently by many of the states and territories of the Union. He was afterwards appointed one of a commission to codify the entire law of the state, and the result of the labors of this commission was three codes, a civil, a political, and a penal code. Besides these labors he has conducted a large and lucrative law practice.

FIELD, CYRUS WEST, a brother of David Dudley, born at Stockbridge, Mass., Nov. 30, 1819, and at an early age removed to New York and engaged in business, in which he was very successful. In 1854 he organized a company for the purpose of establishing telegraphic communication between Europe and America by means of ocean cables. Applying to the legislature of Newfoundland, he was granted the exclusive privilege for 50 years of landing cables from Europe and America upon that island. In 1856 he went to England and organized the Atlantic Telegraph Company, contributing largely towards the capital himself. Vessels for this enterprise were provided by the British and American governments. An attempt was made to lay a cable in 1857, and two were made in 1858, all of which resulted in failure. In 1865 the attempt was renewed, and the Great Eastern had laid 1200 miles, when the cable parted, and was lost. On the following year a cable was laid, and that of 1865 was picked up and completed. Through this and other enterprises, Mr. Field has accumulated a vast fortune. He now resides in New York.

FIELD, HENRY MARTYN, D.D., born at Stockbridge, Mass., April 3, 1822, and graduating from Williams College, entered the ministry of the Presbyterian Church. He was pastor of churches at St. Louis, Mo., and West Springfield, Mass. In 1854 he became editor of *The Evangelist*, and is now both editor and proprietor of that paper. He has traveled extensively, and has published several works descriptive of the countries he has visited.

FIELD BUG (*Pentatoma*), a genus of Hemipterous insects belonging to the Heteropterous section of the order. These insects occur in fields and amongst grass, and possess mouths adapted for biting and suction.

FILE-FISH, the name given to various Teleostean fishes belonging to the order *Plectognathi*, and to the genus *Balistes*, *Diodon*, &c. Their bodies are covered with numerous spines, the presence of which has suggested their popular name. They are also known as 'trigger-fishes,' 'urchin-fishes,' and 'globe-fishes,' the latter name being given on account of their power of distending their bodies at will with air.

FILIO'QUE is a word which was subsequently added to the Nicene Creed, and formed a bone of contention between the Latin and Greek Churches. The Nicene Council (325), being chiefly concerned to establish the deity of the Son in opposition to the Arians, merely affirmed the existence of the Holy Spirit, without defining the nature and relations of the third person of the Trinity. Macedonius, Bishop of Constantinople (342), and many others, maintained the Holy Spirit to be a created being, as the Son was regarded by the Arians, and subordinate to the Son, as the Son was to the Father. By the Council of Constantinople (381) the simple phrase of the Nicene Creed, *and in the Holy Ghost*, was expanded into *and in the Holy Ghost, the Lord and giver of life, who proceedeth from the Father, who with the Father and the Son together is worshiped and glorified, who spake by the prophets*. But as this only affirmed that the Spirit proceeded from the Father, room was left for doubt whether the Council denied the procession from the Son. If it were meant that the Spirit did not proceed from the Son as well as the Father, this favored the notion that the Son was subordinate to the Father; if the Spirit proceeded from both the Father and the Son, this seemed to be placing the Spirit in still greater dependence, namely, on two persons instead of one. Accordingly, the Greek fathers merely taught the procession of the Spirit from the Father, without denying the procession from the Son. The Latin fathers, on the contrary, taught the procession of the Spirit from both the Father and the Son, and at the third Council of Toledo (589)—or, according to Bingham, at Bracara (411)—inserted in the Creed of Constantinople the phrase *F.*, making it run :—'and (I believe) in the Holy Ghost, . . . who proceedeth from the Father *and the Son*,' &c. The Churches of the East refused to accept this as an addition to the faith of the Church, or to alter a single word of the Nicene Creed. This led to a schism between the two Churches, which was never thoroughly healed up, although a formal union was effected at Florence, 1439. See Blunt's *Dict. of Doctr. and Hist. Theology* (1872); *Pearson on the Creed*; Neale's *Hist. of the Holy Eastern Church*.

FIN'GAL, more properly FIONN, the great hero of Gaelic, as Arthur is of Cymric romance. It is impossible to determine whether he belonged to Ireland or to Scotland, or what was the exact period in which he lived, while some even maintain that he existed in name only. But if every national hero is a real person, however much his attributes be exaggerated by popular imagination, then perhaps the historical reality of F. may be conceded. In the *Book of Deer* (12th c.) we have mention of the *Féine, i. e.*, the followers of Fionn; he is represented as frequenting both the N. of Ireland and the N.W. of Scotland. There are many old heroic ballads, belonging alike to Ireland and to Scotland (see Mr. Campbell's *Book of the Féine*, 1872), in which F. is celebrated both as a great warrior and as a generous man; but in Ossian (Macpherson) the Gaelic muse has adorned him with every quality which can raise admiration or call forth affection.

FINN'ER WHALE, a name given to various kinds of whales belonging to the family *Balænidæ* or whalebone whales, and derived from their possessing a soft dorsal fin. Finner whales are of large size—the *Physalus Boops* or rorqual sometimes attaining a length of 90 or 100 feet. They are represented by the genera *Megaptera*. *Balænoptera*, in addition to *Physalus*. They are also named 'furrowed' whales, from the fact that the skin is plaited or folded. The whalebone plates are very small and commercially unimportant.

FINNEY, CHARLES G., an American educator and divine, born at Warren, Conn., Aug. 29, 1792. He at first studied law, but in 1822 entered the ministry. He was a man of great eloquence, and met with great success in revival work. He was one of the promoters of Oberlin College, O., and in 1852 became its president.

This position he held until 1866. The following are among his publications: *Guide to the Saviour*, *Lectures to Professing Christians*, *Lectures on Revivals of Religion*, *Sermons on Important Subjects*, *Skeleton of a Course of Theological Lectures*, and *Lectures on Systematic Theology*. Died Aug. 16, 1875.

FIR BHOLG, signifying 'men of the quiver,' a name given to one of the various tribes who invaded Ireland in prehistoric times. The S. of Ireland is sometimes called Bolga, and it is sought to identify the people with the Belgæ.

FIRE-FISH, the name given to certain Teleostean fishes from their brilliant coloration. The best known species is the red F.-F. (*Pterŏis volitans*) of tropical seas, which belongs to the family *Triglidæ* or gurnards. The body is scaly, and has many spines and rays. The dorsal and pectoral fins are especially large, and their rays are prominent. The color is a pinky brown with dark-brown markings. The average length is 8 or 9 inches. The flesh is eaten on the Ceylon coasts.

FISH, HAMILTON, LL.D., an American statesman, born in New York City, Aug. 3, 1808, graduated from Columbia College in 1828, and was admitted to the bar in 1830. He was a member of Congress (1843–45), lieutenant-governor of New York (1847–49), governor (1849–51), U. S. Senator (1851–57), and in 1869 was made Secretary of State by President Grant. He originated the commission that met in 1871 to settle the differences between Great Britain and the United States relative to the Alabama claims.

FISHER, GEORGE PARK, D.D., born at Wrentham, Mass., Aug. 10, 1827. He was educated at Brown University and pursued theological studies at Yale and Andover seminaries and in Germany. Since his return to America he has been connected with the faculty of the Yale theological school. Among his works are *Essays on the Supernatural Origin of Christianity*, &c., and *History of the Reformation*.

FISK, JAMES, JR., born at Pownal, Vt., April 1, 1835. He began life as a peddler, and afterwards accumulated a fortune through steamboat and railroad investments. For several years prior to his death he had entire control of the Erie railroad. F. was shot by Edward S. Stokes, Jan. 6, 1872.

FISK, WILBUR, D.D., an American divine, born at Battleborough, Vt., Aug. 31, 1792, and graduated from Brown University in 1815. He first studied law, but afterwards entered the ministry of the Methodist church. In 1831 he became president of Wesleyan university, Conn. He published several works of a theological character. Died at Middletown, Conn., Feb. 22, 1839.

FIVE FORKS, a district in Dinwiddie county, Virginia, where a Union force, under General Sheridan, won a decisive victory over the Confederates, April 1, 1865.

FIVE POINTS is a name given to the five articles of doctrine which the Arminians presented to the States of Holland (1611), as embodying their views on predestination and grace, on which alone at that time they differed from Calvinists.

FLAMINI'NUS, T. QUINTIUS, the most distinguished representative of a family of the Quintian gens, was born about B.C. 230. He was elected consul B.C. 198, and obtained Macedonia as his province. He threw himself with great ardor into the war with Philip, and in the course of the struggle both achieved military successes and displayed great diplomatic skill. After the complete defeat of the Macedonians at Cynosephalæ, B.C. 197, terms of peace were concluded, by which Philip relinquished all his Greek possessions in Europe and Asia; and during the Isthmian games of B.C. 196, F. proclaimed the freedom of Greece. He took leave of the Greeks B.C. 194, and on his return to Rome celebrated a splendid triumph of three days' duration. Peace was soon disturbed by the war in which the treacherous Nabis, tyrant of Sparta, was subdued. The most notable event in the subsequent career of F., was his connection with the death of Hannibal, who took poison, fearing lest he should be delivered up to the Romans by Prusias of Bithynia. F. died B.C. 174.

FLAMIN'IUS, CAIUS, was tribune of the Roman people B.C. 230, and carried by popular support an agrarian law for the distribution of the recently conquered territory of the Cis-Alpine Gauls. When consul (223), F. gained a great victory over the Insubians. His censorship (220) was distinguished by the two great works that bear his name, the *Circus F.* and the *Via Flaminia*. He was elected consul for a second time (217), and immediately marched against Hannibal, who was advancing southwards. F., with the greater part of his army, perished in the battle on the shores of Lake Trasimenus, B.C. 217.

FLATBUSH, in King's Co., and a suburb of Brooklyn, which it adjoins. It is the seat of the county institutions, and contains numerous fine residences. Pop. 7634.

FLEU'RY, ANDRE HERCULE DE, CARDINAL, a French statesman and ecclesiastic, was born at Lodève, in Languedoc, June 22, 1653. He studied at the Jesuits' College, Paris, was made almoner to the queen of Louis XIV., and, in 1699, Bishop of Fréjus. He gave up his bishopric in 1715, became tutor to Louis XIV.'s grandson, afterwards Louis XV., and insinuated himself into that prince's favor. He was elected into the Academy in 1721, was admitted to the Council of State in 1723, and in 1726 became a cardinal and prime minister of France. His administration was tolerably successful. He strove to economize and lighten taxation, and at first sought to maintain peace at almost any cost, but sacrificed the freedom of the Gallican Church to Ultramontanism, and was nerveless and vacillating in his foreign policy. In 1733 the court party forced him into the war of the Polish succession, on behalf of Stanislaus Leczinsky, Louis XV.'s father-in-law. The struggle ended in 1736, and in 1741 F. was compelled by court influence to take part in the war of the Austrian succession. He died at Paris, January 29, 1743. F. was a well-meaning, benevolent, and peace-loving minister, but had not the energy needful in his position. He patronized learning, and added several valuable MSS. to the royal library. See St. Simon's *Mémoires*.

FLIED'NER, REV. THEODOR, D.D., a philanthropic clergyman, born at Eppstein, near Wiesbaden, January 21, 1800, studied at Göttingen, and in 1821 became pastor of a small Protestant community at Kaiserwerth, near Düsseldorf. F. is memorable as the founder of the Evangelical Deaconesses, who, though not a monastic body, correspond partly to the Catholic Sisters of Charity, visiting the sick and poor in their homes and in public institutions. F. labored with great practical ability to organize these deaconesses, who have proved a boon to Germany, *e. g.*, in the Austro-Prussian war of 1866. Institutions modeled on F.'s establishment at Kaiserwerth have been founded at London, Paris, Berlin, Alexandria, &c. F. died at Kaiserwerth, October 4, 1864. See F.'s *Buch der Martyrer der evangel. Kirche* (1852), and Catherine Winkworth's *Life of F.* (Eng. trans. Lond. 1867).

FLINT, in Genesee Co., Mich., on the Flint River. It has two railroads, and is distant 64 miles from Detroit. It has fine water power, which is employed in various manufactories. It is surrounded by a fertile agricultural country, and carries on an extensive trade. Pop. 8418.

FLINT, AUSTIN, M.D., a distinguished American physician and medical author, born at Petersham, Mass., Oct. 20, 1812, and graduated from the medical school of Harvard University in 1833. He taught in medical colleges at Buffalo, N. Y.; Chicago, Ill.; the University of Louisville, Tenn.; the New Orleans School of Medicine; and in 1859, was called to Bellevue Hospital Medical College. He is the author of numerous medical works, that are highly regarded by the profession, among which are *Diseases of the Heart* and *Principles and Practice of Medicine*.

FLORENCE OF WORCESTER, a monkish chronicler, belonging to Worcester monastery, where he died 7th July 1118. He wrote a chronicle from the Creation to 1117, compiled chiefly from the *English Chronicle* and the work of Marianus Scotus, with additions from Bede, the so-called 'Asser,' and the Lives of the Saints. His chronicle deals mainly with English history, but also notices events abroad. It was brought down to 1141 by others of the brethren.

FLORID'IA, a town of Sicily, province of Noto, near the Alfeo, 7 miles W. of Syracuse. It has some trade in grain, wine, and olives. Pop. 7030.

FLOTOW, FRIEDRICH VON, a German composer, born at Teutendorf, in Mecklenburg-Schwerin, 26th April 1812. He received his musical education in Paris, where also his first successful opera, *Le Naufrage de la Méduse*, was produced in 1839. His compositions are all operatic; they are pleasant and melodious, and in many ways more like the work of a musician than those of his Italian and French contemporaries. While extremely popular, however, both in Germany and France, they are not yet, with the exception of *Martha*, so much known in this country as they deserve to be. The principal are *Stradella*, *Die Grossfürstin*, *Rübezahl*, *Indra*, *Albin*, *Hilan*, and *L'Ombri*.

FLOUR-MITE (*Acarus farinæ*), a species of *Acaridæ* or mites which belong to the spider class (*Arachnida*). They exist among flour, and resemble in form the cheese-mite or *A. domesticus*. The body is oval, has eight legs, and is covered with bristles. The female flour mites are larger than the males.

FLOYD, JOHN BUCHANAN, born in Virginia, in 1805, and graduated from South Carolina College in 1826. He studied law, was a member of Congress (1847–49), Governor of Virginia (1850–53), and in 1857 was made Secretary of War by President Buchanan. He was in full sympathy with the secession movement, then being planned in the South, and, in the exercise of his power, scattered the army as much as possible, and sent large quantities of government stores and arms to various points in the South, that they might be seized by rebels, when open hostilities should be begun. Upon President Buchanan's refusing to withdraw the U. S. troops from Charleston harbor, after the secession of South Carolina, he resigned his position. He became a

brigadier-general in the Confederate army, but, as a military man, did not meet with success. Died at Abingdon, Va., Aug. 26, 1863.

FLYING DUTCH'MAN, THE, like many other mediæval legends, is a growth by accretion rather than a single independent creation. It is traceable to the 16th c., and is typical of a time of rude religious feeling and of wild seafaring adventure. The germ of the story, in its varied forms, is akin to that of Odysseus and the Wandering Jew. For some great sin an accursed mariner is doomed to perpetual and aimless cruisings. In modern forms of the legend he is rescued from his fate by some holy interposition—a religious amulet or a faithful woman's love. According to a late version, the F. D. was an Amsterdam vessel, the master of which, Van der Decken, swore on a certain tempestuous night to make the Cape or to be 'eternally damned,' and 'though he should beat there till the day of judgment;' and there he is still to be seen, with crowded sail, tearing along in the wildest weather. Heine has made the legend the subject of a beautiful tale; Wagner weaves it into one of his finest operas, treating it as symbolical of the universal longing for rest from the storms of life.

FOGARASY, JANOS, a Hungarian scholar and lawyer, was born at Käsmárk in 1801. He gained considerable reputation from his works on jurisprudence, filled several public offices, and in 1848 was made a member of the financial council of Pesth. F. has zealously studied the Magyar tongue, and made important contributions to philology. Among his writings are *A' Magyar nyelo' metaphysicája* (1834), *A' Magyar nyelo szelleme* (1845), a Magyar-Latin dictionary (1835), and various legal and linguistic works. F. and another eminent Hungarian scholar, Czuczor, are the authors of the Dictionary of the Hungarian Academy.

FO'LEY, JOHN HENRY, R.A., a sculptor of rare force of genius and artistic accomplishments, born in Dublin, 24th May 1818, distinguished himself in the drawing and modeling schools of that city, and removing to London, entered the Royal Academy at the age of sixteen. He was elected Associate in 1849, and R.A. in 1855. He first exhibited in 1839, when his two models, 'Innocence' and 'Death of Abel,' attracted favorable notice. His 'Ino and Infant Bacchus' (1840), purchased by Lord Ellesmere, his 'Death of Lear' (1841), 'Lear and Cordelia' (1842), 'Venus rescuing Æneas' (1843), bear witness to the industry with which he followed up his first success. He afterwards produced 'Prospero and Miranda,' 'The Mourner,' 'Egeria,' &c. His fame, however, most securely rests on his fine marble statue of 'Hampden' in Westminster Palace, his 'Lord Hardinge,' now at Calcutta, and the magnificent equestrian statue of 'Sir James Outram'—a work inspired with vigor and heroic feeling, and the artist's masterpiece. Like the 'Hardinge,' the 'Outram' is now in Calcutta. F. died in London, 27th Aug. 1874.

FOOT, SOLOMON, an American lawyer and statesman, born at Cornwall, Vt., November 19, 1802, and educated at Middlebury College, Vt. He taught for several years, and in 1831 became a lawyer. After holding several positions of public trust in his own state, he was elected to Congress in 1843, and again in 1845. In 1850 he was made U. S. Senator, and continued to hold that office until his death at Washington, D. C., March 28, 1866.

FOOTE, ANDREW HULL, rear-admiral in the American navy, was born at New Haven, Connecticut, May 4, 1808. He entered the navy December 4, 1822, became a commander in 1852, and a captain in 1861. In February 1862 he received the command of the western flotilla, took Fort Henry, attacked Fort Donelson, where he was wounded, and on April 7 took Island No. 10. He received the thanks of Congress, and was made rear-admiral June 16, 1862. F. was appointed to relieve Admiral Dupont at Charleston, but died at New York, June 26, 1863. Admiral F. was not only a gallant, chivalrous naval officer, but a man of singularly strong moral character.

FORE'CASTLE (pron. *foks'le*), in a ship, strictly an elevated foredeck above the maindeck or the spardeck. Vessels are not frequently built with such a F. now, and the name is generally given to that portion of the forepart of the ship which constitutes the quarters for the crew.

FORR'EST, EDWIN, a celebrated American actor, born in Philadelphia, 9th March 1806, first appeared on the public stage at the age of fourteen as Douglas (November 27, 1820). After playing in the chief western cities during a long professional tour, he appeared at the Park Theater, New York, as Othello, in 1826, and at once achieved reputation. He visited England in 1835, again in 1837, when he married Catherine Sinclair, and a third time in 1845. On the third visit to England the friendly relations that had previously subsisted between F. and Macready were severed; and on the occasion of the professional tour of the latter in America, F.'s partisans were the cause of a riot, 10th May 1849, from which the English tragedian barely escaped with his life. F. continued to play till 1871, after which he gave a few Shakspearian readings. He died at Philadelphia, December 12, 1872. F. added a fine presence to a distinct and even powerful histrionic genius. See W. R. Alger's *Life of E. F., the American Tragedian* (Lond & Philad. 1877).

FORT DODGE, a town of Webster Co., Ia., on the Des Moines River, 90 miles N. from Des Moines. It is an important railroad center, and the surrounding country abounds in coal, gypsum, sandstone, limestone, and fire-clay. Pop. 5000.

FORT FISHER, a strong Confederate fortification, near the mouth of the Cape Fear River, N. C. In 1864 it was determined to close the port of Wilmington, N. C., and this could only be effected after the capture of Fort Fisher. On Dec. 13, 1864, a large expedition set forth from Hampton Roads, with this fort as its objective point. The land forces of this expedition were under the command of Gen. Butler. After an ineffectual attempt to injure the fortress by blowing up a vessel laden with powder as near by as it could be towed, on the morning of Dec. 24, the fleet opened fire, and after a bombardment of an hour and a quarter, silenced the guns of the fort. On the following day, the bombardment was renewed, and Gen. Butler landed a part of his forces, but deciding not to attempt an assault, re-embarked and returned. In January of 1865 a second expedition was sent against Fort Fisher under the command of Gen. Terry. On Jan. 15, after a severe bombardment by the fleet, the fort was carried by assault, and captured after a desperate and bloody defence. Gen. Terry took 2083 prisoners, and large quantities of arms. The Union loss in killed and wounded was 646.

FORT MADISON, in Lee Co., Ia., on the Mississippi River, 24 miles above Keokuk. Considerable manufacturing is carried on, and large quantities of produce are shipped from the surrounding farming district. Pop. 4900.

FORT MONROE, a fortification at Old Point Comfort, Va. It was begun in 1817 and has cost nearly $3,000,000. It was designed by Simon Bernard.

FORT SCOTT, in Bourbon Co., Kan., on the Marmaton River. It is engaged in agriculture, manufacturing, and coal-mining, and is a place of considerable trade. Pop. 7600.

FORT SMITH, in Sebastian Co., the most important town of Western Arkansas, on the Arkansas River, and the terminus of the Little Rock & Fort Smith Railroad. It is said to have the second largest cotton compress and oil seed mills in the world, and exports large quantities of wheat, flour, corn, fruit, cotton, stock, and lumber. Pop. 8000.

FORT SUM'TER, a celebrated stronghold of the Confederates during the War of Secession in S. Carolina, on the S. side of the entrance to Charleston inner harbor, and 3 miles from the city. It was built in 1829, and at the time of secession it mounted seventy-eight guns, and was held by a small body of troops under Major R. Anderson. Occupying a commanding position in the harbor of Charleston, it early became the center of interest. The civil war was begun here by the Confederate batteries of General Beauregard on the 12th of April 1861, and the fort was surrendered on the following day. It was held undisturbedly for two years, repulsed a force of nine Northern iron-clads, August 17, 1863, was partly demolished by the land batteries, but was not evacuated till the final surrender of Charleston, February 18, 1865.

FORTU'NY, MARIANO, a modern Spanish painter, was born of poor parents at Reus, near Barcelona, 11th June 1839. His first experience in art was gained by assisting his grandfather, a showman, to paint wax figures. Later he studied at Madrid, and made two journeys through Morocco during the Spanish war, producing a vast number of oil and water-color drawings. On his return he painted, on commission of the Spanish Government, his great picture, 'The Battle of Tetuan,' which procured for him a high reputation as a bold, original draughtsman, and a master of sunny, scintillating color. He eventually settled at Rome, where he founded a school which sought inspiration from nature, and threw discredit on the 'Masters.' His splendid studio latterly became one of the public sights on account of its rare collection of enamels, ceramics, tapestries, &c. He died 21st November 1874. Among his best-known works are 'The Beach at Portici' (sold for $19,760), 'The Siesta,' 'Academicians of Arcadia,' 'Marriage in the Cathedral of Madrid,' 'Snake-charmers,' and 'Madrid Procession Caught in the Rain.' He mainly held to Southern or Oriental *genre* painting. 'Le joli F,' was a perverted genius, cynical and frivolous, whose theatrical subjects lack the genuine feeling of humanity, and whose execution is always more or less feverish and flashy. He was influenced banefully by the artistic necromancy of his brother-in-law, Madrazo, and fell under the weird spell of Gérôme. The criticism of Théophile Gautier greatly helped to raise to a fabulous height the price of F.'s pictures. The unfinished works alone left at his death brought over $80,000. See *F., sa Vie, son Œuvre, sa Correspondance*, by Baron Davillier (Par. 1875).

FORT WORTH, an important trading center of Tarrant Co., Tex., on Trinity River. Four railroads center here, and 8 papers are published. The surrounding country is engaged in agriculture and stock-raising. Pop. 16,000.

FOSTER, BIRKET, an English artist, was born at North Shields in 1812. He was educated at Hitchin Herts, and after practising wood-engraving for some time with Landells, became a draughtsman, in which capacity he early showed an aptitude for the sympathetic treatment of rich pastoral and river landscape. His illustrations of the poetical works of Goldsmith and Scott, of Beattie's *Minstrel, of Evangeline*, &c., are artistic gems, crisp yet fluent in drawing, and in chiaroscuro singularly brilliant and true. Of late years F. has won a high reputation for water-coloring, but his lush bosky dells and bright sunny glades leave an impression more of airy daintiness than of great artistic strength or study. He was elected a member of the Water Color Society in 1860.

FOSTER, JOHN GRAY, born at Whitefield, N. H., May 27, 1823, and graduated from West Point in 1846. He served during the Mexican war, and was wounded at Molino del Rey. At the outbreak of the civil war, he was made brigadier-general of volunteers, and for meritorious conduct in that struggle, was promoted major-general. At the close of the war he returned to the corps of engineers, with which he had formerly been connected. Died at Nashua, N. H., Sept. 2, 1874.

FOSTER, LAFAYETTE SABINE, LL.D., an American statesman, born in Franklin, Conn., Nov. 22, 1806, educated at Brown university, and began the practice of law in 1831. He held numerous political positions in his own state, and in 1855 was chosen U. S. Senator, and again in 1861. After the assassination of Pres. Lincoln, he was, for two years, acting vice-president of the United States. Died in 1880.

FOSTER, STEPHEN COLLINS, an American song-writer, born at Pittsburg, Pa., July 4, 1826. He wrote *Nellie was a Lady; Old Uncle Ned; Camptown Races; Old Folks at Home; Old Dog Tray;* and *Come where my Love lies Dreaming*. All of these attained great popularity. Died at New York, Jan. 13, 1864.

FOSTORIA, in Seneca Co., O. It is an important railroad and trade center; is in the midst of a fine agricultural region; and is engaged to a considerable extent in manufacturing. Pop. 5000.

FOU'CAULT, JEAN BERNARD LÉON, a French savant, was born at Paris, Sept. 18, 1819. Though educated as a physician, he devoted his life to experimental research in the physical sciences, and had charge of the scientific section of the *Journal des Débats* from 1845 till his death, which took place at Paris, Feb. 13, 1868. He is widely known for the calculation of the velocity of light by means of a revolving mirror, and the establishing by direct comparison of the velocities of light in air and water, the undulatory theory over the emission theory; for his invention of the gyroscope, and the application of it, as well as of the simple pendulum, to render the diurnal rotation of the earth evident to the bodily eye; and for his electric light apparatus, with the electro-magnetic regulator. F.'s memoirs are published in the *Comptes Rendus*, and some popular scientific treatises appear in the *Bibliothèque d'Instruction Populaire*.

FOUR'CHAMBAULT, a town in the department of Nièvre, France, near the right bank of the Loire, 5 miles N.W. of Nevers by railway. It has large iron-foundries, forges, and smelting furnaces, and an extensive manufacture of arms. The Loire is here crossed by a suspension bridge. Pop. (1872) 5835.

FOVEAUX' STRAIT separates the South or Middle Island of New Zealand from Stewart's Island. At its narrowest point it is 17 miles in width.

FOX-BATS (*Pteropidæ*), the name applied to a family and section of *Cheiroptera* or bats. They are so named from the resemblance of the head to that of the fox. They are Frugivorous or fruit-eating, and possess a long pointed snout. The ears are of moderate size, and destitute of appendages. Incisors and cutting canine teeth are developed in both jaws. The F.-B. feed chiefly on vegetable matters, but they also subsist on small birds and mammals. The molar teeth have blunt tuberculate crowns. The tail is short or absent. Of the F.-B. the best-known species is the Kalong bat (*Pteropus edulis*) in the Eastern Archipelago, which attains an expanse of wing from 4 to 5 feet. The F.-B. are absent from the New World.

FRANCIS, ST., OF PAULA, born at Paula, in the kingdom of Naples, 1416, was named after St. Francis d'Assisi, to whose intercession his parents believed they owed the birth of the child. Having manifested strong ascetic tendencies even as a child, he was sent at twelve years of age into the Franciscan monastery of St. Mark, in Calabria, where he surpassed all the friars in obedience to their *rule*. On the expiry of his year of probation, after making a pilgrimage with his parents to Rome and other holy places, he took up his abode in a cave on the sea-coast, and devoted himself to a life of extraordinary asceticism. The fame of his sanctity soon attracted to him a number of followers, who built for themselves a chapel and cell in the neighborhood, and he gave to the new order he had thus founded the name of the Eremites of St. Francis. In 1436 the Archbishop of Cosenza sanctioned the building of a cloister and church, and monasteries of the new order soon sprang up in Spain, France, and Germany. In 1474 the *rule* was confirmed by Pope Sixtus IV., and Pope Alexander VI. changed the name of the order to Fratres Minimi. Louis XI. in his last illness summoned F. to France, where in a monastery at Plessis-le-Tours, the saint died, 2d April 1507. He was canonized by Leo X., 1519.

FRANCIS, ST., OF SALES, a bishop and prince of Geneva, was born at the château of Sales near Annecy, 21st August, 1567. He studied rhetoric, theology, and Hebrew in the College of the Jesuits at Paris, and law at Padua, passed advocate at Chambery, and was strongly pressed by his father to become a jurist. But his heart was set on a sacred career, and in 1593 he entered the priesthood. The fame which he won by his first sermons pointed him out as a fit missionary for the district of Chablais, then filled with Protestants. In spite of great opposition, the brilliant young Catholic made numerous conversions, and inspired the Pope with the belief that he might perhaps succeed in winning over Beza himself, then the leader of French Calvinism. Three ineffectual conferences were held in 1597. In 1602 F. visited Paris, preached before Henri IV., who greatly admired him, and signalized himself by the miraculous conversion of courtiers. In the same year he succeeded to the bishopric of Geneva, and in 1607 founded the Florimontane Academy, and published his *Introduction à la Vie Dévote*, a work which excited a prodigious interest, was translated into several languages, and in less than half a century had gone through forty editions. Next year he again visited Paris, where his pious oratory once more brought the city to his feet. Every distinguished person sought his friendship or acquaintance. Cardinal Retz begged him to become his coadjutor and successor, but nothing could induce the modest bishop to abandon his Alpine diocese. Between 1610 and 1614 F. established the orders of the Visitation of the Barnabites at Annecy, and of the Carthusians at Ripaille. Two years later appeared his famous *Traité de l'Amour de Dieu*, which may be said to have evoked the admiration of Christendom. He now thought of resigning his episcopal functions, and passing the remainder of his days in some calm retreat, when the Duke of Savoy required his services at Avignon. On his return he fell ill, and died at Lyon, 28th November 1622. As a writer F. almost equals Montaigne in originality of style and the charm of diction. His *Œuvres Complètes* have been repeatedly published; the best edition is that of Blaise (16 vols. Par. 1835). F.'s letters in particular are exquisitely naïve and graceful. See Hamon's *Vie de Saint François de Sales* (2 vols. Par. 1854).

FRANKFORD, a suburb of Philadelphia, Pa., from which it is six miles distant. It contains important manufactures of cotton and woollen goods, chemicals, carriages, and steel works and iron foundries. Pop. 15,000.

FRANKFORT, the capital of Kentucky, in Franklin Co., on the Kentucky River, 60 miles from its mouth, and on the Louisville & Nashville Railroad, 65 miles from Louisville. It is principally engaged in manufacturing lumber and whisky, and has an extensive trade in coal. Pop. 6958.

FRANKLIN, a town of Venango Co., Pa., on French Creek, near the Alleghany River, 28 miles from Meadville. It has three railroads, and is in the center of the oil regions of Pennsylvania. Pop. 5010.

FRANKLIN, BATTLE OF, an engagement of the civil war between a Union force, commanded by Gen. Schofield, and a Confederate force, commanded by Gen. Hood, near Franklin, Tenn., a small town about 18 miles south of Nashville, on Nov. 30, 1864. Schofield, who was retreating towards Nashville with 17,000 men, was pursued by Hood with 40,000, and at Franklin was forced to halt and give battle. After severe fighting Schofield's men succeeded in repulsing the assault of the enemy, and during the night retired towards Nashville unmolested. The Confederate loss was about 6000, that of the Union army about 2400.

FRANKLIN, WILLIAM BUEL, an American general, born at York, Pa., Feb. 27, 1823, and graduated from West Point in 1843. He served during the Mexican war on the staff of Gen. Wool, and was afterwards professor of philosophy at West Point. He served in the Union army during the civil war, and rose to the rank of major-general of volunteers. In 1866, he resigned from the service.

FRASER, CHARLES, an American portrait painter, born in Charleston, S. C., Aug. 20, 1782; and died at the same place, Oct. 5, 1860.

FRAZIER'S FARM, BATTLE OF, an engagement of the civil war. On June 30, 1862, the Union army of the Potomac, under Gen. McClellan, was retreating towards the James River. It had been pursued by a Confederate force under Generals Jackson and

Longstreet. The Confederate force had been divided, and Longstreet had made a detour, with the intention of intercepting McClellan's retreat. Jackson reaching White Oak Creek, found the bridge across that stream destroyed, and his attempt to force a passage was repulsed. Longstreet, in the meantime, had reached a position where he could attack the Union forces. At 3 P. M. a fierce assault was made upon the Union lines, but after severe fighting along the entire line, the Confederates were driven back. At the close of the struggle, McClellan resumed his retreat, without opposition. Jackson could hear the sounds of battle, but was unable to reach the field of action. This engagement is sometimes known as Glendale. The Union loss was 1800, that of the Confederates 2000.

FREDERICKSBURG, a town of Spottsylvania Co., Va., on the Rappahannock River. It is connected by railroad with Washington and Richmond. Manufactures are carried on; and it is a trade center. Pop. 5010.

FREDERICKSBURG, Battle of. On November 7, 1862, Gen. A. E. Burnside was placed in command of the Union army of the Potomac, in place of Gen. McClellan, removed. He at once consolidated the army into three grand divisions, the right under Gen. Sumner, the center under Gen. Hooker, and the left under Gen. Franklin. The plan of his campaign was to cross the Rappahannock at Fredericksburg, and then follow the line of the railroad to Richmond. On the 17th Sumner's division reached a point opposite Fredericksburg, and found that position occupied by a small force of Confederates. Sumner applied to Burnside for permission to cross the river and take the town, but the latter determined to wait until his communications were fully established. Preparations for crossing were not completed until December 10th, and the 11th and 12th were consumed in crossing the river. In the meantime the Confederates had concentrated in great force under Lee, and had taken up a strong defensive position on the Fredericksburg Heights. On the morning of the 13th a general attack was made on the Confederate line. There was desperate fighting all day, and although the Union forces under Howard, and Hooker, and Humphrey again and again assaulted the enemies' lines, they were unable to dislodge them from their strong position. During the night the Confederates slept on their arms, expecting a renewal of the attack on the following day. Burnside would have renewed the conflict had it not been for the earnest remonstrance of Sumner and his other corps commanders. As it was, the two forces remained confronting each other until the 15th, when Burnside re-crossed the Rappahannock, in the night and during a severe storm. The Union loss was 12,321, and that of the Confederates 5309. Eight days afterwards Burnside was removed from the command of the army of the Potomac. It must be said in Gen. Burnside's defence, that he strenuously objected to his appointment over the army of the Potomac when it was made, alleging, as a reason, his unfitness to command so large a body of men.

FREEDMEN'S BUREAU, established in 1865, as a branch of the war department, to protect the interests of the freedmen and loyal refugees from the States in rebellion against the general government. It provided food, medical care, and education; and was of inestimable value as a humane institution. It was disorganized in 1870.

FRELINGHUYSEN, Frederick, born in New Jersey, April 13, 1753, graduated from Princeton College in 1770, and entered upon the legal profession. He was a member of the Continental Congress (1775); served with distinction in the revolutionary war; served against the Indians, with the rank of major-general (1790); was made U. S. Senator (1793); and died April 13, 1804.

FRELINGHUYSEN, Frederick Theodore, a nephew of Theodore, born at Milltown N. J., Aug. 4, 1817, educated at Rutger's College, and became a lawyer in 1839. He was twice attorney-general of his own state; in 1866 was appointed to the U. S. Senate, and in 1870 was elected to that office. F. was Secretary of State under President Arthur.

FRELINGHUYSEN, Theodore, LL.D., son of Frederick, an American lawyer and statesman, born at Millstone, N. J., March 28, 1787, and graduated from Princeton College in 1804. He served in the war of 1812, and, after holding various political positions in his own state, was made U. S. Senator in 1829. In 1844 he was nominated by the Whig party for the vice-presidency. In 1850 F. became President of Rutger's College. Died at New Brunswick, N. J., April 12, 1862.

FREE'MAN, Edward Augustus, D.C.L., LL.D., one of the first of English historians, was born at Harborne, England, in 1823. He is the son of John F. of Redmore Hall, Worcestershire, was elected scholar of Trinity College, Oxford, in 1841, and fellow in 1845. F. was examiner in the School of Law and Modern History in 1857–58 and 1863–64, and in the School of Modern History in 1873. He contested Mid-Somerset unsuccessfully in 1864; was made D.C.L. of Oxford in 1870, and LL.D. of Cambridge in 1874. He is a prolific author as well as a profound scholar. His works include *Church Restoration* (1846); *History of Architecture* (1849); *Architectural Antiquities of Gower* (1850); *Window Tracery in England* (1850); *Landaff Cathedral* (1860); *History of the Saracens* (1856; new edit. 1876); *History of Federal Government* (vol. i. 1863); *History of the Norman Conquest* (5 vols. 1867–76); *Old English History* (1869); *History of the Cathedral Church of Wells* (1870); *Growth of the English Constitution* (1872); *General Sketch of European History* (1872); *Historical Essays* (1st series, 1871); *Historical Essays* (2d series, 1873); *Comparative Politics and the Unity of History* (1873); *Historical and Architectural Sketches* (1876); *The Ottoman Power in Europe* (1877).

FREEPORT, a town of Stephenson Co., Ill., 121 miles W. of Chicago. Three railroads pass through it, and it is an active business place, with considerable manufacturing. It is in the midst of a farming community. Pop. 8516.

FREE-SOIL PARTY, an American political party resulting from a union of Democrats and Whigs who were opposed to the introduction of slavery into the territories of the U. S. In 1848 they assembled in convention at Buffalo, N. Y., and nominated for President and Vice-President, Martin Van Buren and Charles Francis Adams, but failed to carry any of the states, and polled only a small popular vote. In 1852 they held their convention at Pittsburg, Pa., and nominated for the same offices, John P. Hale and George W. Julian, and were again defeated. In 1856 the Free-Soil party was merged into the Republican party.

FREE'THINKERS, as an historical name, is an epithet applied in England to the Deists of the 17th and 18th centuries. Otherwise it might be used to designate the great school of Rationalists who are to be found among all classes of Christians, and whose attitude towards Christianity is to represent its spirit and ideal without its dogmatic system and supernatural narratives.

FRE'GENAL DE LA SIERR'A, a picturesque town in the province of Badajoz, Spain, in the wild valley of the Martiga, 30 miles S.E. of Badajoz. It has a quaint old castle, with a bull-ring, and industries in leather, linen, &c. Pop. 6948.

FREI'RINA, a seaport of Chili, in the S. of Atacama, on the Huasco, with some export trade in copper. Pop. 10,000.

FREMONT, a town in Ohio, on the Sandusky river, and a station on the railway from Cleveland to Toledo, 30 miles E. of Toledo. It has three newspapers, good schools, a public park, and libraries, and carries on manufactures of cars, engines, boilers, and blinds. Pop. (1880) 8451.

FRERE, John Hookham, was born in London in 1769, entered Parliament in 1796, and became Under Secretary of State for Foreign Affairs in 1799. He was one of the founders of the *Quarterly Review*, and the author of *Translations of Several Plays of Aristophanes* (1840), *Theognis Restitutus* (1842), and other writings, chiefly humorous. In 1808 he was appointed Minister to Spain, married the Countess of Erroll (1816), and removed to Malta, where he died at Pieta, 7th Jan. 1846. His works were published with a memoir in 1872.—Sir Bartle Edward F., nephew of the preceding, was born in 1815, educated at Haileybury College, and entered the Indian Civil Service in 1834. He was made British Resident in Scinde in 1856, and Chief Commissioner in 1860, and for his conduct during the Mutiny twice received the thanks of Parliament, and was created a K.C.B. From 1862 to 1867 he was Governor of Bombay, and in the latter year was made a K.G.C.S.I., and returned to England, where he became Vice-President of the Royal Geographical Society. As special British commissioner he brought about the abolition of slavery by the Sultan of Zanzibar in 1873. Returning to England, he became a member of the privy council, and in 1877 was appointed governor of the Cape of Good Hope. In the same year and the year following, he successfully conducted wars with the Kaffers and other tribes, which resulted in large annexations of territory to the British domain.

FRESNILL'O, a town of Mexico, state of Zacatecas, on a branch of the Santiago, 30 miles N.-W. of Zacatecas. It has a good mining school, and in the vicinity are rich copper and silver mines. Pop. 7015.

FREU'DENSTADT ('town of joy'), a town of Würtemberg, Germany, in the circle of the Black Forest, near the Murg, 40 miles S.-W. of Stuttgart. It has some cotton-spinning, weaving, and smith-work, and a trade in wood, cattle, and fruit. Pop. (1872) 5145. F. was founded in 1559, and its first inhabitants were Lutheran refugees from Austria.

FREY'STADL (Hung. *Galgocz*), a town of Hungary, on the banks of the Waag, 84 miles N.-W. of Pesth, and nearly opposite the fortified Leopoldstadt. It has a castle, a tower of supposed Turkish origin, some manufactures of wooden articles, and a trade in cattle. Pop. (1869) 6098.

FRID'ERICIA, originally FRED'ERIKS-ODDE, a fortified seaport of Denmark, on the E. coast of Jutland, occupies the

peninsula of Skandse-Odde. It is the port where are collected the dues of the Little Belt, and it has twenty-two factories and an active manufacture of tobacco. Pop. (1873) 7186.

FRIEDRICH, Karl Nikolaus, imperial prince of Germany, eldest son of Prince Karl, second brother of the emperor, was born March 20, 1828, commanded in the Danish war of 1864, led the first army through Saxony against Austria, and won the battle of Königgratz with the aid of the Crown Prince in 1866. In the Franco-Prussian war he commanded the second German army, defeated General Froissart at Speichern, and invested Metz until Bazaine capitulated. He then drove back the Army of the Loire, retook Orleans, and forced General Chanzy to retire. F. was made a field-marshal October 28, 1870.

FRIEDRICH WILHELM, Crown Prince of Prussia, and son of King Wilhem I., was born 18th October 1831. He took part in the Slesvig-Holstein war (1864) under Wrangel, and in the war with Austria (1866) received the command of the second army, and fought at Nachod, Trautenau, Skalitz, Soor, Schweinschädel, Königinhof, and Königgratz. In the Franco-Prussian war of 1870 he was in command of the third army, and took part in the battles of Weissenburg, Wörth, and Sedan.

FRONT'LET is the name in the Old Testament (Exod. xiii. 6; Deut. vi. 8, xi. 18) for the article worn by the Jews which in the New Testament is called Phylactery.

FROST, John, LL.D., an American teacher and author, born at Kennebunk, Me., Jan. 26, 1800, and educated at Harvard College. His life was largely devoted to teaching. He published numerous works of educational and historic character. Died at Philadelphia, Pa., Dec. 28, 1859.

FROTHINGHAM, Octavius Brooks, an American divine and author, born in Boston, Nov. 26, 1822, graduated from Harvard College in 1843, and entered the Unitarian ministry in 1847. After filling pastorates at Salem, Mass., and Jersey City, N. J., he became pastor of a Unitarian church in New York City. Here he became the acknowledged leader of the extreme radical wing of Unitarianism, and ultimately an out-and-out rationalist. He subsequently retired from this position, and has since been engaged in literary work. Among his published works are the following: *Stories from the Lips of a Teacher*, *Stories of the Patriarchs*, *A Child's Book of Religion*, *The Religion of Humanity*, *The Life of Theodore Parker*, and *The Safest Creed*.

FRUIT-CROW, the name applied to several species of Conirostral *Insessors* belonging to the sub-family *Gymnoderinæ*. Of this group the *Gymnoderus fœtidus*, or bare-necked F.-C. of Brazil and Guiana, is a typical example. It attains a size averaging that of a common jackdaw, and derives its name from the naked state of the upper part of the head, neck, and throat. The bald F.-C. (*Gymnocephalus calvus*) is another example, and belongs to a different genus. It is common in Cayenne, Guiana, and other parts of S. America: the entire front of the body is destitute of feathers. This species is also named the 'capuchin baldhead.' The fruit-crows eat snails, worms, &c., in addition to their vegetable diet.

FUER'TE DE ANDAL'GALA, a town in the province of Catamarca, Argentine Republic, near which are rich copper-mines. Pop. 5000.

FUNAR'IA, a genus of Mosses, and the type of a small natural order, characterized by its vesicular calyptra, which becomes sabulate above. *F. pygrometrica* is very common on charred and burned soils in this country, and occurs all over the world.

FÜNF'HAUS, a town of Austria, 2 miles N. of Vienna by railway, with manufactures of silks, satins, woollens, red leather, &c., and a population (1869) of 27,065.

FURRUCKNUGG'UR, a walled town in the district of Gurgaon, Punjaub, British India. Pop. (1868) 10,631. Along with the surrounding country, it formerly belonged to a chief who was hanged for rebellion in 1857. F. is the emporium of the important trade carried on in salt, manufactured in the district by evaporation from wells.

FURRUCK SHERE (Farakh Siyyar), an emperor of Delhi of the Mogul dynasty, who succeeded to the throne by murdering his uncle, Jehander Shah, in 1713, and was himself assassinated in 1718. His reign is memorable for the privileges granted to the British East India Company at Calcutta through the court influence of an English surgeon.

FUSARO, LAGO DEL (anc. *Acherusia Palus*), the supposed harbor of Cumæ in the province of Naples, on the peninsula of Baiae, 11 miles W. of Naples. It is believed to be the crater of an extinct volcano, having emitted volumes of mephitic gas as late as 1838. In its center is a pavilion erected by Ferdinand I. At the S. end an outlet of Roman construction (*Foce de F.*) connects it with the sea, and in the vicinity is the vast ruined villa of Servilius Vatia, with many other relics of antiquity. The lake is still, as in ancient times, famous for its oysters.

G.



AG'ERN, Hans Christoph Ernst, Freiherr von, a German writer and statesman, born at Klein-niederheim, near Worms, January 25, 1766, became Chief Minister to the House of Nassau in 1814, represented the Low Countries at the Vienna Congress, opposed the scheme of German federation, and died at Hornau, October 22, 1852. Among his works are *Die Fürsten* (Frankf. 1808); *Aristokratie* (Vienna, 1812); *Demokratie* (Frankf. 1816); *Politik* (Stuttg. 1818); *Die Nationalgeschichte der Deutschen* (2d ed. Frankf. 1825–26); his Memoirs, under the title *Mein Antheil an der Politik* (5 vols. Stuttg. and Leips. 1823–44); *Civilization* (1847), &c.—Friedrich Baldwin G., son of the above, born at Weilburg, October 24, 1794, joined the Austrian army, fought at Dresden, Kulm, Leipsic, &c., became a general, afterwards entered the Dutch service, and was killed at Kardern, April 20, 1848.

GAINES'S MILL, an action of the civil war, on June 27, 1862. McClellan retreating with the army of the Potomac, to the James River, was pursued by Lee, and taking position near Cold Harbor, Va., gave battle. Fierce assaults were repeatedly made upon the Union lines, and at last they were broken. McClellan has been severely blamed for the manner in which he conducted this engagement, in permitting the bulk of his army to remain inactive before a small force under Gen. Magruder, while only 27,000 men were compelled to resist the attack of Lee's entire army. The Union loss was 6000 and that of the Confederates 9000.

GAINESVILLE, a town of Cooke Co., Tex., on the Missouri Pacific Railroad, a few miles from the Red River, and 270 miles N. of Austin. It is a center of trade for the surrounding country and a depot for supplies for drovers. Large droves of cattle pass northward every spring and fall. Pop. 5000.

GALIGNA'NI, Jean-Antoine and Guillaume, celebrated French publishers, were born in London, the former 13th October 1796, the latter 10th March 1798. Their father, who was a native of Brescia, and a skilled linguist, opened an English library at Paris in 1800, and established a *Monthly Repertory of English Literature, Arts, and Science* (1808), and the well-known *G.'s Messenger* in 1814. On his death (1821) the *Messenger* was greatly improved and enlarged by the brothers, who subsequently raised it to a highly-honored position, adopting as its chief object the advocacy of a cordial political relationship between England and France. They each received the cross of the Legion of Honor from Louis Philippe, and were presented with a splendid silver épergne by the English Government (1866) through Lord Cowley in recognition of their efforts to promote the well-being of British subjects, and more especially for having erected the G. Hospital for distressed Englishmen, near Paris. The brothers also built the large hospital of Corbeil at their own expense. Jean-Antoine died December 1873.

GALIZ'YN (spelt also Galitzin and Golizyn) is the name of one of the most distinguished princely families of Russia. From the time that the Princes Dmitrij and Michael commanded Russian

armies in 1514 down to the present day, members of this house have at all times been prominent in Russian diplomacy or in Russian campaigns.—WASSILIJ, 'the Great G.', born 1633, was the favorite of Sophia, Peter the Great's sister, and strove, not without success, to import Western civilization into Russia. For aspiring to marry Sophia, he was banished to a prison on the shores of the Arctic ocean, where he died of poison. His cousin Dmitrij headed the party which wished to restrict the authority of the Czar, and died in the dungeons of Schüsselburg.—DMITRIJ ALEXEJEVITCH G. (born 1735, died 1803), was the ambassador of Catharine II. at Paris and the Hague, a friend of Voltaire and the Encyclopédists. His wife, AMALIE, PRINCESS G., born 21st March 1748, was the daughter of a Prussian general, Graf von Schmettau, who gathered round her at Münster a circle of brilliant authors, including Jacobi, Hamann, and Hemsterhuis, the last of whom addressed to her his *Lettres sur l'Athéisme* (1785). She was not less distinguished for accomplishments than for intense devoutness. Her own influence and that of the circle in which she moved was mainly influential in producing the extravagant religious sentimentality which for a time characterized large sections of cultured German society. She died 24th August 1806. A son of the Princess, DMITRIJ, born in 1770, died as a Catholic missionary in N. America, 6th May 1840.

GALLARA'TE, an old walled town in the province of Milan, N. Italy, 24 miles N.W. of Milan by railway. It lies at the S.-E. base of the Somma Hills, and on the margin of a vast plain reaching to Milan, and yielding maize, mulberries and vines. G. has large steam cotton-mills. Pop. 5200.

GALLAUDET, THOMAS, D.D., born at Hartford, Conn., June 3, 1822, and graduated from Yale College in 1842. He was for many years a teacher in the New York Asylum for the Deaf and Dumb and in 1850 became rector of an Episcopal church in New York. Here he established a service for deaf mutes, for the amelioration of whose condition as a class, he has expended the best energies of his life.

GALLAUDET, THOMAS HOPKINS, LL.D., father of the preceding, born at Philadelphia, Pa., Dec. 10, 1787, and graduated from Yale College in 1805. He studied for the ministry, but devoted his life to the education of the deaf and dumb. Died at Hartford, Conn., Sept. 9, 1851. His life has been written by H. Humphrey (1858).

GALLIA'TE, a town in the province of Novaro, N. Italy, 4 miles E.N.E. of Novaro by railway. It has an old castle, silk and cotton mills, &c. Pop. 6700.

GALLIPOLIS, a town of Gallia Co., O., on the Ohio River, 200 miles above Cincinnati, and on the Columbus, Hocking Valley and Toledo Railroad. It has a large furniture factory, machine shops, and foundries; manufactures brooms, carriages, and other articles; is a trade center for a large farming, coal, and mineral region; and is a headquarters for numerous steamboats. Pop. 5000.

GAM'BIER, JAMES, LORD, a British admiral, born in the Bahamas, October 13, 1756. He entered the navy when very young, became a post-captain in 1778, was engaged in the repulse of the French at Jersey in 1781, and was the first to break the French line with his ship the *Defence* in the action off Brest, June 1, 1793. He was made rear-admiral in 1795, vice-admiral in 1799, and Governor of Newfoundland in 1801. In 1807 he bombarded Copenhagen, and captured the Danish fleet of nineteen ships of the line, and many smaller vessels. He was then made a baron, and was offered, but declined, a pension. In 1808 he received command of the Channel Fleet, and in 1809 successfully attacked a French squadron off Aix, but a dispute which arose on this occasion with his subordinate, Lord Cochrane, led him to demand a court-martial, by which he was honorably acquitted. He was made Admiral of the Fleet on William IV.'s accession, and died at Iver, near Uxbridge, April 19, 1833.

GAN'GI, an old town of Sicily, province of Palermo, in a hilly region, 12 miles W. by N. of Nicosia. It is near the remains of the Sikelian *Enginum*, originally a Phœnician colony, where in Cicero's time was a famous temple of *Magna Mater* (or Aschera), despoiled by Verres. This older G. was destroyed by Friedrich II. in 1299. Guiseppe Salerno, a famous painter of the 17th c., was born at G., and was called *Lo Zoppo* ('the lame') *di G.* His 'Last Judgment' is in one of the churches. Pop. 10,535.

GANGUE is the mineral product which accompanies the ores in metalliferous veins.

GANSEVOORT, PETER, JR., born at Albany, N. Y., July 17, 1749. He was a member of Montgomery's expedition against Canada, and in 1777 defended Fort Stanwix against the English and Indians, commanded by St. Leger. He was thanked by congress for this service, and in 1809 was made brigadier-general U. S. A. Died July 2, 1812.

GA'PER SHELL, the popular name of a well-known genus of lamellibranchiate *Mollusca*, scientifically known as the *Mya arenaria*. The shell is common on many parts of the British coasts, the animal burrowing in sand and mud, and possessing long siphons or breathing-tubes for the purpose of conveying water to the gills. It is much sought after for bait, and is also eaten in many districts. The family *Myacidæ* is distinguished by the thick shell with 'gapes' behind, and by the foot being of small size. The genus *Mya* itself possesses an oblong shell, a straight 'foot,' a siphon fringed at its extremity, while the gills do not project into the siphon.

GARDEN CITY, a village of Long Island, N. Y., founded by the late A. T. Stewart, a wealthy merchant of New York City. It is about 18 miles from New York, with which it has direct communication by railroad. The original intention was to build up a large town, which should be occupied as a place of residence by business and professional men from New York. Numerous houses were built, a first-class hotel erected, and gas and water introduced, but the population has always remained small. Here Mrs. Stewart has erected a magnificent cathedral to the memory of her husband, and G. C. has become the cathedral city of the Protestant Episcopal diocese of Long Island.

GAR'DENER'S GAR'TERS, the popular name given to the variegated variety of *Phalaris arundinacea*, a grass frequently cultivated in cottage gardens.

GARDNER, in Worcester Co., Mass., on the Fitchburg & Boston and the Barre & Gardner railroads, 27 miles from Worcester. It is extensively engaged in the manufacture of chairs. Pop. 6500.

GARDNER, HARMONY C., an American authoress, born at East Weymouth, Mass., July 31, 1821, and married to Rev. Abel Gardner in 1842. Among her published works are the following: *Rosedale, a Story of Self Denial; Extracts from the Diary of a Country Pastor; Ellinor Gray; Annie Lee, and her Irish Nurse; Faultfinding, and what Came of It; Rosamond Dayton; The Power of Kindness; The King's Daughter; Miss Carrol's School; Harry Love;* and *Holiday Poems*. Her works have been distinguished by the purity of their tone and a keen sense of humor, and have had a wide circulation.

GAR'NETT, REV. RICHARD, a distinguished philologist, born at Otley, Wharfedale, July 25, 1789. His literary and scholarly bias led him to quit a business life and join the Church. In 1815 he became a curate at Blackburn, in 1821 priest-vicar in Litchfield Cathedral, in 1836 vicar of Chebsey near Stafford, and in 1838 assistant-keeper of printed books in the British Museum. He contributed frequently to periodicals, and died at London, Sept. 27, 1850. G. united vast learning, a keen scientific faculty, and a singular gift of luminous expression. His *Philological Essays* (Edinb. 1859), a selection from his contributions to journals, are a treasury of fresh research, lucid statement, and penetrating speculation. His essay on the Celtic tongues is an especially valuable contribution to the science of language. In the mellow humor and racy anecdotage with which he occasionally flavors his erudition he somewhat recalls the great scholars of the 16th c. See the memoir by his son prefixed to his *Philological Essays* (Lond. 1859).

GARRET, THOMAS, born at Darby, Pa., Aug. 21, 1783. Learning the cutler's trade, he removed to Wilmington, Del., and became a hardware merchant. He was an ardent abolitionist and lost his entire estate through fines and actions, resulting from assistance given to runaway slaves. He lived, however, to see the slaves set free, and succeeded in gaining a second competence before his death. Died at Wilmington, Del., Jan. 23, 1871.

GARR'OW (GARO) HILLS, a district of Assam, British India, S. of the Brahmapútra, bounded N. by Kamrup, S. by Mymensing. Area, 3390 sq. miles; pop. (1872) about 80,000. This tract was first brought under direct British management in 1866, and in 1872 the intervention of an armed force was required. The hills produce valuable timber and cotton. Elephants are numerous. The headquarters of the Deputy Commissioner are at Tura. The G. people, of whom there are about 13,000 in Bengal proper, and 14,000 in the rest of Assam, are a very primitive race. They are divided into villages, with headmen and priests, and into clans; descent and inheritance of property is traced through the female line. Human sacrifice was formerly practised. Slaves are numerous (Dalton's *Ethnology of Bengal*, Calcutta, 1872).

GAS-ENGINE is an engine of the same general structure as the ordinary steam-engine, but differs in obtaining its motive power from the explosion of a mixture of inflammable gas and air. As early as 1799 Lebon, a French artisan, had constructed and patented such a machine. The inflammable mixture, introduced alternately on each side of the piston, was fired by an electric spark. It was found to work well and effectively, but coal gas not having been at that time introduced for illuminating purposes,

the expense of preparing the mixture rendered the scheme a practical failure. Lenoir's engine, patented in 1860, was very much a reproduction of Lebon's; while the chief points of difference in Hugon's machine, constructed about the same time, consisted in firing the mixture by a gas jet and in introducing a little water, which, converted into steam by the great heat, lessened the violence of the action. Very different in action, and much more economical in the consumption of its fuel than any of its predecessors, is the invention of Otto and Langen of Köln, exhibited at Paris in 1867. The gaseous mixture, introduced beneath and fired by a permanent gas jet, shoots up the heavy piston to the top of the vertical cylinder. A partial vacuum ensues and the piston descends, urged down by its own weight and the atmospheric pressure. A heavy fly-wheel equalizes the motion as far as possible, and maintains the action during the moments when the piston is ineffective.

GASSE'RIAN GANG'LION is a swelling on one of the roots of the fifth cranial nerve, situated on the upper part of the petrous portion of the temporal bone. It gives off three branches—(1) the ophthalmic, which enters the orbit; (2) the superior maxillary, for the upper jaw; and (3) the inferior maxillary, for the external ear, the tongue, the lower teeth, and the muscles of mastication. The G. G. is on the sensory root of the nerve. Its special functions are unknown.

GASTEROMYCETES, one of the six orders into which the *Fungi* are divided, of which the Puffball is an example.

GASTROLO'BIUM, a genus of Leguminous plants embracing many species peculiar to Australia. They are chiefly shrubs with yellow flowers, and are very poisonous to cattle, large numbers of which die yearly by eating the foliage. The most fatal species are *G. bilobum* and *G. spinosum*. Several species are grown in British greenhouses.

GAT'LING, Richard Jordan, an American inventor, was born in N. Carolina, 12th September 1818. At an early age he was anticipated by Ericsson in the discovery of screw propulsion, but his ingenuity was successfully shown in devising a machine for sowing wheat in drills. G. studied medicine at Ohio and Cincinnati, 1847–49, and subsequently engaged in railway and real estate speculations. In 1850 he invented a double-acting hemp-breaker, and in 1861–62 elaborated his masterpiece, a mitrailleuse, or repeating machine gun. At the first trial of the 'G. gun,' in 1862, it fired 200 shots per minute. It has since been adopted in the United States, as well as by several European Governments, for use with troops, and for the flank defence of fortifications.

GAUGING, in mensuration, is the measurement of the capacity of a vessel of any kind, and is of great importance in the collection of the revenue. In most instances the determination is only approximate, the vessel being taken as some simple surface of revolution, such as a spheroid or paraboloid or simply a cylinder, to which it may bear some approximate resemblance.

GAUNT, John of, Duke of Lancaster, third son of Edward III., was born at Ghent—whence his name—in 1339, and married his cousin Blanche, daughter of the Duke of Lancaster, in 1359, succeeding to his father-in-law's estates in 1362. After fighting in Spain, he led an English army into France in 1372, but met no resistance, and retreated to Bordeaux with only a remnant of his troops. During Edward III.'s latter years he took a large share in the government, and rendered himself very unpopular by his overbearing insolence towards the commons, and by striving as the leader of the barons against the national party to undo the reforms of the Good Parliament. Being anxious to seize the wealth of the great churchmen, he for a time supported Wiclif, but afterwards withdrew his favor from the reformer. The peasant revolt of 1381 forced him to fly to Scotland, whence he shortly returned to England. Claiming the throne of Castile through his marriage with a daughter of Pedro the Cruel, he invaded Spain, and in 1388 married his daughter to the Prince of the Asturias. He afterwards tried fruitlessly to rule Guienne. G. died in 1399. He was the patron of Chaucer, and is the knight of *The Boke of the Duchesse*. He is the 'time-honored G.' of Shakspeare's *Richard II.*, where he delivers the famous panegyric on England. See Green's *Short History of the English People* (Lond. 1875).

GAUNT'LETT, Dr. H. J. G., musician, was born at Wellington, Salop, England, in 1805, and practised as a lawyer in London. He became organist of St. Olave's, Southwark, in 1827, was made Doctor in Music in 1842, and died 21st February 1876. He was a vigorous writer, a good organist, a prolific composer of hymn-tunes and anthems, and a strenuous promoter of congregational psalmody.

GAUR, or GOUR, the ancient Hindu capital of Bengal, of which only ruins now remain, situated in Maldah district, on the left bank of the Ganges, about 180 miles N. of Calcutta. The original Sanscrit name was Lakshmanawati or Lucknonti. Its history has been traced back to the 7th c. A.D. In 1202 it was taken by the Mohammedens, and remained the seat of government under the Afghan dynasty until the triumph of the Mogul Akbar in 1574. About this latter date the main stream of the Ganges deserted its old bed, and the city was depopulated by a pestilence. The area now covered by ruins was estimated by Rennell to extend over 30 sq. miles, and the population could hardly have been less than one million souls. The whole has relapsed into jungle, the most renowned shooting-ground for tigers in Bengal. A few mosques and gateways still stand, in an indifferent state of repair, but the majority of the buildings have been pulled down, and the materials used in the towns for fifty miles round. The most celebrated monument is a circular minar or tower, 81 feet high and 21 feet in diameter, which is described in Fergusson's *Indian Architecture*. There are several large tanks, with masonry banks, containing good drinking water, one of which is nearly one mile long and half a mile wide.

GAVAR'NI, the well-known pseudonym of Sulpice Guillaume Paul Chevalier, a French caricaturist, who was born in Paris in 1801. Beginning life as a mechanical draughtsman, he early discovered a genius for burlesque penciling. He first published sketches of the valley of Gavarni in the Pyrenees; hence his *nom de plume*. About 1835 he began to contribute regularly to *Charivari* and other comic journals the wonderful series of ever-varying social and character sketches, instinct with artful originality and scathing cynicism, which earned for him the name of the 'arch-fiend of caricature.' Among his best known works are *Les Enfants Terribles*, *Les Parents Terribles*, *Les Rêves*, *Comme l'on dîne à Paris*, *Les Fourberies de Femmes*, and *Impressions de Ménage*. He successfully illustrated many popular works, as Eugene Sue's *Wandering Jew* and Balzac's *Diable à Paris*. G. died at Anteuil, 23d November 1866. A selection from his sketches was published in Paris, 1845, in 4 vols. 8vo, with notes by Théophile Gautier, and 2 vols. subsequently under the title of *Perles et Parures* (1850).

GAY, Marie-Françoise-Sophie, a French authoress, whose maiden name was Nichault de Lavalette, born at Paris, July 1, 1776, married M. Gay, and wrote many romances and several dramatic pieces. Her salon was a famous resort of authors and artists. She died at Paris, March 5, 1852. Among her works are *Laure d'Estelle* (1802), *Anatole* (1815), *Le Moqueur Amoureux* (1830), *Scènes de Jeune Age* (1833), *La Duchesse de Châteauroux* (1834), *Les Salons Célèbres* (1837), *Le Mari Confident* (1849). See Gautier's *Notices Contemporaines*.

GEIK'IE, Archibald, F.R.S., LL.D., a distinguished geologist, was born at Edinburgh, Scotland, Dec., 28, 1835, and educated at the High School and University of that city. In 1855 he was appointed to the geological survey of Scotland, of which he became the director in 1867, and in 1870 obtained the Murchison chair of mineralogy and geology at Edinburgh University. On the death of Sir Robert Murchison in 1881 he was appointed Chief Director of the Geological Survey of Great Britain. Besides various geological memoirs in the journals of the Geological Society and elsewhere, which entitle him to a foremost place among geologists, he has published several works bearing more or less on his special department. See *The Phenomena of Glacial Drift of Scotland* (1863); *The Scenery of Scotland viewed in Connection with its Physical Geography* (1865); and *Memoir of Sir Roderick J. Murchison, &c.* (2 vols. 1872).—James G., the brother of the preceding, was born at Edinburgh, August 23, 1839, was appointed to the geological survey in 1861, and succeeded his brother in his professorship in the Edinburgh University. He is the author of *The Great Ice Age* (2d ed. 1876).

GEMBLOU'X (Flem. *Gemblours*, pron. *Changblu*), a quaint old town of Belgium, province of Namur, 25 miles S.E. of Brussels by railway. It has a famous Benedictine abbey, the origin of which is assigned to the 9th c., and from which proceeded the very useful *Chronik des Siegebert von G.* Since 1860 the abbey buildings have been used as a Royal Agricultural Institute. Don John of Austria gained a victory here over the Netherlanders, 31st January 1578. Pop. 3018.

GENERA'TOR, in mathematics, is a point, line, or surface by whose motion a curve or surface may be described or *generated*. Thus a point moving round a fixed point at a constant distance from it describes a circle, and a straight line rotating round a fixed line not in the same plane generates an hyperboloid.

GENTZ, Friedrich von, a distinguished German political writer and statesman. Born in 1764 at Breslau, he entered the Prussian public service in 1786. On the outbreak of the French Revolution, he was for a time its enthusiastic defender, but ere long became the most fanatical opponent of all attempts to establish free institutions. Both before and after G. passed from the Prussian to the Austrian service in 1802, he was zealous and influential in stirring up war against Napoleon; it was he who drew up the Berlin manifestoes of 1806 and the Austrian manifestoes of 1809 and 1813, and he was present at the Congress of Paris as first secretary. Soon he was known to Europe merely as the tool

of Metternich, and to the policy of reaction he wholly devoted his versatile and brilliant talents. He died suddenly, 9th June 1832. His political writings have been twice published in 5 vols. (by Weick in 1836–38 and by Schlesier in 1838–40), his letters in 1841 (new series 1877), and his diaries (*Tagebücher*) in 1861. See also the valuable *Dépêches inédites du Chevalier de Gentz aux Hospodars de Valachie*, by Count Prokesch-Osten (Par. 1876).

GEOFF'REY DE VIN'SAUF, an English didactic poet of the reign of Richard I., also known as Galfridus Anglicus. He studied at Oxford and in France and Italy, and was in Rome at the end of the 12th c. His metrical treatise *De Nova Poetria*—the earliest attempt at literary criticism made by an Englishman—was very popular in the middle ages. In it G. advocates a return to the style and measures of classic Latin poetry, and protests against the mediæval of rhyming Latin verse. A lively *Itinerary of King Richard* has been ascribed, but probably wrongly, to G.

GEOFFROYA, a genus of trees occurring in S. America, belonging to the *Leguminosæ*, but differing from most of that order in having succulent fruits. The principal species is *G. superba*, a magnificently branched tree with beautiful green foliage and bright yellow flowers. Its wood is hard; and its fruit when boiled is said to be largely used by the inhabitants of the Ilha de St. Pedro.

GEORG I. (CHRISTIAN WILLIAM FERDINAND ADOLF GEORG), King of Greece, second son of Christian IV. of Denmark and younger brother of the Princess of Wales, was born 24th Dec. 1845. He was educated at Copenhagen, entered the navy, and was chosen King of Greece in 1863. G. married the Princess Olga, daughter of the Grand Duke Constantine and niece of the Czar of Russia, in 1867.

GEORGETOWN COLLEGE, an American educational institution, at Georgetown, D. C., chartered by Congress in 1815. Besides the usual collegiate course, it maintains law and medical departments. It is under the control of the Jesuits.

GEPHYR'EA, the name given to a class of lower *Annulosa*, represented by such forms as the *Sipunculi* or 'spoon-worms,' found in the sand of the English coasts. They are nearly allied to the *Annelida* or true worms, but differ from them in some important particulars. Thus, while the body is usually annulated or segmented, it may be perfectly smooth. In the majority of cases it wants appendages, and the ventral nervous cord is not provided with ganglia or nervous enlargements. The sexes are distinct and the young appear to undergo a metamorphosis in the course of their development. *Sipunculus Bernhardus*, found burrowing in the sand of the coasts, is a familiar species. The anterior extremity is provided with a retractile trunk or proboscis, and the digestive system is convoluted. *Syrinx* is a second genus of G., and *Echiurus*, which occurs in the N. Sea, has posterior bristles.

GEPI'DÆ, or GEPI'DI, one of the chief Gothic tribes, are first mentioned about 280 A.D. as dwelling near the mouth of the Vistula. They gradually moved S. into Pannonia, and settled between the E. and W. Goths. Their power was destroyed by Alboin the Longobard in 566.

GERANIA'CEÆ, a natural order of Thalamifloral Dicotyledonous plants, including about seven genera and 700 species. They are found in various parts of the world. The species of *Pelargonium*, which have very showy flowers, and of which numerous hybrids are now cultivated in greenhouses, abound at the Cape of Good Hope. The genus *Pelargonium* is distinguished from that of *Geranium* by having the flowers irregular and spurred. The plants of the order are aromatic and astringent.

GER'HARD, JOHANN, born at Quedlinburg, 17th October 1582, died Professor of Theology at Jena, 17th August 1637. He is generally ranked next to Luther and Chemnitz amongst the great Lutheran divines. His *Loci Theologici* are the foundation of the more developed systematic form of orthodox Lutheranism, and were first published in 1610 in 10 vols. An enlarged edition (22 vols.) appeared 1622–89. The *Confessio Catholica* is polemic, while the *Meditationes Sacræ* are an outcome of the warmest personal piety.

GERHARDT, PAUL, one of the foremost of German hymn-writers, was born 12th March 1607, at Gräfenhainichen, in Saxony. After he came to Berlin as pastor in 1657, he was known as the leader of the extreme Lutheran party in the embittered theological strife of that period. As such he was deposed by the Government in 1666, though soon replaced. He died an archdeacon at Lübben, 7th June 1676. G.'s hymns (*Geistl. Andachten*), first published in 1666, are very popular; they have been frequently reprinted, the latest edition being that of Bachmann in 1866. Biographies of G. have been written by Langbecker (Berl. 1841) and Bachmann (Berl. 1863).

GER'MAN (Lat. *germanus*, 'derived from the same *germen*,' 'germ') is a term applied to those born or descended from the same father or mother, and thus related in full blood.

GERMAN'IC FOLK-LAWS. After the migrations of the Germanic races had subsided, their old laws were gradually embodied in Latin, generally by private effort. They are chiefly of a penal character, and are distinguished from the Roman law and the capitularies of the Frankish kings as *Leges Barbarorum* :—(1) *Lex Salica* and *Lex Ripuariorum*, the laws respectively of the Salic and Rhenish Franks; (2) *L. Burgundiorum* (before 501), or *L. Gundobaldi*, or *Loi Gombette* (from King Gundobald), a formal code, with traces of the influence of the Roman law; (3) *L. Visigothorum*, recorded by King Enrik at the end of the 5th c., but after the West Goths were driven back to Spain, so grafted on Roman law as to become a distinct growth, the main stem of the modern law of Spain, and which, incorporated into a law-book (the *Forum Judicum*) about the middle of the 7th c., was in the 13th c. translated into Spanish under the name *Fuero Juzgo;* (4) *L. Longobardorum* (the oldest part, 'Edictum Lotharis,' dating from 643), extended by successive Longobardic, Frankish, and German kings and emperors, and recognized as a system of law for all Italy, the whole being collected (beginning of 12th c.) under the title *Lombarda*, or *Liber Legis Longobardicæ*, and enriched with the glosses of the University of Bologna; (5) *L. Alamannorum* (the modern Swabians), coeval with the Ripuarian or Rhenish; (6) *L. Baiuvariorum* (or Bavarians), recorded between 622 and 638, and very like the preceding; (7) *L. Saxonum*, from the same time; and (8) *L. Angliorum et Werinorun, i. e., Thuringorum*, also from the beginning of the 9th c.

GER'MERSHEIM, a town of Rhenish Bavaria, at the confluence of the Queich and the Rhine, 8 miles S.S.W. of Speyer. It has some trade in corn, hemp, flax, &c. Pop. 10.180. G. was originally a Roman fortress and station. A 'burg' was built here by Konrad II., but the place first emerges as a town in the time of Rudolf of Hapsburg, who died at G. in 1291.

GERRY, ELBRIDGE, an American patriot and statesman, born in Massachusetts in 1744. He was a member of the Continental Congress in 1776, and was one of the signers of the declaration of independence. In 1810 he became governor of Massachusetts, and in 1812 vice-president of the United States. Died suddenly in 1814.

GERSTER, ETELKA, a well-known operatic singer, born in Hungary in 1856. She made her debut at Venice, and, after singing with success in the principal cities of Europe, came to America in 1877, where she has since sung in New York and the leading cities of the United States.

GES'NER, JOHANN MATTHIAS, a celebrated German humanist, born at Roth, near Nürnberg, 9th April 1691. After completing his studies at Jena, he became in 1715 con-rector and librarian at Weimar, in 1728 rector of the gymnasium at Ansbach, in 1730 rector of St. Thomas School, Leipsic, in 1734 Professor of Rhetoric, and in 1735 librarian in the University of Göttingen. He died 3d August 1761. G. labored with intelligence and zeal for the improvement of classical studies, and formed a wider and higher idea of culture than was customary among pedagogues. His chief works are his editions of the *Scriptores de Re Rustica*, of Quintilian, Claudian, Pliny the Younger, and Horace; his *Primæ Liniæ Isagoges in Eruditionem Universam* (new ed. Leips. 1784); *Novus Linguæ et Eruditionis Romanæ Thesaurus* (4 vols. Leips. 1749); *Opuscula Varii Argumenti* (8 vols. Bresl. 1743–45); and *Thesaurus Epistolarum Gesneri* (Halle, 1768).

GETTYSBURG, BATTLE OF, one of the most important engagements of the Civil War. In the month of June, 1863, General Lee, by a well executed stratagem, and rapid marching, passed by the Union army, then under Gen. Hooker, and crossing the Potomac river and the state of Maryland, entered Pennsylvania, thus changing the seat of war from southern to northern soil. The force under Lee numbered nearly 100,000 men, and the North was thrown into great consternation by this gigantic invasion, under the ablest military leader of the Confederacy. Hooker being made aware of Lee's movements, rapidly pursued him northwards. On the 28th of June, Gen. Hooker was removed from his position, and Gen. George G. Meade was placed in command of the Army of the Potomac. On June 30th these armies were brought face to face with each other near the little village of Gettysburg, Pa., and both North and South anxiously awaited that struggle which was to determine whether Lee's invasion should be checked, or should sweep triumphantly forward. The position occupied by the Union forces was one of unusual strength, and it was Meade's plan to fight entirely on the defensive. On the morning of July 1st the battle opened, and although desperately assailed during the day, the Union forces firmly held their position. At about noon of the following day the struggle was renewed by the Confederates, and fiercely maintained until the darkness of night put an end to the bloody conflict. On the morning of the 3d the battle was again renewed, and several important points were taken

by the Union forces. Lee finding his men met and repulsed at every point, determined to make one last and mighty effort to force his way through the hitherto impregnable line, that opposed his march. From 12 to 1 P. M., there was an ominous silence, which at the latter hour was broken by the thunders of 150 guns, opened simultaneously upon the Union lines. These were responded to by 80 guns, and for two hours this artillery battle was maintained without cessation. Then Lee massed 18,000 men in column and launched them against Cemetery Ridge. With hats drawn over their faces, through a deadly storm of iron and lead, this great mass moved gallantly and grandly forward, on and on, up to the very cannon's mouth; but it was in vain, and with shattered ranks, they were driven back. The battle was won, and Lee was compelled to retrace his steps into Virginia. The forces actually engaged were about 75,000 upon each side. The Union loss was about 23,000 and that of the Confederates about 32,000.

GHAZI, an Arabic word signifying 'champion or hero,' especially assumed by those Mohammedans who have slain infidels in battle, in the form of *ghazi-úd-din*, 'champion of the faith.'

GHER'IAH, the name of two places celebrated in Indian military history. One of these, also called Viziadrug, 170 miles S. of Bombay on the sea-coast, was captured from the Mahrattas in 1755 by a British fleet and army under Admiral Watson and Colonel Clive. At another G., near Mûrshedabad, on the Ganges, 140 miles N. of Calcutta, Major Adams, after a hard-fought battle, defeated the Nawab Mîr Cossim in 1763, and finally established the pre-eminence of the East India Company in Bengal.

GIARR'E, a large town in the province of Catania, Sicily, near the sea, and 42 miles S.S.W. of Messina. The vicinity is famous for its wine, and about 5 miles above the town, on the side of Mount Etna, are several trees of remarkable size and age, and the remains of the famous *Castagno di Cento Cavalli*, held to have been formerly the largest chestnut-tree in the world. Pop. 17,197.—G. RIPOSTO, about a mile distant to the E. of G., of which it is the port, is a station on the railway from Giardini to Catania. Pop. 6530.

GIDDINGS, JOSHUA R., an American statesman, born at Tioga Point, Pa., Oct. 6, 1795, removed to Ohio, with his father, when a child, studied law, and was admitted to the bar in 1821. From 1839 to 1859 he was a member of Congress, where he distinguished himself as a strong opponent of the encroachments of the slave power. By his outspoken policy he incurred the intense hatred of southern men, and was several times assaulted by them. In 1861 he was appointed Consul-general to British North America. Died at Montreal, May 27, 1864.

GIFFORD, SANFORD ROBINSON, an American landscape painter, born at Greenfield, Saratoga Co., N. Y., June 10, 1823, educated at Brown University, R. I., and pursued art studies in New York City. Among his best-known works are 'Mansfield Mount,' 'Shrewsbury River,' 'San Giorgio,' 'Tivoli,' 'On the Nile,' 'Venetian Sails,' and 'Baltimore in 1862.' Died in New York City, 1880.

GIL'BERT, SIR HUMPHREY, a famous Devonshire gentleman of the Elizabethan era, born at Dartmouth in 1539, educated at Eton and Oxford, adopted the profession of arms, and rendered distinguished service in the Irish wars (for which the Queen conferred upon him the honor of knighthood) and in the Low Countries. He sat in the parliament of 1571. In 1576 he wrote a treatise on the N.W. Passage to India, and two years after succeeded in obtaining from Elizabeth a patent authorizing him to 'discover and take possession of any remote heathen and barbarous lands not being actually possessed by any Christian prince or people.' Aided by his half-brother, Sir Walter Raleigh (G.'s mother was twice married, the second time to Walter Raleigh of Fardel, Devonshire), he fitted out a naval squadron for discovery and conquest in 1579; but his ships, damaged by tempest and beaten in an engagement with the Spaniards, were driven back to England. In 1583 he organized another expedition of five vessels and 260 men, which was still more disastrous. With four out of his five vessels G. reached Newfoundland, and in terms of his patent took possession of it in the Queen's name. Sailing southward G. lost the largest of his three remaining ships, with nearly all on board, off Cape Breton. On the 9th September in the midst of a storm, G., 'sitting abaft with a book in his hand,' more than once exclaimed 'We are as near to heaven by sea as by land.' On the evening of the same day the frigate in which he sailed went down with all on board. Besides being a conspicuously brilliant, chivalrous figure in an age renowned for brilliance and chivalry, G. is to be remembered as taking a prominent part in laying the foundations of English colonization in America.

GILLES'PIE, GEORGE, a notable Scotch divine, born at Kirkcaldy in 1612. He was ordained minister of Wemyass in 1638, translated to Edinburgh in 1642, and in the following year was appointed commissioner from the Church of Scotland to the famous Westminster Assembly. The ability which he showed in theological discussion excited the admiration even of his Erastian opponents. In 1648 G. was elected moderator, but died prematurely in the same year. His *Dispute against the English Popish Ceremonies*, *Aaron's Rod Blossoming*, and *Miscellany Questions*, are meritorious works, but his historic eminence is greater than his literary fame.

GILL'MORE, QUINCY ADAMS, an American military engineer, born at Black River, O., Feb. 28, 1825, and graduated from West Point in 1849. In 1861 he was made chief-engineer of the expedition against Port Royal, under Gen. W. T. Sherman. Under his directions the bombardment of Fort Pulaski, at the mouth of the Savannah River, was begun on April 9th, and that fortress was forced to surrender on the following day. In 1863 he conducted the operations against Charleston, S. C., which resulted in the capture of Fort Wagner and the destruction of Fort Sumter. He has published, among others, the following works: *Siege and Reduction of Fort Pulaski; A Practical Treatise on Limes, Hydraulic Cements and Mortars;* and *Engineer and Artillery Operations against the Defences of Charleston in* 1863.

GIMIGNA'NO, SAN, an old Italian town in the province of Siena, 22 miles S.S.W. of Florence. It has a mediæval appearance, and its tall towers, whence it was called *San G. delle belle torri*, are still standing. Of its churches the most interesting are *La Collegiata*, built in the 11th c., and *S. Agostino*, begun in 1280. G. was a thriving place in the 13th c. Pop. 7425.

GIPSY-MOTH (*Hypogymna dispar*), a species of Moths, belonging to the family *Arctiidæ*, in which the antennæ of the males are deeply notched, the wings being bent downwards in repose, and the proboscis small or wanting. The genus *Hypogymna* has no proboscis, and the wings are opaque. The feelers are comb-like in both sexes, and the male abdomen has a tuft at its tip. The male G.-M. is of dark-brown color; the female, greyish white. The front wings are marked with four transverse and wavy brown bands, and a V-shaped mark exists at the middle of their anterior margin. The G.-M. is common on the Continent.

GIRARD COLLEGE, an educational institution at Philadelphia, Pa., established in 1833–48 by the liberality of Stephen Girard. Mr. Girard, an eccentric banker of Philadelphia, who had accumulated a large fortune, at his death in 1831, left over $2,000,000 for this purpose. In his bequest he directed that the institution to be founded, should be open to white male orphans between the ages of eight and ten, and that they should be apprenticed to some industrial occupation between the ages of eight and fourteen. The buildings, which are composed very largely of marble, are spacious, and about 500 boys are accommodated.

GLAD'BACH (*Mönchen-G.*), the chief industrial town in Rhenish Prussia, on the Niers, 16 miles W. of Düsseldorf by railway. It has active manufactures of linens, cottons, silks, ribbons, druggets, velvets, tobacco, machinery, &c., besides large bleachfields and dye-works. Pop. (1875) 31,962. G. was founded in the end of the 8th c.—G. (*Bergisch-G.*), a town of Rhenish Prussia, 8 miles E.N.E. of Köln by railway. It has manufactures of paper, nets, and percussion-caps, and was included in the former Duchy of Berg. Pop. (1871) 6195.

GLADDEN, WASHINGTON, D.D., an American divine, born in Pennsylvania in 1836, and educated at Williams College. He has been pastor to several Congregational churches, one of the editors of the New York *Independent*, and has met with much success as a lecturer. He has published several works, among which is *Workingmen and their Employers*.

GLAND'FORD BRIGG, or simply BRIGG, a market-town in Lincolnshire, England, on the Ancholme, 18 miles W. of Great Grimsby by railway. It has a corn exchange, a horticultural society, railway works, malthouses, breweries, cornmills, and a large river trade in corn, coal, and timber. The river is navigable for sloops from the Humber. Pop. (1871) 2646.

GLASS-SNAKE (*Ophisaurus ventralis*), a species of *Lacertilia* or Lizards found in N. America, and so named from its snake-like aspect, the limbs being wanting. It is included in the family *Chalcidæ*, to which also belong several peculiar lizards, such as the *Chirotes* of Mexico, in which only the front limbs are developed; and the African *Bipes*, in which only the hind limbs are represented. The palate in the G.-S. is toothed, and two deep grooves extend along the sides of the body, which is marked with lines of black, yellow, and green, the belly being bright yellow, and the head mottled on its upper surface. The upper parts are occasionally black, and the under grey; but great variations of color are observable. The name 'G.-S.' is derived from the brittle nature of the animal's body, the sudden contraction of the tail-muscles causing the body to break in two when the animal is incautiously handled. The common blindworm (*Anguis fragilis*) exhibits the same peculiarity. The G.-S. is very common in plantations, and is often dug up in autumn along with the sweet

potato (*Convolvulus batatas*). It feeds on insects, smaller reptiles, &c.

GLAU'CIUM, a small genus of Herbaceous plants, belonging to the Poppy family, found generally on the sea-coasts of Europe and America. There are two Brititish species, viz., *G. luteum*, the yellow horned poppy, and *G. phœniceum*, the scarlet horned poppy. Several species are cultivated for their showy flowers. Most of them have an acrid poisonous juice.

GLEIM, Johann Wilhelm Ludwig, a German poet, was born near Halberstadt, 2d April 1719. Till 1747, when he settled finally in Halberstadt as cathedral secretary, he had been engaged as tutor and secretary in families of distinction. G.'s indefatigable efforts to encourage poetical and literary promise, and his zeal in promoting German unity and national feeling, have, quite as much as his own writings, secured for him the affectionate title of *Father Gleim*, by which he is generally called. He died 18th February 1803. Of his own poems, his *Kriegslieder* (Berl. 1778) are by far the best. *Halladat*, a didactic poem, had appeared in 1774; and *Fabeln und Erzählungen* were posthumously published in 1810. G.'s *Sämmtliche Werke* were edited in 7 vols. (Halb. 1811–13; new ed. 8 vols. 1841) by Körte, who also wrote his life (Halb. 1811).

GLOUCESTER CITY, in Camden Co., N. J., on the Delaware River, opposite Philadelphia and below Camden. It is largely engaged in manufacturing. Pop. 5347.

GLOVERSVILLE, in Fulton Co., N. Y., on the Fonda, Johnstown & Gloversville Railroad, 50 miles from Albany. It is engaged in manufacturing gloves and mittens, and carries on a large wholesale trade. Pop. 8600.

GLOXIN'IA, a genus of tropical American plants belonging to the order *Gesneraceæ*, several species of which are grown in British hothouses for their richly-colored foliage and graceful flowers.

GLUTÆ'US (Gr. *gloutos*, 'the buttock') is a term applied to various muscles which form that region. In man they are three in number, viz., the G. maximus, the G. medius, and the G. minimus—of which the first is the chief extensor of the hip-joint, while the two latter remove the thigh from the median plane of the body (that is, they are *abductors*), and they assist in supporting the body on one limb during the act of walking.

GLYP'TODON, an extinct genus of Edentate quadrupeds most nearly allied to the existing Armadilloes. The fossil remains of the G. occur in the Recent or Post-tertiary deposits of S. America —that is, in the region where existing armadilloes are found. This coincidence exemplifies Owen's 'organic succession of animal forms.' A well-known specimen is the *G. clavipes*, 9 feet long. The G. had no divisions of its armor-plating, which, as in the armadilloes, consists of bony pieces of hexagonal shape, firmly united by suture, thus rendering all movement of the casing impossible. The head and tail had each a cuirass of plates. The vertebræ of the spine were fused into a solid mass. The feet were large, and the last joints of the toes short and massive. No canine or incisor teeth were developed, but there were eight molars on each side of each jaw. The crowns of the latter teeth were fluted and divided into lobes.

GMUN'DEN, a town of Upper Austria, at the outflow of the Traun from the Traun or G. Lake, 36 miles S.W. of Linz by railway. It is the seat of an imperial 'direction' for salt-mines and forests, and has considerable fisheries and an active river trade. The fine castle of Ebenzweirer stands out in the lake. Pop. (1869) 5623.

GO'A (*Crocodilus palustris*), a species of Crocodiles belonging to Asia and Australia, known also as the 'marsh erocodile,' and 'mugger.' A large specimen may attain a length of 33 feet. The G. travels overland for considerable distances during the dry season in search of water.

GOALUN'DO, a town in the district of Furidpur, province of Bengal, British India, at the junction of the main streams of the Ganges and Brahmaputra, 152 miles N. of Calcutta by rail. It is the terminus of the E. Bengal Railway, from whence the Assam steamers start, and the registration depôt of the coolies for the tea plantations. The railway station and protective works against the river currents, erected at a total cost of £100,000, were swept away in the floods of October 1874, and are now abandoned. There is a trade in dried and salted fish. During the first six months of 1876 the traffic in boats was valued at £700,000; by railway at £600,000.

GODD'ARD, Arabella, an English pianist, was born in Brittany, January 1836. In 1848 she was placed under Mrs. Anderson, the Queen's pianist, and afterwards became the pupil of Kalkbrenner and Thalberg. Her first public appearance was in 1850. In 1854–56 she visited the Continent, and in 1873–76 America and Australia. G. excels in the performance of both classical and modern music.

GOD'UNOV, Boris Feodorovitch, a Russian noble of Tartar descent, was born in 1552. After he had long been the virtual ruler under the weak Feodor I., and had by the final conquest of Siberia done much to strengthen and extend the empire, he was in 1598 called by the Bojars to the throne. Although he inaugurated serfdom (1595), his reign greatly advanced civilization in Russia by many wise measures for the promotion of trade, education, and the strict administration of justice. He poisoned himself, 13th April 1605. His son Feodor G. (born 1589) succeeded his father as Czar, but was murdered in June of the same year by Demetrius, brother of Feodor I., who returned at the head of a Polish army.

GOD'WIN, Mary Wollstonecroft, an English authoress, born at Beverley, Yorkshire, April 27, 1759. In her youth she left her father's house and maintained herself as a schoolmistress and governess until 1787, when she entered on a literary life in London. Several tales which she issued won some notice, and in 1791 her *Vindication of the Rights of Women* made her generally known. She then visited Paris, where she became intimate with the leading Girondins, and formed a *liaison* with an American named Imlay, who left her in great distress. In 1797 she married William G., whose Radicalism she shared, and died in London, September 10 of the same year, in giving birth to Mary G., afterwards the wife of Shelley and authoress of *Frankenstein*. See William G.'s remarkably candid *Memoirs of Mary Wollstonecroft G.* (1798).

GODWIN, Parke, an American journalist and author, born at Paterson, N. J., Feb. 25, 1816, and graduated from Princeton College in 1834. He has been connected with various journals, particularly the New York *Evening Post*, and has published, among other works, the following: *A Popular View of the Doctrines of Fourier; Democracy, Pacific and Constructive; Vala*, a novel; *Handbook of Universal Biography; Political Essays; History of France; Cyclopædia of Biography;* and *Out of the Past*.

GOE'DEKE, Karl, a critic and historian of German literature, was born in 1814 at Celle, in Hanover, taught privately for many years at Göttingen, and was subsequently appointed a professor in the university there. G.'s principal work is a history of German poetry, *Grundriss zur Geschichte der Deutschen Dichtung* (3 vols. 1856–70). He has also published *Elf Bücher Deutscher Dichtung* (2 vols. 1849). *Deutsche Dichtung im Mittelalter* (1852), and has edited Lessing, Schiller, and Goethe, with notes and biographical introductions. His biography of Goethe has been published as a separate work.

GO'LAB SINGH, the founder of the present dynasty of Cashmere, feudatory to the British Government of India. By descent a Dogra Rajput, he entered the service of Runjit Singh, the Sikh Rajah of the Punjaub, in 1820. Though he himself never joined the Sikh sect, he became the most favored minister of Runjit, who conferred upon him the fief of Jummu, which lies at the mouth of the Cashmere valley. He used the Sikh soldiery to conquer for himself the additional province of Ladakh; and after the first Sikh war, in 1845–46, he received from the British the state of Cashmere, in consideration of paying £750,000 in a lump sum and an annual tribute of a few goats and shawls. Though often suspected, he continued loyal to the treaty then made, and on his death in 1857 his son succeeded to the state on the same terms. See Cashmere, and Cunningham's *History of the Sikhs* (Lond. 1853).

GOLDEN, a rapidly growing town of Jefferson Co., Col., on a fork of the S. Platte River, which affords fine water power. It has coal shafts, smelting works, copper-reduction works, and several large flouring mills. Pop. 2916.

GOLDSBOROUGH, Louis M., an American naval officer, born at Washington, D. C., Feb. 18, 1805, and entered the navy in early life. He was promoted lieutenant in 1825, commander in 1841, and captain in 1855. In 1861 he was placed in command of the North Atlantic blockading squadron, and in connection with Gen. Burnside, conducted an expedition that seized Roanoke Island and many important positions in North Carolina. In 1862 he was made rear-admiral, and in 1873 retired from the service. Died Feb. 20, 1878.

GOLUN'DA (*G. Barbara*), a genus of *Muridæ*, or Mice, familiarly known as the Barbary mouse, from its occurring in that country. This elegant animal has a rich brown fur, striped longitudinally with yellow, while the under parts are white. It is about the size of the common mouse. The G. becomes very tame in captivity.

GON'DA, the chief town of the district of the same name in the province of Oudh, British India, about 120 miles N. of Allahabad. Pop. (1869) 11,966.—G. *district*, which lies under the Himalaya, is watered by the Bapti and Gogra rivers, by which it exports to Bengal rice, other cereals, and oilseeds, and receives salt and iron. Area, 2629 sq. miles; pop. (1869) 1,167,816.

GONIAS'TER, a genus of Starfishes (*Echinodermata*), including those familiarly named 'cushion stars.' The body is pentagonal, and flat on either side; the rays inconspicuous, and only to be seen distinctly on the under surface. The 'knotty cushion star' (*G. equestris*) occurs abundantly round the British coasts. The genus is first represented in a fossil state in the jurassic rocks.

GONZA'GA, a town of Northern Italy, in the province and 15 miles S. of the city of Mantua by railway. It stands amid fertile plains, was doubtless formerly of great strength, and is said erroneously to have been the cradle of the Gonzaga family. Pop. 17,526.

GOODALE, Elaine and Dora R., sisters and poets, born in Massachusetts, in 1863 and 1866. Both exhibited remarkable poetic genius, when mere children. They have published *Apple Blossoms, In Berkshire with the Wild Flowers*, and *All Round the Year*.

GOOD TEMPLARS, a secret society organized in the cause of temperance, in New York State, in 1851. It rapidly spread throughout the entire Union, and soon acquired a large membership. Its members are solemnly pledged to total abstinence from all intoxicants.

GOODWIN, Thomas, D.D., an English divine, born at Rollesley, Norfork, 1600, studied at Cambridge, where he was made vicar of Trinity Church in 1632. Shortly afterwards he left the English Church, and withdrew to Holland, where he became pastor of the English church at Arnheim. He returned to England about 1640. In 1649 the Parliament made him President of Magdalen College, Oxford. After the Restoration he led a studious life in London until his death, February 23, 1679. Anthony Wood speaks of him as 'one of the Atlasses and patriots of Independency.' His works, which are theological, were published (Lond. 5 vols.) 1681—1704.

GOOD'YEAR, Charles, born at New Haven, Connecticut, December 29, 1800, became an iron manufacturer in Philadelphia, and in 1830 began to experiment on the uses of india-rubber. In 1836 he invented a nitric acid process for fitting it to be worn as waterproof shoes, &c., and in 1839 he perfected a method of vulcanizing india-rubber by sulphur. G. died at New York, July 1, 1860.

GOOROO', or GURU (derived from a Sanscrit word signifying 'heavy'), 'a person of weight or respectability,' a word used throughout India in two special senses—(1) for the village schoolmaster in the indigenous *pathsala;* and (2) the religious teacher or guide who communicates to his disciple the peculiar prayer which initiates him into any particular sect. In this latter sense it was commonly applied to the ten Sikh Gooroos, from Nanuk to Govind Singh, whose succession has now ceased. To this day the watchword of the Sikhs is *Wah gooroo* = 'Hail G.,' and Gurumuki is the name of that peculiar modification of the Sanscrit alphabet adopted by that sect. See Cunningham's *History of the Sikhs* (Lond. 1853).

GOOSEBERRY FLY (*Nematus grossulariæ*), a species of *Neuropterous* insects allied to the well-known Sand-Flies, and included in the family *Tenthredinidæ*. The antennæ are simple in the genus Nematus, and the tarsi are jointed. The G. F. is noteworthy from the ravages of its larvæ on the gooseberry trees and fruit.

GOPH'ER or MUNGOFA TORTOISE (*Testudo gopher*), a species of *Testudinidæ* or tortoises found in America, of a brownish-yellow color, mottled with dark brown. It attains a length of 13 or 14 inches, and the female is larger than the male. The back is greatly arched. The food of the G. T. consists of vegetable matter, and it is specially fond of the sweet potato. The eggs are larger than those of pigeons, and are highly esteemed as food.

GORDON, Lucy, Lady Duff, daughter of Mrs. Austin, was born in 1821, married Sir A. G. in 1840, and became known as an excellent translator of French and German works. She died at Cairo, July 14, 1869. Among her translations are Ranke's *History of Prussia*, Niebuhr's *Greek Legends, The Amber Witch, The Village Doctor*, &c. Her original works, marked no less by an exquisite feminine lightness and grace than by an almost perplexing freedom of religious sentiment, are *Letters from the Cape* (1864) and *Letters from Egypt* (1865) and *Last Letters from Egypt* (1875), with a *Memoir* by her daughter, Mrs. Ross.

GOSAIN', or GOSWA'MI (Sansc. lit. 'one who is master of his passions'), is the term used throughout India for a special class of professed religious mendicants. In S. India they are chiefly the reputed descendants of the religious reformer, Sankara Acharya; they are gathered into *maths* or convents, and profess celibacy. In N. India, they are generally members of the Vaishnav sect, who may marry and follow secular pursuits; but the name is loosely applied to all sorts of disreputable vagrants.

GOSHEN, a town of Elkhart Co., Ind., on the Elkhart River. It is the center of a rich agricultural district, and has good water power, which is extensively used in manufacturing. Pop. 5500.

GOSS, Sir John, an eminent composer, was born at Fareham in Hants in 1800. In 1811 he became one of the 'young gentlemen' of St. James' Chapel Royal, and in 1856 was made composer to the Chapels-Royal. He was organist of St. Paul's Cathedral from 1838 to 1872, and till recently Professor of Harmony at the Royal Academy. G. has published an *Introduction to Harmony and Thorough Bass* (1833), a collection of voluntaries (1864), and numerous glees and anthems. He composed the music for the funeral ceremony of the Duke of Wellington in 1852, and for the thanksgiving service for the Prince of Wales' recovery from fever in 1872; on the latter occasion he was knighted.

GOSSAN'DER (*Mergus*), the name of a well-known genus of Natatorial birds, belonging to the family *Anatidæ* or ducks, and to the special sub-family *Merginæ*. It is distinguished by the straight, compressed bill, which has its edges prominently toothed, by the short and rounded tail, and by the front toes being webbed, while the hinder toe has only an edging of membrane. The G. (*Mergus merganser*) arrives in Britain in November, and migrates northwards in March. A few specimens may be found remaining throughout the year in Britain. The northern coasts are the habitat of these birds, which subsist on fishes, and secure their prey by means of the sharp-toothed projections of the bill. These projections are merely prominences of the horny lining of the bill, and are in no sense to be regarded as physiologically corresponding to teeth. The average length of the G. is 2 feet. Its color is a deep metallic green on the neck and upper part of the back, the latter region being black, and the tail dark grey. The wing-coverts are white, and the breast and belly of a ruddy buff hue. The bill and legs are scarlet. The female has a reddish-brown head and neck, and a grey back. The nest is constructed in the neighborhood of water, and the eggs, which number six or seven, are of a pale buff color.

GOSSE'LIES, a town of Belgium, province of Hainault, 4 miles N.W. of Charleroi. There are coal-mines in the neighborhood, and G. has manufactures of woollen cloth, hats, &c., tanneries and bleachfields. Pop. (1870) 7000.

GÖ'THALAND, or GÖ'TALAND (also called GOTA RIKE, 'the Gothic kingdom'), southmost of the three provinces of Sweden, embracing eight läns or districts with the islands Gotland and Oland. Area, 28,126 sq. miles; pop. (1874) 1,991,021. The surface, though in general mountainous, is well watered and wooded, and presents many fertile tracts. The chief river is the Götha or Göta, once unnavigable from cataracts (Trollhättan, &c.), but now so fitted with canals and locks that vessels can reach Lake Venern, from whence the Göta Canal affords free passage to the Baltic. The chief towns are Göteborg, Malmö, Norrköping, Carlskrona, Jönköping, Lund, and Calmar. To Englishmen it possesses a special interest as the native land of the hero Beówulf whose adventures have been celebrated in one of the oldest and greatest of English poems.

GOTTS'CHALK, Louis Moreau, an American musician, born at New Orleans, La., May 18, 1829. Very early in life he began to evince musical genius, at the age of six years had given a concert, and when twelve years old was sent to Paris to complete his musical education. He gave piano concerts throughout Europe, and, upon his return home in the U. S., Mexico, and South America, and everywhere won universal applause. He was also a composer of high merit. Died at Rio Janeiro, Brazil, Dec. 18, 1869.

GOUGH, Hugh, Lord, a distinguished English general, born at Woodstown in the county of Limerick, Ireland, 3d November 1779, entered the army in 1794, served at the Cape of Good Hope and in the W. Indies, and was present at most of the battles of the Peninsular war, in which he was more than once severely wounded. He was sent to India in 1837, and to China in 1840, in command of the land forces; for his services in the latter country he was made G.C.B. and a baronet. From 1843 to 1850 he was commander-in-chief in India, and commanded in person throughout the two bloody Sikh campaigns of 1845–46 and 1848–49. On his return to England he was created baron and viscount, and received a pension for three generations; subsequently also he obtained a field-marshal's staff. He died 3d March 1869. Personally he was regardless of danger, and he was not sparing of the lives of his soldiers, preferring an immediate bayonet charge to the proper use of artillery.

GOUGH, Richard, an antiquary, born in London in 1735, studied at Cambridge University, and after a life of research died at Enfield in 1809. His works include *Anecdotes of British Topography, The Sepulchral Monuments of Great Britain, The History of Pleshy in Essex. Plates of the Coins of the Seleuculæ. Account of the Missal presented to Henry VI. by the Duchess of Bedford.* G. left all his MSS. to Oxford University.

GOUL'BURN, a town in New South Wales, 128 miles S.W. of Sydney, with which it is connected by railway. It is the center of an important agricultural district; while gold is found in the

vicinity, though not in rich quantities. Copper is also beginning to be worked. G. is a see of the Anglican and Roman Catholic Churches. Pop. of the town (in 1875), 4453; of the district, 13,756.

GOVERNOR'S ISLAND, a small island in New York harbor, occupied by government fortifications, and used as a military station. It is about three-fourths of a mile south of the southern extremity of New York City.

GOVIND', or GOVIND' SINGH', the tenth and last *guru* of the Sikhs, flourished 1660–1708. It was he who developed what had previously been a mere religious sect into a nationality of disciplined warriors. He gave the name of *khalsa* = 'select or liberated;' and a great part of the *Grunth* or Holy Book is composed of the elaborate ceremonies and rules of conduct which he imposed on his followers. See Cunningham's *History of the Sikhs* (Lond. 1853).

GOW'DIE, a name given to the Gemmeous Dragonet, a Teleostean fish allied to the Goby, and known scientifically as the *Callionymus lyra*. The term 'G.' refers to the golden lustre of the body.

GOWHAT'I (*Gauhati*), the chief town in the district of the Kamrup, province of Assam, British India, on the left bank of the Brahmaputra. Pop. (1872) 11,492. It was the capital of Assam under the early Hindu dynasty, and the fortifications can still be traced for miles on both sides of the river. All buildings have now entirely disappeared, but the soil is mainly composed of decaying brick and mortar, and sculptured stones are continually turned up by the plough. It is by far the most populous town in the province, indeed the only town, and is the seat of a considerable river trade; but owing to its unhealthiness, the headquarters of the Chief Commissioner have been removed to Debrugurh.

GOZZ'I, COUNT CARLO, an Italian dramatist, born at Venice in 1722. When a youth, he joined the army in Dalmatia, and after spending three years there returned to Venice, where he began to write fanciful fairy dramas, one of which, *L'Amore delle tre Melarance*, brought out in 1761, had such a complete success that G. for a time quite eclipsed his rival Goldoni. He produced many other wild romantic pieces, full of spectacle and bustle, and not without humor and pathos amid their lively trivialities. G. died April 6, 1806. His pieces were speedily displaced by Goldoni's. An edition of his works in 10 vols. was published in 1792. See his autobiography, called *Memorie inutili di Carlo G.* (Venice, 1797).

GRADISK', a town in the S. of Russia, province of Poltava, near the left bank of the Dnieper, 65 miles S.W. of Poltava. It has four churches, a monastery, and some grain and cattle trade. Pop. (1870) 7107.

GRAHAMS, THE, OF THE BORDER, are descendants from Sir John G. of Kilbride, second son of Malice 'with the bright sword,' first Earl of Strathern, and afterwards Earl of Menteith. The principal families are those of Plomp, Esk, and Netherby.

GRAIN, the origin of all weights in England, was a G. of dried wheat from the middle of the ear. Thirty-two grains made one pennyweight, twenty pennyweights one ounce, and twelve ounces one pound. Now twenty-four grains make one pennyweight. The G. is the smallest weight in common use.

GRAN CHACO, EL (i. e., 'the great hunting-ground'), also called CHACO GUALAMBA, is a wide expanse of llanos in S. America, comprising the N.E. of the Argentine Republic and the S.E. of Bolivia. Area and population uncertain. The surface is very level, in the S. waste, in the N. covered with luxuriant vegetation. It is watered by the Rio Salado, Vermego, Pilcomayo, &c. Little is known of the interior, which is occupied by scattered tribes of nomadic Indians.

GRAND COMBE, LA, a town of France, department of Gard, 9 miles N.N.W. of Alais by railway, has important manufactures of iron, and one of the richest coal-pits in France, yielding annually 15,000 tons of fuel. Pop. (1872) 9367.

GRAND FORKS, in Grand Forks Co., Dakota, on the St. Paul, Minneapolis & Manitoba Railroad, and on the Red River of the North, at the head of navigation. It is surrounded by a good agricultural region and carries on a large trade. Pop. 4800.

GRANGER, GORDON, an American general, born in New York City, in 1821, and graduated from West Point in 1845. He served gallantly during the Mexican war, and was present at the battles of Vera Cruz, Cerro Gordo, Contreras, Churubusco, Chapultepec, and the capture of the city of Mexico. He rendered valuable and heroic services during the civil war, and was made major-general of volunteers in 1862. He participated in the battles of Chickamauga and Missionary Ridge, and other engagements. Died Jan 10, 1876.

GRANVELL'A, ANTOINE PERRENOT, CARDINAL DE, the accomplished but unscrupulous Minister of the Emperor Karl V. and of Philip II., was born at Ornans, in Burgundy, 20th August 1517. In 1540 he became Bishop of Arras, and soon entered the diplomatic service of Karl V., under whom G.'s father had kept the great seal. G.'s sagacity and linguistic attainments—so great that he had perfect command of seven languages—soon raised him to high favor, and his influence over the great political negotiations of his time renders him one of the most prominent men of the 16th c. G. was present at the Diets of Worms and Ratisbon, and at the Council of Trent. He negotiated the marriage of Philip II. with Mary of England, and, as Minister of Margaret of Parma, he conducted the affairs of the Netherlands from 1559 till his unpopularity compelled him to retire in 1564. In 1570 he concluded the alliance of Spain and the Pope against the Turks, was for a time vice-king of Naples, and died at Madrid, 21st September 1586. For his services to Church and State, G. was successively rewarded with the archbishopries of Mechlin and Besançon and in 1561 he was raised to the cardinalate. The papers left by G. illustrate all the negotiations in which he was engaged, and extend to eighty folio volumes of MS. In 1842 the publication of them was begun, See Gerlache's *Philippe II. et G.* (Bruss. 1843).

GRAPH'IC REPRESENTA'TION is the practical application of the principles of co-ordinate geometry to the construction of curves, which show readily to the eye the relations existing between a series of numbers which refer to some one physical phenomenon. The construction of maps by means of meridians and parallels is a very perfect example of the nature of the methods commonly employed, except that in this particular case the co-ordinates are not referred to *rectangular* axes. In the elucidation of the laws by which a continually and regularly varying phenomenon is governed, the method of G. R. is of singular power.

As an example, take the variation of barometric pressure throughout the day. Measure along a horizontal line twenty-four equal spaces to represent hours, and at each point raise a perpendicular representing by its length the height of the mercury at the corresponding hour. The result will be a series of points, the curve through which will indicate on mere inspection the general variation of barometric pressure from hour to hour. In our best observations the barometer is made to record its variation in this way for every instant. A strong electric or lime light is thrown through the barometer tube upon a strip of sensitive photographic paper, which is moved slowly and equally along by clockwork. The column of mercury of course shuts off the light from the lower part of the paper, which is therefore not acted upon, and by this means a sharp line of demarcation is obtained upon the paper, which gives at once the law of variation. When there are three variables involved in the progression of any phenomenon, G. R. on a plain surface becomes more difficult. For instance, in mapping a country, we must take account of vertical elevation, as well as of latitude and longitude. The usual method of representing mountains on maps is not only inaccurate, but, as a rule, misleading. The true scientific method is by *contour lines*. A glance at an Ordnance Survey map will show at once the nature of this representation, which consists in drawing through points at the same elevation a line, which must be ultimately a closed curve. The principle is the same as in the drawing of isotherms or equipotential lines. The closer two different contour lines are, the steeper is the slope at that place; and if they touch, they indicate a perpendicular precipice.

In all branches of science graphical methods are coming into greater favor, and in practical science European engineers have developed a kind of applied geometry which they call graphical statics. By its methods the engineer can solve numerous statical problems by simple construction more easily and with as much accuracy as by calculations founded on analytical investigations. The leading treatise on this subject is the *Graphische Statik* of Professor Culman of Zurich (2d ed. 1875). See also Professor Dubois's *Elements of Graphical Statics* (New York, 1875).

GRAPHIS, a genus of Lichens which have their fructification resembling Oriental writing, hence they have been called 'scripture worts.' There are several species in Britain which grow on the bark of trees.

GRAPPLE-PLANT, the common name for *Uncaria* (Harpagophytum) *procumbens*, an American plant belonging to the order *Pedaliaceæ*. It has received the name G. P. from its fruits being furnished with very strong, sharp, branching hooks, which lay hold of animals, and travelers' garments, and with difficulty can be removed.

GRAY, DAVID, was born at Merkland, Dumbartonshire, 29th January 1838, studied at Glasgow University, and in May 1860 removed to London, where symptoms of consumption showed themselves. Sent by his friends (chief among them, Lord Houghton) to Italy, he derived no benefit from the change of climate, and returning to his father's house at Merkland, January 1861, died there, 3d December of the same year. His work, *The Luggie and Other Poems*, abounds in delicate and subtle descriptions of natural scenery, and in melodious and suggestive lines. Had he lived he

might have won fame. See *Life and Works of D. G.* (Lond. 1862), and *Poems of D. G.*, edited by Henry Glassford Bell (Glasg. 1874).

GRAY, HENRY PETERS, an American painter, born at New York, in 1819. The following are among his best known works: 'The Roman Girl,' 'Proserpine and Bacchus,' 'Wages of War,' 'Cleopatra,' and 'Origin of the American Flag.' Died at New York, in 1879.

GREAT BARRINGTON, a town of Berkshire Co., Mass., on the Housatonic Railroad. It is engaged in manufacturing, and has quarries of variegated marble. Pop. 4658.

GREAT FALLS, in Strafford Co., N. H., on the Salmon Falls River and the Boston & Maine and Eastern railroads, 74 miles from Boston. It is one of the largest cotton and woollen manufacturing places in the state. Pop. 5500.

GREEN BAY, in Brown Co., Wis., on the Fox River, at the head of Green Bay. It has four railroads and a fine harbor, and is engaged in lake commerce and the lumber and general jobbing trade. Pop. 7479.

GREENLEAF, SIMON, LL.D., an American law writer, born at Newburyport, Mass., Dec. 5, 1783, was admitted to the bar in 1806, and after having practiced at several places in Maine, was, in 1833, made Royall professor of law in Harvard University, and in 1846 was made Dane professor, succeeding Judge Story. His principal work was a *Treatise on the Law of Evidence*, in three volumes, which is everywhere recognized as an authority upon that subject. He also published a religious work, entitled an *Examination of the Testimony of the Four Evangelists by the Rules of Evidence as Administered in Courts of Justice, with an Account of the Trial of Jesus*, a work that has attracted considerable attention. Died at Cambridge, Mass., Oct. 6, 1853.

GREEN RIVER, a branch of the Colorado, rising in Wyoming, and after passing through Utah, unites with the Grand River. It is about 750 miles long. Coal and gold are found in the upper part of its valley.

GREEN, SETH, born in New York, in 1817, and noted for his successful efforts to promote fish culture. Through his energy, many of the rivers and lakes of the United States have been stocked with valuable fish.

GREENSBURGH, a town of Westmoreland Co., Pa., on the Pennsylvania Railroad, at its junction with the Southwest Pennsylvania Railroad. It is in an agricultural district; is a trade center and a prominent coal shipping point. Pop. 5000.

GREENVILLE, a city of Greenville Co., S. C., at the terminus of the Greenville and Columbus Railroad, 143 miles from Columbia, and also on the Richmond and Danville Railroad, 165 miles from Atlanta. It has a salubrious climate and is a favorite summer resort. Here are located Furman University, the Baptist Female College, and Greenville Military Institute. As a cotton market and business point, it ranks second in the state. The vicinity abounds in excellent water power and has numerous cotton factories. Pop. 8,350.

GREENWICH, in Fairfield Co., Conn., on Long Island Sound and the New York & New Haven Railroad, 27 miles from New York. It is surrounded by an agricultural community and contains the residences of many New York business men. Pop. 8,000.

GREENWOOD CEMETERY, in the southern part of the city of Brooklyn, celebrated for its beautiful and costly monuments, and the beauty of its scenery. It is one of the largest and most beautiful cemeteries of the world.

GREG, WILLIAM RATHBONE, was born at Manchester, England, in 1809, was made a Commissioner of Customs in 1856, and Controller of the Stationery Office in 1864. He has become well known as the author of *Essays on Political and Social Science*, *Enigmas of Life* (1872, 5th ed. 1873), *Literary and Social Judgments*, *Political Problems*, *The Creed of Christendom* (3d ed. 1873), *Rocks Ahead, or the Warnings of Cassandra* (1874). He is a singularly lucid and graceful writer, and a clear and original thinker, but his teachings are somewhat narrow, cold and dogmatic. In his fidelity to fact, in his earnest attachment to what truth he knows, no less than in his rigid attitude of hostility to convictions which he does not share, we can recognize both the good and the evil of his Puritan training.

GREN'VILLE, an important English family connected with the county of Buckingham since the reign of Henry I., became conspicuous in the 18th c., when RICHARD G., by his marriage with Hester, daughter of Sir Richard Temple, afterwards the Countess Temple, acquired great wealth and influence. Their son, RICHARD G., succeeded through his mother to the title and estates of the Temple family. In 1757 he was made Keeper of the Great Seal, and in the political strifes of the time was first the friend and afterwards the foe of Chatham, who had married his sister Hester. It is a compliment to his powers that some have attributed to him the authorship of the *Letters of Junius*. He died childless, 11th September 1779.

GRE'TRY, ANDRE ERNESTE MODESTE, a musical composer, was born at Liége, Belgium, February 11, 1741, became a choir boy in the Collegiate Church at the age of six, and in 1759 went to Rome to study counterpoint under Casali. He studied little, but he brought out an 'Intermezzo' in 1765 at a Roman theater. In 1767 he went to Paris. Between this and 1803 he wrote fifty—chiefly comic—operas, *e. g.*, *Le Huron* (1768), *Le Tableau Parlant* (1769), *L'Amant Jaloux* (1778), *Richard Cœur de Lion* (1785), *Guillaume Tell* (1791), *Delphis et Mopsa* (1803). G. acquired great renown, had a street named after him, was made member of many learned bodies, and received substantial benefits from Napoleon to compensate him for the loss of his wealth during the Revolution. He died at Montmorency, near Paris, 24th September, 1813. G.'s works suffered neglect at the time that Méhul and Cherubini began to compose, but they were afterwards revived with new honors. He lived among a circle of admirers, and is said to have disdained all music but his own. Strong in graceful and original melody and dramatic expression, he was extremely ignorant of the principles of his art, as his works abundantly show.

GREUZE, JEAN BAPTISTE, a famous French genre painter, was born at Tournus, Burgundy, in 1726. He studied at Lyons, Paris, and Rome, and for a time misdirected his powers through ambition to be an historical painter, but afterwards limited his efforts to genre and portraits, and achieved a remarkable success. He was long an Associate of the French Academy of Painting, and died at Paris, March 21, 1805. Among his chief works are 'La Petite Fille au Chien,' perhaps his masterpiece, 'La Bonne Mère,' 'Le Gâteau des Rois,' 'La Fille Confuse,' 'Une Jeune Fille tenant une Colombe,' &c. G.'s treatment is sometimes meretricious, and his modeling defective. He was especially successful in subjects from common life, and above all in roguish or languorous female faces, which he executed with peculiar softness and grace, with combined delicacy and richness of color.

GREWIA, a genus of small trees and shrubs belonging to the order Tiliaceæ found in warm regions, but absent from America. The wood of *G. elastica* and *G. occidentalis* is used for making bows and carriage shafts. The inner bark of many of the species yields a strong fibre.

GREY'NESS OF THE HAIR, or CANIT'IES, may be congenital, accidental, or senile. Congenital greyness is usually partial, occurring in the form of round patches; but cases have been met with in which the hair on one side of the head was brilliantly white, while on the other side it was jetty black. Accidental and senile greyness present varieties in extent. When white hair falls off it is not reproduced. Blanching of the hair commences at the root, and the colored part is gradually carried onwards, further and further from the integument. Black and brown hair is most liable to greyness, but blonde and auburn hair is more liable to fall off. When the hair is 'snowy,' of an opaque white, and of the thickness of ordinary hair, it contains abundance of calcareous salts; but when it is clear and transparent, assuming a yellowish tint on exposure to the atmosphere, it contains little or no calcareous salts. Senile greyness depends on diminished powers of the nervous system, resulting in the alteration of pigmentary deposits in the formative cells of the hair. In most cases the effects are gradual; but there are numerous instances on record in which the change took place within a few hours, owing to violent mental emotions. The hair of Marie Antoinette, the wife of Louis XVI., became grey in a short period, from grief. So also with Mary Queen of Scots, Sir Thomas More, and others. Rayer mentions a case in which several of the cilia became blanched within a short time in consequence of mental agitation, and there is an instance recorded of a young lady suffering from acute mania, whose eyelashes became white within ten hours, the hair of the scalp not being affected.

GRIFF'ARD (*Spizaëtus bellicosus*), a species of eagle sometimes known as the martial eagle, occurring in S. Africa. The color is dark brown, the feathers bordered by paler brown, and the quill feathers black. The tarsi are long and slender, the inner toe exceeding the outer in length. The nostrils are large and oblique. The bird is powerful and rapacious, and its cry is shrill and disagreeable.

GRIFFIN, CHARLES, an American general, born in Ohio, in 1826, and graduated from West Point in 1847. He served in the Mexican war, and in 1861 was made captain, and was present at the first battle of Bull Run. In 1862 he was made brigadier general of volunteers, and was in command of a brigade at the battles of Yorktown, Gaines's Mill, Malvern Hill, second Bull Run, Antietam, Fredericksburg, Chancellorsville, and Spottsylvania. For gallantry in the Rappahannock campaign he was made brevet major-general of volunteers. Died at Galveston, Tex., Sept. 15, 1867.

GRIFFIN, GERALD, an Irish poet and novelist, was born at Limerick, December 12, 1803. After several years of literary work in London, he joined the monastic order of the Christian Brothers of Cork, and died there, June 12, 1840. Several of his lyrics are tender and musical. Of his novels, the best is the *Collegians* (1828), a powerful tragic story, which won considerable popularity, and which is the groundwork of Boucicault's *Colleen Bawn*.

GRIGORIOP'OL, a fortified town of Russia, government of Kherson, on the left bank of the Dniester, 78 miles N.W. of Odessa. Founded by Armenian settlers in 1793, it was named after the national saint, Gregory the Illuminator. It has some manufactures of silks and cottons. Pop. 6477.

GRIMM'IA, a genus of Mosses found on walls and rocks, growing in cushion-like tufts, throughout the world. There are over a dozen species, found in Alpine and sub-Alpine districts. *G. pulvinata* is the commonest. G. is named in honor of Grimm, a German botanist.

GRIM'SEL, a mountain pass in the Bernese Alps, Switzerland, 7103 feet high. It connects the valleys of the Aar and Rhone, which have just emerged from their respective glaciers, and on its ridge lies the Todtensee ('lake of death'), where the Austrians and French buried their dead in the summer campaign of 1799. At the N. entrance of the pass is the G. Hospice, (6148 feet above the sea-level), a few miles W. of which the Aar glacier terminates.

GRISWOLD, RUFUS WILMOT, D.D., an American author, born at Benson, Vt., Feb. 15, 1815. He became a Baptist minister, but devoted most of his life to literary work. Among his works are *Washington and his Generals*, and *Napoleon and the Marshals of the Empire*. Died in New York, N. Y., Aug. 27, 1857.

GRIVEGN'ÉE, a town of Belgium, province of Liége, on the Ourthe, near the height of Espérance, 2 miles S.E. of Liége. It has large machine-works, fulling-mills, and coal-mines. Pop. (1873) 6234.

GRO'CYN, WILLIAM, one of the great scholars who brought the Renaissance learning into England, was born at Bristol in 1442. He was educated at Winchester and New College, Oxford, became divinity reader in Magdalen College, and in 1479 rector of Newton Longville in Buckinghamshire, and afterwards prebendary of Lincoln. From 1488 to 1491 he studied Greek under Chalcondylas in Italy. On returning to England, he taught the new language in Exeter College, Oxford, where its introduction, and especially G.'s new mode of pronunciation, were strongly opposed —the University being divided into two factions of Greeks and Trojans. G.'s lectures, however, were highly successful, and Oxford became a center of Hellenic culture. Erasmus, who studied under G., spoke with admiration of his wide knowledge. In 1506 G. was made Master of Allhallows College, at Maidstone, Kent, where he died in 1519. A Latin epistle to Aldus Manutius is his only extant work.

GROSSE'TO, the fortified capital of a province of the same name, Central Italy, on the Ombrone, 8 miles from the sea, and 65 S. of Florence by railway. The seat of a bishop, it has a beautiful cathedral, a *Compagnia di Misericordia*, several sugar refineries, a trade in coals, chemicals, wine-casks, &c. Pop. (1871) 4151. The huge ruins of the Etruscan *Rusellæ* lie 5 miles N.E., where are also the Bagni di Roselle (*Aquæ Rusellarum*), copious springs with a temperature of 28° 5′ R., rich in various salts.

GROU'CHY, EMMANUEL, MARQUIS DE, a noted French marshal, belonged to an ancient family of Normandy, was born at Paris, 23d October 1766. He entered the army at the age of fourteen, was a sub-lieutenant in the king's bodyguard in 1789, but eagerly embraced the cause of the Revolution. In 1792 he was made a brigadier-general, received the command of the cavalry in the army of the Alps, and took part in the conquest of Savoy. In 1793 he was engaged in the suppression of the Vendean revolt. The decree of the National Convention ordering the expulsion from the army of all aristocrats induced him to throw aside his title and re-enter the ranks as a private. In 1795 he was reappointed a general of division, served under Hoche in the army of the West, under Joubert in the army of Italy (1798), when he induced the Sardinian king to abdicate and deliver up his fortresses to France. He was with Moreau in his memorable Piedmontese campaign against the Austrians, commanded a division of the army of the Rhine, contributed to the success of Hohenlinden, and was made inspector-general of cavalry. In 1805 he commanded one of the divisions of the camp at Brest, distinguished himself (1806–7) in the war against Prussia, his corps being the first to enter Berlin after Jena. His brilliant cavalry charges at Eylau helped to decide the day. For his services at Friedland (1807) he obtained the grand cordon of the Legion of Honor; at Wagram (1809) the title of colonel-general of chasseurs and commander of the Iron Crown, which made him a grand officer of the empire. In the Russian campaign of 1812 he fought at Wilna, Krasnoï, Smolensk, Moscow, and commanded the *escadron sacré* which guarded Napoleon on the retreat. A quarrel with the Emperor prevented him from taking part in the Leipsic campaign, but he fought against the allies when they invaded France.

On the return of Napoleon from Elba, G. received the command of four divisions, forced the Duc d'Angoulême to surrender at Lyon, was made marshal, cleared the royalists out of the south, defeated Blucher at Ligny, 16th June 1815, but was unable to give the Emperor any help on the decisive day of Waterloo, owing to a rigid adherence to the orders he had received. Exiled after the second restoration of the Bourbons, G. came to live in America, but was permitted to return in 1821. The revolution of 1830 restored him his military honours, and two years later he was called to the House of Peers. He died at St. Étienne, 29th May 1847. G.'s conduct at Waterloo has been severely censured, and a whole library of acrimonious literature has been written on the subject, but no one now believes the base insinuation of his opponents that he betrayed his master or his country. See Thier's *Histoire du Consulat et de l'Empire*.

GROUSE DISEASE, the name given to a peculiar epidemic disorder affecting Grouse in certain seasons, and causing a great mortality in the moors. The disorder has received various explanations, some authorities, *e.g.*, Dr. Cobbold of London, ascribing the disease to the presence of parasites of various kinds, while others, *e.g.*, Dr. Farquharson of London and Dr. Andrew Wilson of Edinburgh, favor the theory of an infectious disorder of an epidemic and febrile type. That the latter view is correct is supported by the fact that even so-called healthy grouse are almost invariably infested with parasites (such as the *Tænia calva* and a species of *Strongylus*), whilst mere parasitism will not explain the sudden spread and extension of the disorder. Dr. Wilson, from his researches (see *Edinburgh Medical Journal*, April 1875), inclines to the belief that the respiratory mucous membrane is specially affected, and that the disease, in some cases at any rate, assumes the form of an acute inflammatory affection. A paper by Dr. Farquharson of London on the G. D. will also be found in the vol. of the *Edinburgh Medical Journal* for 1875, and Dr. Cobbold's contributions to this subject are contained chiefly in the British Association Reports.

GROWTH. During early life the tissues of the body increase in size by taking up materials from the blood which they convert into substances similar to themselves. For example, muscle grows by matters obtained from the blood, which are assimilated by the substance of the muscle. This increase in size constitutes G., as regards the individual tissues. Up to a certain period of life the body generally increases in size and weight. It may then remain nearly stationary in these respects for many years, in consequence of the amount of waste of tissue being nearly equal to the amount of repair. During this middle period of life, in one sense the body may have ceased growing, but still G. may be taking place in one or more of the tissues, as, for instance, in muscular tissue in consequence of being habitually exercised, or in fatty tissue. In the later years of life, the waste is in excess of the repair, and consequently the body decreases in size and weight. The general conditions regulating G. may be briefly stated as follows:—(1) A healthy quality of the blood; (2) a proper quantity of blood; (3) a proper influence of the nervous system; and (4) a healthy state of the various tissues of the body.

GRUNDTVIG, NIKOLAI FREDERIK SEVERIN, a distinguished Danish theologian, born 8th September 1783, near Vordingborg, in Zealand, was educated at Aarhus 'Latin school,' and Copenhagen University, and early chose as his favorite studies religion and mythology. In 1805, after a period of strong spiritual excitement, he caught an enthusiasm for Scandinavian antiquity from the poetry of Oehlenschlager, and for a poetic Christianity from the study of Schelling and Steffens. G.'s remarkable literary activity for the popular enforcement of his gradually developed views, dates from 1807. A course of sermons delivered at Copenhagen in 1810, awoke great interest, and led to his rebuke by the University Consistorium. In 1811, he became curate of his father's parish, and the next year published the first of a number of able and characteristic works on the history of the world, quickly followed by the first struggles of the many-sided literary warfare that stimulated most years of G.'s long life, whether he opposed Molbech, Oersted, Heiberg, Clausen, Rudelbach, or Martensen. After living at Copenhagen from 1813, in 1821 he became minister of Præstö, and the year after curate of St. Saviour's at Christianshavn, but resigned in 1825 under a censure, which was only removed in 1838. In 1839 he was appointed chaplain of Vartou Hospital, and in 1861 was made a bishop. He died in 1872. G.'s chief writings are: *Nordens Mythologi* (1808), *Nordens Kæmpeliv* (1810), *Nytaarsnat* (1811), *Bibelske Prædikener* (1816), *Bjovulfs Drapa* (1820), *Nytaarsmorgen* (1824), *Nordens Mythologi og Sindbilledsprog* (1832), *Verdenshistorien* (1833–36), *Christenhedens Syvstjerne* (1860).

GRUNTH (Sansc. *grantha*, 'a book'), the holy book of the Sikhs, divided into the *adî* or first G., which contains chiefly the sayings of Nanuk, the founder of the sect; and the tenth G., compiled by Govind Singh, the tenth and last *guru*. Both are in verse, and the language used is Hindi rather than Punjaubi; but the written character is that known as Punjaubi or Gurumukhi, from its having been adopted by the Sikh *gurus*. The earliest writer is Arjun, the fifth *guru* (1581—1606). The contents are chiefly prayers addressed to the One Great God, with some mythological stories. See Cunningham's *History of the Sikhs* (Lond. 1853).

GUADALUPE', the name (1) of a long spur of the Rocky Mountains between the Rio Grande and the Pecos; (2) of a beautiful grain-growing and sylvan county in the S.W. of Texas, U. S.; and (3) of a river rising in the S. of Texas, which flows S.E. through a fair, fertile region, and, after a course of 200 miles, joins the San Antonio, 13 miles from its mouth, in Esperitu Santo Bay.

GUANA'CO, a variety or sub-species of Llama (q. v.) inhabiting Patagonia, and distinguished by its long neck and its ruddy brown color. The height at the shoulder is about 3½ feet. The G. lives in herds of from ten to thirty or forty in number, and is kept for the sake of its wool, skin, flesh, and milk. It is wonderfully sure-footed, and in its native state is quiet and timid, but when domesticated shows fight on being irritated, and discharges saliva over its assailant.

GUEBWILL'ER, a German town in the province of Elsass-Lothringen, on the Lauch, 15 miles S.S.W. of Kolmar. Its church of Saint Leger is a very interesting edifice of the 12th c., and it has also a Dominican church of the 14th c. There is considerable trade in white wine; and ribbons, cottons and woollens, &c., are made. Pop. (1871) 11,338.

GUILFORD COURT HOUSE, BATTLE OF, an engagement of the Revolutionary war, near a small hamlet of the same name, in Guilford Co., N. C. On March 15, 1781, Gen. Green, with a Continental army of 4,000 men, 3000 of whom were raw militia, came upon Lord Cornwallis at this place, and an action ensued. Green's army, although making a gallant stand, were compelled to retreat before Cornwallis' 2500 veterans, but the British suffered so severely that their general deemed it wise not to pursue Green, and so fell back upon Wilmington.

GUILIEL'MA, a small genus of palms found in S. America. *G. speciosa* is the peach palm, largely grown on the banks of the Amazon by the Indians for food. The fruit, about the size of a fowl's egg, contains a quantity of starchy matter, and is either roasted or boiled. A beverage is also made from the fruit by fermentation.

GUIS'BOROUGH, a town in the North Riding of Yorkshire, England, at the foot of the Cleveland Hills, 5 miles from the mouth of the Tees. It is a station on a branch line of the North-Eastern Railway. G. has roperies, tanneries, and brickworks; and ironstone mining is carried on in the neighborhood. Pop. (1881) 6616. Some ruins are still extant of a famous monastery built in 1119 by Robert de Brus.

GUISE, a town in the department of Aisne, France, on the left bank of the Oise, 13 miles W.N.W. of Veroins. It was formerly strongly fortified, and has a castle built in 1649. Shawls, wool, and cotton are manufactured, and there are iron and copper foundries. Pop. (1872) 5659. G. has been repeatedly besieged in medieval and modern times. In 1443 it was handed over to Charles of Anjou; it afterwards passed to a branch of the house of Lorraine, who took from it their title of Duc de G.

GUJRANWALL'A, the chief town of the district of the same name, Punjaub, British India, N.E. of Lahore. It possesses a large square mud fort, the original residence of the family of Runjit Sing.—The *district* of G. has an area of 2657 sq. miles; pop. (1868) 550,576. It is bounded N. by the Chenaub river; the crops are wheat, rice, other cereals, and sugar-cane; the exports are wheat, wool, and ghee.

GULAN'CHA, or GALUN'CHA, the name in India for an extract prepared from *Tinospora cordifolia* and *T. crispa*, two plants belonging to the order *Menispermaceæ*. G. is used as a tonic and diuretic, and also as a specific for the poisonous bites of insects.

GUMMI RUBRUM, an exudation from the bark of the *Eucalyptus rostrata*, imported from Australia, and introduced into European practice by the late Sir Ranald Martin in cases of diarrhœa and dysentery. G. R. adheres with great tenacity to mucous surfaces, and is much used, in the form of lozenges, for the relaxed throat of public speakers; and, in combination with Cayenne, in cases of relaxed uvula. It is also administered in decoction, extract, syrup, and tincture.

GUMSUR', a town in the district of Ganjam, province of Madras, British India, notorious for the human sacrifices practised by the Konds, which required to be suppressed by armed force in 1845.

GUNGE (*ganj*), a word of Persian derivation used throughout India (commonly in compounds, as Sahibgunge) for a village with a market-place containing grain and other necessaries of life.

GUN'JA (*ganja*), a narcotic drug akin to bhang and haschisch, prepared from the leaves and flowers of the hemp plant (*Cannabis sativa* or *Indica*), which is extensively smoked throughout India. The cultivation is almost entirely confined to a small tract in the district of Rajshahye, Bengal, where about 1,000,000 lbs. are annually produced. It is the policy of the Government to check the consumption by a gradual enhancement of the excise duty, which has hitherto been effected without any diminution in the revenue. In 1874–75 the duty on G. in Bengal alone amounted to £105,817.

GUNN'ERA, a genus belonging to the natural order *Haloragegeaceæ*, but some authors place it in *Araliaceæ*. There are about a dozen species of G. known, chiefly natives of New Zealand, Java, and S. America. *G. scabra* or '*panke*' is grown in British gardens and pleasure-grounds as an ornamental plant. When growing in sheltered damp places, its leaves, which are very rough, attain a large size, and it produces a conical fleshy spike of minute flowers. Its roots are astringent, and are employed for tanning, and its leaf stalks eaten as rhubarb.

GUNNISON, an important mining town of Gunnison Co., Col. The surrounding country is rich in iron, gold, silver, and coal. There is also considerable land adopted to agriculture. Pop. 4000.

GUR, the Indian name for unrefined sugar, made from the date-palm. It is extensively manufactured in the districts of Jessore and Nuddea, in the delta of Bengal, and it enters largely into native sweetmeats.

GURH (*garh*), a word of Sanscrit derivation, used throughout India (especially in composition) for a fort, particularly when the walls are of mud.

GUR'KHA, a town in the state of Nepaul, India, 53 miles N.W. of Katmandu. It was the former capital of the present dynasty. The war between England and Nepaul in 1814 is known as the G. war. There are at present five battalions of Gurkhas in the Indian army, who have done good service both during the Mutiny of 1858 and in all subsequent border campaigns. They were sent to the Malay peninsula on the occasion of the disturbances at Perak in 1875. Accurately speaking the Gurkhas, who are an aboriginal tribe, ought to be distinguished from the Gurkhalis, who are the ruling race, are of mixed Hindustani origin, and claim to be Rajputs.

GURMUKTESAR' (*Garhmuktisar*), a town in the district of Meerut, North-West Province, British India, on the right bank of the Ganges, 887 miles N.W. of Calcutta, and 31 S.E. of Meerut. Pop. (1872) 7962. The river is always navigable to this point; and G., besides being the site of an important ferry and bridge of boats to Moradabad, carries on a thriving trade as the port of Meerut. There are four temples here dedicated to the goddess of the Ganges; and a fair is said to be annually attended by 200,000 persons.

GUTH'RIE, JAMES, son of the laird of Guthrie, was a zealous minister of the Kirk of Scotland, and one of the first to suffer for his opinions after the Restoration. He was born before 1617, and was educated at St. Andrews, where he afterwards became professor of Philosophy. In 1638 he was ordained at Lauder, and in 1649 was translated to Stirling, where he remained till his death. G. was the leader of the Protesters or extreme Presbyterian party in Church politics, and in 1650 publicly excommunicated the Earl of Middleton for his hostility to the covenant. In 1651 G. was deposed for disowning the king's authority in spiritual matters, and in 1661 he was brought to trial for the same offence, for writing two pamphlets *The Western Remonstrance* and *The Causes of the Lord's Wrath*. He defended himself with great eloquence, but was found guilty of treason, and condemned to death. The sentence was executed 1st June 1661. G. was also the author of an attack on Cromwell (*Considerations, &c., concerning Dangers which threaten Religion*, 1660; reprinted 1738), of sermons, and a treatise on ruling elders and deacons.—WILLIAM G., cousin of the preceding, was also an eminent Scottish churchman and divine. He was born 1620, and studied at St. Andrews. On receiving license to preach, he resigned his family estate of Pitforthy to one of his brothers, and was ordained minister of Fenwick, near Kilmarnock, in 1644. He soon became a popular preacher, and was appointed chaplain to the Scotch army, in which capacity he was present at the battle of Dunbar. Like his cousin, G. was a leader of the party of the Protesters. As a parish minister, he was much addicted to rural sports, especially fishing and fowling, and was popular even with those who did not adopt his views. Shortly after the Restoration in 1664, he was suspended from his charge by Archbishop Burnet, and never preached again. He died 10th October 1665. G. was the author of

the well-known work *The Christian's Great Interest*, which was translated into Dutch, German, and French. See Muir's *Memoirs and Letters of G.* (Edingb. 1827).

GUTH'RUM THE DANE, or GUTHRUM OF EAST ANGLIA, a Danish leader who long opposed King Ælfred. He was beaten by Alfred in a great battle at Edington in 878, and forced to surrender after standing a siege of fourteen days in his camp. He was then baptized as a Christian, and the peace of Wedmore was concluded.

GUTZ'KOW, KARL FERDINAND, one of the most prominent among recent German poets, essayists, and novelists, was born 17th March 1811 at Berlin. His early efforts were miscellaneous, and chiefly connected with journalism. Denounced in 1835 as a leader of the 'Young Germany' (*Junges Deutschland*) party, he was imprisoned, and for many years afterwards suspected by the German Government. After 1839 G. has chiefly been known as a dramatist, and as the author of novels bearing on the social questions of the time. His works are very numerous. Of his tragedies *Richard Savage* (1839) and *Uriel Acosta* (1847) are the most important, and of his comedies *Zopf und Schwert* (1844). His novels *Die Ritter vom Geiste* (in 9 vols. 1850, 4th ed. 1865) and *Der Zauberer von Rom* (also in 9 vols. 1859, 3d ed. 1863), at once made their mark, are rich in character and incident, and display a great power of grasping and delineating the different aspects of Roman Catholic and Protestant life. His *Gesammelte Werke* in 13 vols. appeared 1845–52; his *Dramatische Werke* in 20 vols. 1862–63, 3d ed. 1871.

GUYOT, ARNOLD HENRY, PH.D., LL.D., an eminent scientist, born near Neuchatel, Switzerland, Sept. 28, 1807, and graduated from the University of Berlin in 1835. From 1839 to 1848 he taught in an academy at Neuchatel, and during these years devoted himself to geological studies, paying particular attention to the glaciers. In 1848 he came to America, and in 1855 became professor of geology and physical geography in Princeton College, N. J. He has published numerous valuable scientific works, and a series of school geographies and maps. Died Feb. 8, 1884.

GWYNNE, NELL, a fascinating actress and a mistress of Charles II., born in London, February 2, 1650. At the Portugal Street Theater and at Drury Lane, she won the hearts of the town, especially by personating youthful gallants. Pepys calls her 'a mighty pretty soul!' She was a generous, witty, and very beautiful madcap, with a laughing face and curling golden-brown hair. It is said she received £60,000 in four years from Charles II., who intended to make her Countess of Greenwich, and whose last words were, 'Do not let poor Nelly starve.' She was pensioned by James II., and died in her thirty-eighth year, November 1687.

GYM'PIE, a town in Queensland, Australia, 116 miles N. of Brisbane. It is entirely dependent upon the yield of the auriferous quartz reefs which surround it, and to the discovery of which, in 1867, it owes its existence. The value of the gold produced at G. since that date is about £1,500,000. Pop. (1875) 5793.

GYO'MA, a town of Hungary, on the Körös, 89 miles S.E. of Pesth by railway. It is celebrated for its wine. Pop. (1869) 8587.

GYPS, a genus of vultures, represented by the griffon or fulvous vulture, and by other species.

GYPSY-WORT, the English name for *Lycopus Europæus*, a labiate plant found by ditches and river-banks in Britain and throughout Europe. It yields a black dye, which is used by gypsies to render their skins darker. Hence the name G.-W.

H.

HACKETT, JAMES HENRY, an American actor, born in New York in 1800; began his career as an actor in 1826, and rapidly rose to prominence in such characters as *Justice Woodcock*, *Dromio*, and *Rip Van Winkle*. His *Falstaff* was regarded as one of the best. Died at Jamaica, L. I., in 1871.

HAD'RAMAUT, the *Adramitæ* of Strabo, is the part of Arabia to the S. and S.E. of the great central waste. The name is more strictly applied to the smaller coast district to the N.W. of Aden, of which the chief town is Makulla. In the interior it is confined by the angle of the mountains Wadi Masilah and Wadi Doân, while a series of hills are dotted along the coast. The people, mostly in towns and villages, are of many tribes, and trade in camels, fine horses, dates, gums, &c. The country is rich in coal and copper. See Wrede's *Reise in H.* (1870).

HA'GEDORN, FRIEDRICH VON, a German poet, was born at Hamburg, 23d April 1708. He studied law at Jena, published a collection of poems in 1729, and shortly thereafter went to London. In 1733 he was appointed secretary to an English company at Hamburg, and there, having had abundant leisure to cultivate his muse and enjoy the delights of social intercourse, he died, 28th October 1754. Though lacking original power, H. was very successful in fables, short tales, and such poetic trifles as had hitherto been disfigured by the clumsiness of an imperfectly polished tongue. In purity of style and eloquence of versification, H. stands far above most of his contemporaries. An edition of his *Poetische Werke*, accompanied by a memoir, was published by Eschenburg at Hamburg in 1800 in 5 vols.

HAGEN, FRIEDRICH HEINRICH VON DER, a scholar who did much to awaken interest in the study of ancient German poetry, was born February 19th, at Selmiedeberg, in the N. of Brandenburg, entered into the public service at Berlin in 1803, and was in 1810 appointed Professor of the German Language and Literature at the newly-founded university, where he for the first time made the old German tongue a branch of university study. He died at Berlin, June 11, 1856. Besides editing the *Nibelungenlied* four times (viz., 1810, 1816, 1820, and 1822), the works of the *Minnesänger* (1838), and other ancient German poems, H. wrote a *Grundriss der Geschichte der Deutschen Poesie* (Berl. 1812).

HA'GENAU (Fr. *Haguenau*, 'the enclosed meadow'), a town of Elsass-Lothringen, Germany, on the Moder, and in the great Hagenauer Forst, 20 miles N. of Strassburg by railway. It is girt with old towering walls and broad moats, and has manufactures of leather, oil, soaps, madder, and other dyes. Pop. (1875) 11,726. H. was founded by Friedrich Barbarossa in 1164, suffered in the Thirty Years' War, and passed to France in 1648. The French gained two bloody victories over the Austrians here in 1793. In the Franco-German war H. was taken the day after the battle of Wörth by Badenese troops under General La Roche, August 7, 1870.

HAIDUCKS (Magyar, 'drivers'), originally cowherds, was in the 16th c. a name for a class of mercenary soldiers, who in 1605 had a district of country allotted to them on the E. side of the Theiss with several peculiar privileges. This territory has over 60,000 inhabitants, chiefly Magyars, and is still directly under the supreme Government. In the 18th c. the word came to be used for the servants of Hungarian officials and magnates.

HAIN'ICHEN, a town in the kingdom of Saxony, Germany, 10 miles N.E. of Chemnitz by railway. It spins and weaves woollens, has cotton manufactures, and extensive bleaching and dye works. Pop. (1875) 8468.

HAJIPUR' ('town of the pilgrim') is the name of several towns in India. The best known is at the confluence of the Gunduck with the Ganges, in the district of Mozufferpur, province of Bengal, just opposite Patna city. Pop. (1872) 22,306. In the neighborhood is held the great cattle fair of Sonepur in November, and H. itself has a large trade, valued at £600,000 a year: exports, indigo and saltpetre; imports, piece goods, indigo seed, and grain. It was a place of some importance under the Mohammedans.

HALE, EDWARD EVERETT, an American clergyman and author, born at Boston, Mass., April 3, 1822, was educated at Harvard College, and in 1846 entered the Unitarian ministry. He first preached in Worcester, Mass., and in 1856 was called to the South Congregational Church of Boston. He has been a voluminous writer, and the following are among his works: *The Rosary*, *Margaret Percival in America*, *Sketches of Christian History*, *Kansas and Nebraska*, *Letters on Irish Emigration*, *Ninety Days' Worth of Europe*, *Ingham Papers*, *Sybaris and other Homes*, *How to Do it*, *Ten Times One is Ten*, *Reformation*, *Level Best and Other Stories*, *Ups and Downs*, *Christmas Eve and Christmas Day*, *In His Name*, *Our New Crusade*, *and Workingmens' Homes*.

HALE, JOHN PARKER, an American statesman, born at Rochester, N. H., March 31, 1806. He was educated at Bowdoin

College, and began to practice law at Dover, in his native state. Although a Democrat during the early period of his political career, he was strenuously opposed to the extension of slavery, and, when in congress, refused to vote for the annexation of Texas, in opposition to the expressed legislative will of his state. He served several terms in congress, and in 1847 was elected to the U. S. senate. In 1852 he was the candidate of the Free-Soil party for president, but polled only a small vote. He was elected to the U. S. senate in 1855 and again in 1858, where he was an earnest supporter of Mr. Lincoln's policy during the civil war. In 1865 he was appointed minister to Spain. Died at Dover, N. H., Nov. 19, 1873.

HALL, CHARLES FRANCIS, an American explorer, born at Rochester, N. H., in 1821. He was for some time a blacksmith, but removed to Cincinnati, O., where he was a journalist and stationer. In 1860 he sailed from New London, Conn., upon an expedition of polar research. The ship George Henry had been fitted out for this purpose by a Mr. Grinnell of New York. Hall spent two years among the Esquimaux, after which he returned home. In 1864 he published a work entitled *Arctic Researches*. He soon afterwards set out upon a second and similar voyage, this time in the ship Monticello, which had also been equipped by Mr. Grinnell. In 1869 he returned from the polar regions, having with him relics of the famous Franklin expedition. In 1871 he sailed for the north on the Polaris, which had been fitted out by the government for the purpose. While on this expedition he died in Greenland, Oct. 10, 1871.

HALL, CHARLES HENRY, D.D., a prominent clergyman of the Episcopal Church in America, born in Georgia, in 1820. He was educated at Yale college, and has been rector of churches in Washington, D. C., and Brooklyn, N. Y. He is now (1885) rector of Holy Trinity in the latter city. He has published *Commentaries on the Gospels*, *True Protestant Ritualism*, &c.

HALL, JOHN, D.D., an eminent minister of the Presbyterian Church, born in the county of Armagh, Ireland, July 31, 1829, was educated at Belfast College, and was licensed to preach in 1849. After filling various positions in his native country, he was, in 1867, called to the pastorate of the Fifth Avenue Presbyterian Church in New York City. In 1875 a new and magnificent edifice was erected by his congregation at the corner of Fifth Avenue and Fifty-fifth street, where Dr. Hall has gathered about him one of the largest and wealthiest Presbyterian congregations in the U. S. He has published *Family Prayers for Four Weeks*, *Papers for Home Reading*, *Questions of the Day*, *God's Word through Preaching*, and others.

HALL'IWELL, JAMES ORCHARD, F.R.S., was born at Chelsea, June 21, 1820, and studied at Cambridge University. He has devoted himself to Shakspearian criticism, and among his many works are *Shakspeariana* (1841), *A History of Freemasonry* (1842), *Dictionary of Provincial and Archaic Words* (1844–45), *Life of Shakspeare* (1845), *Popular Rhymes and Nursery Tales* (1849), *An Account of the New Place, Stratford-on-Avon* (1864), an edition of *Shakspeare*—his greatest labor (1865), and *Illustrations of the Life of Shakspeare* (Part I. 1874). He has published large numbers of forgotten pamphlets, plays, &c., of the Elizabethan age, and has enriched his edition of *Shakspeare* with many archæological notes. A peculiarity of H.'s *Shakspeare* is its containing the novels and tales which supplied the plots of the dramas.

HALL'UIN, a town in France, department of Nord, 10 miles N.N.E. of Lille. It carries on weaving, cotton-spinning, bleaching linen, and calico printing. Pop. (1872) 12,946.

HAMILTON COLLEGE, an educational institution at Clinton, Oneida Co., N. Y., chartered by the state in 1812. It maintains, besides the usual collegiate course, a flourishing law school, and is the possessor of an unusually fine astronomical observatory, the gift of Edwin C. Litchfield of New York, after whom it has been named. It was formerly non-denominational, by is now controlled by the Presbyterian Church.

HAMLIN, HANNIBAL, an American statesman, born at Paris, Me., Aug. 27, 1809, and became a lawyer in 1833. In 1843 he was elected to Congress, in 1848 U. S. Senator, and in 1857 governor of Maine. This position he resigned, however, to accept that of U. S. Senator, to which he was subsequently elected in the same year. In 1860 he was elected Vice-President of the U. S., with Lincoln as President, and in 1869 he was again chosen U. S. Senator.

HAMM'ER-PURG'STALL, JOSEPH, FREIHERR VON, a celebrated Orientalist, was born at Gratz, in Styria, June 9, 1774, and educated at Vienna. After a long and varied official career, he died in the Austrian capital, Nov. 23, 1856. H.-P. was a most voluminous author, and his writings are valuable. Though deficient in critical insight, and not adequately equipped in philology, he has immensely enlarged our knowledge of Eastern tongues and of Eastern history and literature. Among his more important works are *Des Osmanischen Reichs Staatsverfassung und Staatsverwaltung* (2 vols. Tüb. 1816); *Geschichte des Osmanischen Reichs* (10 vols. Pesth. 1827–34), still the standard authority on Turkish history; *Geschichte der Assassinen* (Stutt. and Tüb. 1819); *Gemäldesaal Moslemischer Herrscher* (6 vols. Darmst. 1837–39); *Geschichte der Khane der Krim* (Vienna, 1856); *Geschichte der schönen Redekünste Persiens* (Tüb. 1818); *Geschichte der Osman. Dichtkunst* (4 vols. Pesth. 1836–38); *Geschichte der Arab. Literatur* (7 vols. Vienna, 1850–57), besides editions of numerous Eastern authors—Turkish, Persian, and Arabic. See Schlottmann's *Joseph von H.* (1857).

HAMME-SUR-DURME, a fortified town of Belgium, province of W. Flanders, 3 miles N. of Bruges. It lies at the intersecting point of two important canals, and has considerable trade and some industry in linens and lace. Pop. (1874) 10,518.

HAMMOND, WILLIAM ALEXANDER, an American physician and surgeon, born at Annapolis, Md., Aug. 28, 1828, and studied medicine at New York University. In 1862 he was made surgeon-general, U.S.A.; and, in 1864, was made professor of mental and nervous diseases and of clinical medicine in Bellevue hospital medical college in New York city. He has published numerous medical works of great value.

HAMPTON, WADE, an American politician, born at Columbia, S. C., in 1818, and graduated from South Carolina College. He was intensely southern in his prejudices, and an ardent supporter of the doctrine of secession, as advocated by the partisan statesmen of the South. At the outbreak of the civil war, he entered the Confederate service, and was present at the first battle of Bull Run. He was made brigadier-general and was engaged at Seven Pines, Antietam, and Gettysburg. He was three times severely wounded. Since the termination of the war he has been prominently connected with the Democratic party. He is now (1884) a member of the U. S. Senate.

HANCOCK, JOHN, LL.D., an American patriot, born at Quincy, Mass., Jan. 12, 1737. He was an earnest opponent of the tyranny exercised by Great Britain, and delivered an eloquent funeral oration over the remains of those slain at the Boston massacre. In 1774 he was president of the Provincial Congress, and of the General Congress from 1775 to 1777. He was the first signer of the Declaration of Independence. He was afterwards twice governor of Massachusetts, and a member of Congress. The possessor of a large fortune by inheritance, he used it liberally for every good and charitable work. Died Oct. 8, 1793.

HANCOCK, WINFIELD SCOTT, an American general, born in Montgomery Co., Pa., Feb. 14, 1824, and graduated from West Point in 1844. He served during the Mexican war, and was present at San Antonio, Chernbusco, Contreras, Molino del Rey, and the capture of the city of Mexico. For gallantry at Chernbusco and Contreras he was promoted. In 1861 he was made brigadier-general of volunteers, and was from that time until the termination of the war connected with the Army of the Potomac. He rendered gallant and valuable services at the siege of Yorktown and the battles of Golding's Farm, Garnett's Hill, Savage's Station, White Oak Swamp, Crampton's Pass, South Mountain, and Antietam; and in 1862 he was made major-general U. S. Volunteers. He commanded a division at Fredericksburg and Chancellorsville, and rendered gallant service at Gettysburg, where he was severely wounded at the very moment of victory. Here he commanded the left center, and repulsed the final and grand assault of Lee on the third day of the battle. Recovering from his wound, he was present at the Wilderness, Spottsylvania, and the assault upon Petersburg. He also commanded the Union forces at Deep Bottom and Ream's Station. In 1880 he was nominated for the Presidency by the Democratic party, but was defeated by Gen. James A. Garfield, the candidate of the Republican party.

HAND'ICAPPING, is the term given in horse-racing and other sports to the placing of competitors upon an equal footing by artificial means. Thus a superior horse is made to carry certain weights—the adjustment of which is left to a chosen handicapper.

HAN'SEN, PETER ANDREAS, a German astronomer, was born at Tondern, in Schleswig, December 8, 1795. In 1825 he became director of the Lieberg Observatory in Gotha, a position which he held for many years. He is the author of several astronomical works, as *Untersuchungen über die gegenseitigen Störungen des Jupiter und Saturn* (1838); *Theorie des Aequatoreals* (1854); *Geodätische Untersuchungen* (1865); and *Anwendung der Methode der kleinsten Quadrate auf Geodäsie* (1868). His great reputation, however, rests upon his *Sonnentafeln* (1854) and *Mondtafeln* (1857). In the preparation of the latter he was led to call in question the then universally accepted value for the sun's parallax, which had been deduced from the transit observations of 1761 and 1769. He found that, for the concordance of theory and observation, the parallax would require to be increased (*i. e.*, the sun's distance

diminished) by 1-30th. Leverrier was somewhat later led to the same conclusion, and their deductions have been fully verified by subsequent and more accurate determinations.

HARDEE, WILLIAM J., an American general, born in Georgia in 1838, and entered the army early in life. He served with distinction in the Mexican war. In 1861 he resigned from the U. S. army and entered the Confederate service, where he was assigned to duty with the rank of brigadier-general. For his gallantry at the battle of Shiloh he was made major-general, and for gallant services at Perryville, he was made lieutenant-general. He continued in active service throughout the war, and was one of the army under Johnston, which surrendered at Durham Station, N. C., in 1865. He was the author of *Hardee's Tactics*, a work that was adopted for use in the U. S. army. Died at Wytheville, Va., Nov. 6, 1873.

HARRIS, TOWNSEND, an American statesman, born at Sandy Hill, N. Y., in 1803, and in early life removed to New York, where he engaged in business. Here he became interested in educational matters, and to his efforts was largely due the establishment of the College of the City of New York. In 1854 he was made consul at Ningpo, Japan, and subsequently acted as representative of the United States, in effecting treaties between that country and Siam and Japan. He was afterwards consul-general of the U. S. to Japan; and, upon his return to his native land, assisted in founding the N. Y. 'Society for the Prevention of Cruelty to Animals.' Died in 1878.

HART, JAMES MCDOUGAL, born in Scotland, in 1828, and came to America when a child. He became an artist and is famous for his landscape scenes. The following are his most admired works: 'Autumn Woods,' 'Coming out of the Shade,' and 'Moonrise in the Adirondacks.'

HART, WILLIAM, brother of the preceding, born in Scotland in 1823, and came to America when young. He is also an artist, and has produced, among other works, 'Up the Glen in the White Mountains,' 'The Golden Hour,' and 'The Last Gleam.'

HARTE, FRANCIS BRET, an American poet and author, born at Albany, N. Y., Aug. 25, 1839. He has written numerous poems and stories of Western life, many of which have become very popular. Among his poems are 'The Heathen Chinee,' 'Plain Language from Truthful James,' 'John Burns of Gettysburg,' and 'The Society of the Stanislaus.' He is also the author of *The Luck of Roaring Camp* and *The Outcasts of Poker Flat*.

HART'INGTON, THE RIGHT HON. SPENCER COMPTON CAVENDISH, MARQUIS OF, eldest surviving son of William, 7th Duke of Devonshire, was born July 23, 1833, and educated at Trinity College, Cambridge, where he graduated B.A. in 1854 and was made LL.D. in 1862. He entered the House of Commons in 1857 as one of the Liberal Members for North Lancashire, moved a vote of no confidence in Lord Derby's Government in 1859, and was appointed a Lord of Admiralty in March 1863, and in the April following Under-Secretary for War. In 1866 he became Secretary for War in Lord John Russell's second administration. He lost his seat for North Lancashire at the general election of 1868, but was soon after returned for the Radnor Boroughs. In the Gladstone Cabinet he held the office of Postmaster-General till January 1871, when he became Chief Secretary for Ireland. Shortly before the assembling of Parliament in 1875, Mr. Gladstone resigned the leadership of the Liberal party, and in February 1876 the Marquis of H. was chosen his successor. During the momentous period from 1876 to 1880 he led the Liberal Opposition with skill, sagacity, and moderation. In the winter of 1877 he was elected Lord Rector of the University of Edinburgh, and about the same time addressed a great meeting in that city, when he enunciated the lines of policy on which he thought his party should move. It was at this time understood that he would be the head of the next Liberal ministry, but the enthusiasm evoked by the speeches of Mr. Gladstone during the years 1879–80 compelled the latter to resume the conduct of affairs in the Liberal ministry of 1880. The Queen indeed sent for the Marquis of H., and requested him to form a ministry, but he declined the responsibility and recommended Her Majesty to accept again the services of Mr. Gladstone.

HART'MANN, EDUARD VON, a retired officer of Prussian cavalry, and author of the most paradoxical and popular of recent metaphysical systems. H. was born in Berlin, 23d February 1842, was disabled by an accident from entering on active military service, and devoted himself to philosophy in 1864. The *Philosophie des Unbewussten* ('Philosophy of the Unconscious'), to which H. owes his fame, appeared in 1869, and in 1874 had reached a sixth edition. H.'s system is strictly monistic, the basis, principle, or cause of the universe being regarded as unconscious spirit, with the attributes of will and ideation. Both attributes attain to consciousness only in the animal world. With Schopenhauer H. is convinced that the universe contains upon the whole much more evil than good, and that it were much better that the universe did not exist. In so far H. is thoroughly pessimistic; but he declines to affirm that ours is the worst of possible worlds. On the contrary, the teleological perfection which an unconscious providence has brought about goes far to prove that this is the best of *possible* worlds. Still, man's chief end is to hope for, and to strive, according to prescribed methods, towards the extinction of existence, towards the blessedness of *Nirvana*. Like Schopenhauer, with whose system H.'s has the nearest affinity, H. has the deepest contempt for 'professor-philosophy,' and the professors are in return agreed that H.'s system is but dillettanti philosophizing. H. has also, though an adherent of the development theory, written against the mechanical aspect of Darwinism; and as an advocate of a return to a purified Brahmanical faith, published a work on the *Selbstzersetzung des Christenthums* ('Self-Dissolution of Christianity,' 2d ed. 1875). His *Gesammelte Studien* began to appear in Berlin in 1876. In 1877 he published *Wahrheit und Irrthum im Darwinismus*.

HARTRAUFT, JOHN FREDERIC, an American soldier and statesman, born at New Hanover, Pa., Dec. 16, 1830, graduated from Union College, Schenectady, N. Y., in 1853, and began to practice law in 1859. At the outbreak of the civil war, he entered the Union service, and served with gallantry until its termination. In 1864 he was made brigadier-general, and in 1865 brevet major-general. Since the close of the war he has been a prominent actor in Pennsylvania politics, holding various positions of public trust. In 1872 he was elected governor of that state and has recently (1884) been appointed collector of the port of Philadelphia.

HARTSUFF, GEORGE L., an American general, born in N. Y. in 1830, and educated at West Point. He served in the campaign against the Seminole Indians, and was also actively engaged in the civil war. At the battle of Antietam he was severely wounded. He rose to the rank of major-general. Died in 1874.

HARVARD, JOHN, the founder of Harvard University, born in England, in 1608, and removed to Massachusetts in 1637. At his death he left one-half of his estate to establish a college. This amounted to $4000, and with it the now famous university was founded.

HASS'AN, the chief town of the district of the same name, in the state of Mysore, India, 114 miles W. of Bangalore; pop. (1871) 6305. The *district* of H., which is mountainous, has an area of 3291 sq. miles; pop. (1871) 668,417. The crops are *ragee* (largely exported), rice, tobacco, chillies, and areca nuts. Coffee, introduced in 1843, is now grown on 50,000 acres; every native has a few coffee-trees. There is a fine breed of cattle, used for draught. Brassware of excellent quality is manufactured.

HASTINGS, a town of Dakota Co., Minn., on the Mississippi River, 20 miles below St. Paul. It is engaged in milling and manufacturing, and is a shipping point for grain. Pop. 3947.

HATFIED, EDWIN FRANCIS, D.D., an eminent American clergyman, born at Elizabethtown, N. J., Jan. 9, 1807; graduated from Middlebury College, Vt., in 1829; and, after a course of theological study at Andover Seminary, entered the ministry of the Presbyterian Church in 1832. After a brief pastorate in St. Louis, Mo., he was called to the Seventh Presbyterian Church of New York City, where he remained from 1835 to 1856. Here his labors were attended with a wonderful degree of success. Large congregations flocked to hear him, and multitudes were converted under his ministry. In 1856 he accepted a call to the North Presbyterian Church of New York, but in 1863 was compelled to retire from active work in the ministry on account of ill health. Among his published works are *Universalism as it Is* (1841), *Memoir of Elihu W. Baldwin, D.D.* (1843), *St. Helena and the Cape of Good Hope* (1852), *The History of Elizabeth, N. J.* (1868), *The Church Hymn Book with Tunes* (1872), and *The Chapel Hymn Book* (1873). Died in New York City, Sept. 22, 1883.

HAUFF, WILHELM, a popular German novelist, whose works very plainly show the influence of Sir Walter Scott, was born at Stuttgart, November 29, 1802, where he died, 18th December, 1827. His principal historical romance is *Lichtenstein* (1826); his *Marchen* reached a 9th edition in 1861. H. also wrote *Phantasien im Bremer Rathskeller Memoiren des Satan*, and *Der Mann im Monde* (all in 1827), together with many short tales.

HAUPT, MORITZ, a philologist, highly esteemed for his labors as an editor of classical texts and of the works of the early German authors. He was born 27th July 1808, at Zittau, in Saxony, studied at Leipsic, and became professor there in 1838. H.'s sympathy with the revolutionary movements in 1848 and 1849 led to his being expelled from his post; but in 1853 he was appointed to the chair in the University of Berlin, vacated by the death of Lachmann, and is a secretary of the Berlin *Akademie*. In the department of classics H. has given editions of Ovid, Horace, Catul.

ius, Tibullus, Propertius, and Virgil. In the native field H.'s most important publications are his critical editions of *Erec* (1839), of *Armer Heinrich* (1842), and of *Guter Gerhard* (1840); he has also superintended new issues of Lachmann's text of the *Nibelungen*, of Wolfram, and of Walther von der Vogelweide. He died in 1874. The first two volumes of his philological *Opuscula* appeared at Leipsic in 1876, and in 1877 his *Französische Volkslieder*, edited by Tobler.

HAUSS'MANN, Baron Georges Eugene, the rebuilder of Paris, was born in that city, March 27, 1809. He was educated at the Conservatoire de Musique, and subsequently received a legal training; but his marked administrative capacities brought him under the notice of Louis Napoleon, who in 1853 appointed him Préfet of the Seine. In this office H. displayed the utmost energy and resource; and the works which he undertook by way of developing the natural and architectural beauties of Paris completely changed the aspect of the capital. Public gardens, squares, markets, official buildings, bridges, hospitals, and asylums were all formed under his direction; and among his more important schemes may be mentioned the improvement of the Bois de Boulogne, the prolongation of the Rue de Rivoli, the construction of the Boulevard de Sebastopol, and the formation of about a score of additional boulevards in various quarters in the city. The success of his projects made H. for a time exceedingly popular; and he also stood high in favor at court, being promoted to the rank of Grand Officer of the Legion of Honor in 1856, and Grand Cross in 1862. In 1858 he was created a senator; and he became also a member of the Academy of Fine Arts, and of the Imperial Council of Public Instruction. His magnificent notions, however, could only be realized by an enormous expenditure of money; and as one loan succeeded another, public discontent began to be manifested. After several loans had been exhausted, the Municipality of Paris, by special powers, raised a further sum of 250,000,000 francs in 1865, and another of 260,000,000 four years later. On the formation of the constitutional Ministry under Ollivier (1870), H. was requested to resign his ædileship; and on refusing to do so, was dismissed by an imperial decree. After the fall of the Empire, he left France for a time; but ultimately returned, and became in 1871 Director of the Crédit Mobilier.

HAVEN, Erastus Otis, D.D., LL.D., an American educator, born at Boston, Mass., Nov. 1, 1820, and graduated from Wesleyan University in 1842. After devoting several years to teaching, he entered the Methodist ministry in 1842, and in 1854 became professor of Latin in the University of Michigan. He was president of the University of Michigan, 1863–69; president of Northwestern University, Evanston, Ill., 1869–72; and was made chancellor of Syracuse University in 1874. Among his publications are *Young Man Advised*, *Pillars of Truth*, and *Rhetoric*. Died at Salem, Oregon, Aug. 2, 1881.

HAVEN, Gilbert, a Bishop of the Methodist church in America, born in Massachusetts, in 1821. He was educated at Wesleyan University, and in 1851, entered the ministry. He was made Bishop in 1872. Died in 1880. He published numerous sermons and addresses.

HAVEN, Joseph, D.D., LL.D., an American scholar and educator, born at Dennis, Mass., Jan. 4, 1816; graduated from Amherst College, Mass., in 1835; and became a Congregational minister in 1846. He was professor of mental and moral philosophy in Amherst College, 1850–58; professor of systematic theology in the Chicago Theological Seminary, 1858–70; and, after an extended tour in Europe, was, in 1873, made acting professor of mental and moral philosophy in Chicago University. He published *Mental Philosophy* (1857), *Moral Philosophy* (1859), and *Studies in Philosophy and Theology* (1869). Died May 23, 1874.

HAV'ERFORD COLLEGE, in Delaware Co., Pa., founded in 1832, and controlled by the Quakers, or Friends. It has a fine property, and maintains the usual academic standard of education.

HAWLEY, Joseph Roswell, an American soldier and statesman, born at Stewartsville, N. C., Oct. 21, 1826, removed with his father when a child to New York, graduated from Hamilton College in 1847, and began to practice law in Hartford, Conn., in 1850. In politics he was a pronounced anti-slavery man, and was one of the organizers of the Republican Party in Connecticut. In 1857 he retired from the law, and became editor of the Hartford *Evening Press*, which under his management soon became one of the leading Republican organs of the country. At the outbreak of the civil war he entered the Union service with the rank of captain. He served gallantly during the entire struggle, and was made brigadier-general in 1864, and brevet major-general in 1865. After the war he returned to editorial work, and became manager of the Hartford *Courant*. He was subsequently a member of Congress, and U. S. Senator from Connecticut. He was chosen president of the Centennial commission to arrange for the celebration of the one hundredth anniversary of American Independence. He is one of the most eloquent and stirring political speakers of the Republican Party, and is now (1884) U. S. Senator from Connecticut.

HAWTHORNE, Julian, son of Nathaniel, born at Boston, Mass., in 1846. He was educated as an engineer, but has devoted his life largely to literary work. Among his works are *Garth*, *Bressant*, and *Idolatry*.

HAY, John, an American poet and journalist, born at Salem, Ind., Oct. 8, 1839; graduated from Brown University in 1858; and was admitted to the bar at Springfield, Ill., in 1861. He was assistant secretary to President Lincoln, and occupied various positions in the government service abroad until 1870, when he became a member of the editorial staff of the New York *Tribune*. He is best known by his dialect poems 'Little Breeches,' 'Jim Bludsoe,' and 'Banty Tim.' These, with others, have been published in *Pike County Ballads*. He has also published *Castilian Days*.

HAYES, Augustus Allen, M.D., an American chemist, was born at Windsor, Vermont, February 28, 1806. H. studied chemistry under Dr. Dana, devoted himself entirely to that science, and filled various important posts. Among his discoveries is that of the organic alkaloid sanguinaria, which produces most brilliant salts. He has also investigated the properties of chromium, and written on chemical differences in varieties of guano, and the action of sea-water below the surface. Died in August, 1882.

HAZEN, William B., an American general, born at Hartford, Vt., Sept. 27, 1830, and graduated from West Point in 1855. He was engaged in frontier duty until the civil war, when he raised the 41st Ohio volunteers, and entered the Union service. He was in command of a brigade at the battles of Shiloh, Perryville, and Stone River. In 1862 he was made brigadier-general of volunteers. He was present and rendered gallant services at the battles of Chickamauga, Chattanooga, and Missionary Ridge; was present at the capture of Atlanta; and marched with Sherman to the sea. In 1864 he was made major-general of volunteers. For his valuable services in the civil war he was made major-general U. S. A.

HEADLEY, Joel Tyler, an American author, born at Walton, N. Y., Dec. 30, 1814, educated at Union College, and for a time pursued the ministry, but eventually devoted himself to literary work. He has published *Letters from Italy*, *The Alps and the Rhine*, *Napoleon and his Marshals*, *Sacred Mountains*, *Washington and his Generals*, &c.

HEARNE, Thomas, an English antiquary, born at White Waltham, Berkshire, in 1678, studied at Edmund Hall, Oxford, became assistant librarian in the Bodleian in 1701, and lived in Edmund Hall till his death, June 10, 1735. His chief works are editions of Justin, Eutropius, Livy, Spelman's *Life of Alfred*; Leland's *Itinerary*; *Lelandi de Rebus Britannicis Collectanea*; Langtoft's *Chronicle*; *Aluredi Beverlacencis Annales*, &c. He also wrote *Ductor Historicus*, and *The History and Antiquities of Glastonbury*.

HEART-URCHIN, the name given to certain genera of *Echini*, or 'Sea-urchins,' from their heart-like or cordate shape. These 'urchins' are called 'irregular,' on account of their difference in form from the Common Echinus, which is spherical. The purple H.-E. is the *Spatangus purpureus* of the naturalist; the common species, the *Amphidotus cordatus*. A curious form is the 'Fiddle H.-E.' (*Brissus lyrifer*), so named from a mark of that shape on the shell or 'test.'

HEAVEN, that particular portion of space beyond our globe in which God has placed the everlasting home of faithful angels and men. We have seen, in the article Beatific Vision, how the trials of God's servants in this life are rewarded in the next by seeing Him face to face and possessing Him securely and forever. The article in Vol. III., page 743, sets forth the various traditional and instinctive beliefs of pagan peoples and others with regard to the existence and location of a future abode of bliss. It remains to supplement all this by a statement of the Catholic doctrine regarding the location of our eternal home and the precise nature of the beatitude or supreme happiness there enjoyed.—1. There exists no formal declaration or doctrinal sentence of the Church, deciding peremptorily where God reveals Himself to His saints. In Holy Writ there is no passage clearly pointing out the place of the Heaven which Christians believe in. That it is outside of our earth is alone certain. The Jewish commentators of the Old Testament writings only confused men's minds by favoring the belief in the seven heavens, of the Cabbala; from them this fantastic hypothesis passed to the Arabs and into the Koran. St. Paul speaks of a 'third heaven' into which he was 'caught up,' and saw and heard things indescribable and unspeakable. This third heaven St. Paul is thought by some to identify with the paradise of the just, others, however, deny that such was the thought of the Apostle, who merely mentions his having been 'caught up . . . even to the third heaven,' only as one stage of the journey which terminated in his being 'caught up into paradise.' The distinction was made by several of the Church Fathers. In medieval

times the Catholic schools adopted the current notions about the physical constitution of the universe. St. Thomas Aquinas fairly resumes them all by his hypothesis of three heavens, the sidereal, the crystalline, and the empyræan. The last mentioned, the outermost or highest portion of space, was, he maintained, the place where heaven existed. The 'scientific imagination' of our best modern scholars, if they weigh well the meaning of the medieval philosophers, will find but little to find fault with in thus locating the abode of the Blessed far away beyond the track of comet, or the orbit of the remotest star, the calm region of peace untroubled, and that 'land of the living,' where the Infinite Creator puts forth the magnificence of His power and love, to establish a dwelling place worthy of the society assembled there, the élite of good angels and good men, and His own life and light poured out on all there. The intellect and imagination of the most accomplished scientist easily conceive of a region of earth where perpetual springtide ever reigns, a region unvisited by the scorching heats of summer or the colds of winter, safe from storm and pestilence and earthquake. If he believes in the almighty power and goodness of a Creator, he can easily conceive of a globe as vast as our sun and revolving in an orbit uncrossed by any other, obeying laws devised by the Wisdom which made all things in weight and measure and number, and which knows how to devise for this 'house unmade by (finite) hands, eternal in the heavens,' conditions of physical perfection, beauty, and magnificence unseen by created eye hitherto and unconceived of by the mind of man. Thus, while we are taught that Heaven is placed beyond our globe, our imagination is allowed free scope in fixing its locality in space.—2. But Heaven is a state as well as a place, and we have to gather from the Church and her authorized teachers what, precisely, it is that constitutes that state or condition of Beatitude, or perfect bliss enjoyed by both Angels and Saints. All through the middle ages, as well as in more recent times, the most eminent theologians have been divided on the question,—whether the joy and happiness of the soul that sees God face to face, have their seat in the intellect, the truth-knowing faculty, or in the will, the loving power. St. Thomas Aquinas and his school affirm that the beatitude of the Blessed in Heaven derives its proper form from the act of the intellect by which they see the Divine Essence in itself. The will, they say, is in itself a blind appetite, tending impulsively toward its proper object and resting in its possession, whereas the intellect alone can perceive an immaterial object and make it by knowledge present to the soul. Thus it is the intellect which in the Beatific Vision apprehends the Infinitely Free and Good, judges it to be so, measures and estimates its perfection, reaches out, grasps, and possesses It, as the eye opens to the light, admits, and retains it with the forms of things it reveals. The delight, the joy, the blissful sense of possession experienced by the will, only arise from the judgment uttered to it by the intellect, that the object attained and grasped is the Supreme Good. This was perfectly in accordance with the teaching of Aristotle, who, in all questions within the competence of mere reason, was supreme with the Schoolmen. Man is by nature an intellectual being: this is his noblest characteristic. Now, according to Aristotle, 'that which is proper to each by nature, is best and sweetest for each; sweetest then for man is the intellectual life, since this chiefly constitutes man. Such a life therefore is most happy.'

Opposed to this is the opinion of the great Irish Doctor, the Franciscan Scotus, who makes the will the seat of beatitude, and its source the act by which it loves God (*amore amicitiæ*) with a love which friend entertains for friend. The dissension seems to arise from a mere misunderstanding, and from an imperfect analysis of the acts of our faculties. Man's reason or rational nature is made up of both intellect and will; for both are correllative and complete each other. In the soul the two faculties are distinguished from each other, but not distinct from the soul itself. It is the one spiritual essence within whose reach the intellect by perfect apprehension brings the Infinite Truth, and whose will or effective power with all its energy possesses itself of that Divine Object, its Supreme Good.—This undivided knowledge and love of the Infinitely Perfect constitutes the essential beatitude of Angels and Saints. The bliss derived from the society of that Blessed City above, from the charity which reigns supreme there, from the more perfect knowledge of all created things clearly seen in the light of the Divine Essence, as the effect is perceived and known in the Cause, is termed by theologians the accidental beatitude of Heaven. Add to this, after the Resurrection the reunion of soul and body for each member of the human family, and the increase of bliss to the soul of enjoying everlasting companionship with its glorified body, made to partake of the qualities of Christ's flesh arisen from the tomb. And then it is lawful to conjecture that the marvelous physical world amid which the Heavenly Paradise is placed, will complete for the purified and exalted bodily senses, the deep and overflowing and exhaustless cup of joy.

HEDGEHOG PLANT is applied to species of *Medicago* (more particularly *M. intertexta*) on account of the prickly legume being spirally twisted into a sort of ball. In like manner *Caucalis daucoides*, belonging to the *Umbelliferæ*, is called *Hedgehog Parsley* from its spiny fruit.

HEF'ELE, KARL JOSEPH VON, an ecclesiastical historian, was born 15th March, 1809, at Unterkochen, in the E. of Würtemberg, became in 1840 professor in the Catholic theological faculty of the university at Tübingen, and in 1870 Bishop of Rottenburg. He was known before and at the Vatican Council as a zealous opponent of the dogma of infallibility, but has since tacitly accepted it. H. published an edition of the *Patres Apostolici* (1839, 4th. ed. 1855); *Der Cardinal Ximenes* (1844, Eng. trans. 1860); but is best known by his great work the *Konciliengeschichte* (vols. i.—viii., 1855 to 1874), of which an English translation has appeared.

HEINRICH VON VELDEKE, one of the chief of the Minnesänger, and founder of the medieval German court poetry, flourished during the 12th c., resided at the court of Hermann, Landgraf of Thuringia, and took part in the wars of Wartburg. His works include *Eneid*, a love story, partly based on Virgil's *Æneid*, but drawing its inspiration mainly from French sources; *Herzog Ernst von Baiern*, and various love songs. A legend of St. Gervais is also ascribed to him. Gervinus says he was the first who gave German verse cadence and melody, and subjected it to fixed laws. See Ettmüller's *H. von V.* (Leips. 1854).

HEINTZELMAN, SAMUEL P., an American general, born in Pennsylvania, in 1805, and educated at West Point. He served in the Mexican war, and also in the civil war, participating in the engagements of Bull Run (first and second), Williamsburg, Fair Oaks, and Chantilly, and winning promotion to the rank of major-general. He retired from the service in 1869, and died in 1880.

HEL'DENBUCH (Ger. *Book of Heroes*), a famous collection of old German heroic poems dealing with events which happened in the time of the barbaric invasions of the Empire. It includes the tales of Dietrich of Bern, of the famous rose-garden of Worms, of the dwarf Elberich, and the emperor Otnit, &c. These were written at various times, but mostly in the 13th c., and among their authors were Heinrich von Ofterdingen and Wolfram von Eschenbach. The first printed edition of the H. appeared in 1491 (new ed. by A. Von Keller, 1867). A modernized edition was issued by Von der Hagen (Berl. 1811), and again by Simrock (6 vols. 2d ed. 1851); the original was published by Von der Hagen and Prunissier (Berl. 2 vols. 1820–24).

HELENA, a rapidly growing town of Phillips Co., Ark., on the Mississippi River, 80 miles below Memphis. It has five cotton seed oil factories and growing manufacturing interests. It is connected by railroad with St. Louis, Little Rock, and Memphis; is a landing place for river steamers, and is an important trade center. Pop. 3652.

HELENA, the capital of Montana Territory, on the Northern Pacific Railroad, 16 miles from the Missouri River. It is an important trade center. It is surrounded by an agricultural district, in which there are mines of gold, silver, and iron. Pop. 8000.

HE'LIOSTAT, an instrument for keeping a celestial object constantly in the field of view of the telescope. It effects this by throwing a reflected image of the object into the tube of the telescope from a plane mirror, which is kept in the necessary position by clockwork.

HELL, the place where fallen angels and lost men are eternally punished. Eternal Hell is the counterpart of a supernatural and everlasting Heaven. The article in Vol. III., page 754, is entirely unsatisfactory, especially at the present time in America, when the existence of a future state after death, and, in particular, both the existence of Hell and the eternity of its pains are openly and seriously called in question. As to the sinful act by which the eternal loss and separation which are the essence of the dreadful and mysterious penalty of Hell, it is said, that it is in opposition to the nature and attributes of a just and good God to inflict everlasting punishment for the act of a moment or the enjoyment of a guilty but short-lived satisfaction. The very nature of sin implies separation from God and loss of God; and this loss and separation is of itself final and irreparable. To sin is to offend knowingly and freely Him who is the author of the transgressor's being, his benefactor and master. Catholic doctrine asserts that the sin which deserves Hell is of necessity a mortal offence, entailing the extinction of friendship between the Creator and the offending creature. He who transgresses the divine law wills by his act that there were no law-giver to resent the infraction, no judge to punish it. The will, by its sinful choice, turns away from God and from His society, His promises, and forfeits all right to its supernatural destiny with its eternal rewards. Sin, therefore, opens between the Creator and the sinner a gulf of itself impassable. The condition of the soul is one of separation from the source of all holiness and bliss. It is loss of God in life, and, death supervening at any moment, only makes the loss irremediable. And this is simply eternal damnation (Lat. *damnum*,

loss). The act which entails such awful consequences is a free act, committed, in our supposition, with a full knowledge of the heinousness of the transgression. Of himself neither guilty man nor guilty angel can, if he would—and we suppose that he would not—restore the relation in which he stood toward his Maker before he fell by sin. And God is surely not bound to change the perverse disposition of the sinful will, or to lift up the sinner to the height from which he has fallen. Such are some of the grounds which reason illuminated by faith finds to justify the ways of God on this dread subject. To the soul who believes in Christ and in His saving mission, the spectacle of the Saviour hanging crucified between two criminals throws a vivid light on Hell. Dreadful must be the misfortune, eternal and incomparable must be the loss, from which He the eternal Son endeavors to save us by such a death of shame and agony. So much for a preliminary to the discussion of the doctrine itself relating to Hell and everlasting punishment.

1. Examining the Old Testament for the grounds of this belief in Hell, we find but few passages which can fit in with the formal and explicit declarations of our Lord, and with the positive and well defined teaching of the Eastern and Western Churches from the earliest times. Theologians quote, in support of the existence of Hell, three principal passages from the Hebrew Scriptures: Isaias xxx, 14; lxvi, 24; and Daniel xii, 2. The first is as follows: 'Sinners shudder in Sion: trembling seizes unholy men. O who will dwell in devouring fire? O who will dwell in eternal burnings?' The second is: 'All flesh shall come (to Jerusalem) to adore before my face, saith the Lord. And they shall go out and see the carcasses of the men that have transgressed against me: their worm shall not die, and their fire shall not be quenched: and they shall be a loathsome sight to all flesh.' The passage from Daniel is this: 'But at that time shall Michael rise up, the great prince who standeth for the children of thy people: and a time shall come such as never was from the time that nations began even until that time. And at that time shall thy people be saved, every one that shall be found written in the book. And many of those that sleep in the dust of the earth shall awake: some unto life everlasting, and others unto reproach, to see *it* always.' In the deuterocanonical or Greek Old Testament writings, we have two passages which are in striking conformity with the above. Ecclesiasticus vii, 17–19: 'Number not thyself among the multitude of the disorderly. Remember wrath, for it will not tarry long. Humble thy spirit very much: for the vengeance on the flesh of the ungodly is fire and worms.' Judith xvi, 20: 'Wo be to the nation that riseth up against my people: for the Lord Almighty will take revenge on them, in the day of judgment he will visit them. For he will give fire and worms into their flesh, that they may burn and may feel forever.'

In the New Testament the utterances of Our Lord are so clear and explicit as to leave no room for misconception or doubt with regard to the tremendous meaning of His words. He takes the name (Gehenna) of the place of everlasting punishment from the Valley of Hinnom, near Jerusalem, which was to the Jews a special object of horror. There under Achaz and other kings the Jews were wont to make their children pass through fire in honor of Moloch, or, it may be, sacrificed them as a burnt-offering to that idol. The holy King Josias polluted this glen; it became a place of execution for criminals, their bodies being cast into it to rot amid all kinds of filth and abominations. It was to the popular mind a vivid image of Hell, and such is the meaning of the word Gehenna so often used by Christ,

2. Coming to the nature of the pains inflicted on the damned, we find that they are twofold, according to the universal teaching of the Church, the pain of loss (*pœna damni*), and the pain of sense. The former arises from the consciousness of having lost forever the Beatific Vision, the society of the Blessed in Heaven, and the bliss consequent upon the possession of God. The pain of sense is caused, principally at least, by the fire of Hell. In the Council of Florence, the Decree of Union between the Eastern and Western Churches abstained from defining this pain of sense as caused by material fire, because Greek theologians hold that the fire is metaphorical, namely, the consuming remorse and burning anguish of souls suffering such loss, degradation, and hopeless banishment. That the fire of Hell is material is considered by the Roman Catholic Church a truth so certain, that it would be verging on heresy to maintain the contrary. With regard to the question how the souls of lost men before the Resurrection, and the purely spiritual substance of the fallen angels, can be made to suffer from a material fire, we can only say that God who created both matter and spirit can alone solve the difficulty. Our reason and personal experience, however, can help us somewhat toward a conception of the possibility of the thing. Our own soul is a simple, immaterial, and spiritual substance, and yet, created for an organic material body, it has spiritual, interior faculties corresponding with the bodily senses. It sees with the eyes, hears with the ears, feels with the sense of touch spread all over the body. It is the immaterial principal within us that feels pleasure or pain through the bodily organs. He who made the spirit for the body and, the body for the spirit, can make the avenging flames of the other life serve his will and do the work of His justice on the disembodied soul of man and on the degraded angelic substance.

3. The most awful portion of this revealed doctrine regards the endlessness or eternity of these pains. We said at the beginning of this article that there was, in Catholic teaching, a striking and most perfect correspondence in the twofold notion of an Everlasting and Supernatural Heaven, and an Everlasting Hell. Christ in His most solemn utterances on this subject,—utterances delivered on the slope of Mount Olivet overlooking the Temple and the scene of His approaching suffering and death, distinctly contrasted, in the final sentence which He is to pronounce as Judge of the living and the dead, the 'eternal life' reserved for the good, with the 'eternal fire prepared for the Devil and his angels,' into which the wicked are bidden to depart from Him, their would-be Saviour. The words which both in Hebrew and in Greek expressed in His age the notion of eternity, might be open to critical discussion, or leave possible room to doubt the everlasting and irrevocable nature of the doom. But the context makes doubt impossible. The Hell to which the accursed are sent is a 'hell, where their worm dieth not and their fire is not quenched' (St. Mark ix, 48).—Origen held the opinion, that the fire of Hell is purgative even for devils, who, after a period of punishment, will be restored to God's favor. This universal restoration approved itself to the mind of St. Gregory of Nyssa and St. Gregory Nazianzen. St. Jerome thought this hope of restoration might be held out to sinners who had died in the Catholic faith; a similar opinion to St. Jerome's was expressed by St. Ambrose. St. Augustine taught something widely different from these views,—which are plainly erroneous,—and that is, that the prayers and good works of men in this life may help to mitigate the sufferings of the damned. The Church has not condemned this opinion of St. Augustine.

4. As there exists a definite though unknown place for Heaven, so must there for Hell. Many theories have been propounded on this point, but the Church has not pronounced upon any of them. Some will have it that the eternal fires are in the center of our globe. St. Thomas Aquinas, quoting St. Augustine and St. Gregory the Great, confesses that no one can know where Hell is, unless he has had a special revelation on the point.

HELLADOTHE'RIUM, a remarkable extinct genus of *Ungulate* or 'hoofed' quadrupeds, allied to the existing giraffe. The H. fossils occur in the Upper Miocene (Tertiary) rocks of Attica. No horns were developed in these singular beings, and as regards their dentition they appear to have resembled the antelopes. Fossil giraffes occur in the tertiary deposits in the Siwalik Hills of India.

HELSINGBORG, a bathing-place and port of Sweden, in the län of Malmöhus, on the Sound, opposite Elsinore. It has frequent steam communication with Copenhagen, and carries on a trade in iron wares and pottery. Pop. (1874) 8103.

HENDERSON, in Henderson Co., Ky., on the Ohio River and the Louisville & Nashville Railroad. It is engaged in manufacturing tobacco, whisky, and flour; and carries on a considerable commerce. Pop. 6000.

HEN'DERSON, Thomas, a Scottish astronomer, was born at Dundee, December 28, 1798. In 1831 he was appointed director of the royal observatory at the Cape of Good Hope. Here he made those observations which resulted in the calculation of the parallax of a *Centauri*—the nearest fixed star to our system, and the first whose distance was calculated. In 1833 his health compelled him to return to England, and the succeeding year he was appointed Astronomer-Royal for Scotland, and Professor of Astronomy in the University of Edinburgh. H. died November 23, 1842.

HENDRICKS, Thomas Andrews, an American statesman, born in Ohio, Sept. 7, 1819; removed, when a child, with his father, to Shelby Co., Ind.; graduated from South Hanover College in 1841; and was admitted to the bar in 1843. He engaged actively in politics, and soon became one of the leaders of the Democratic Party in Indiana. He was a member of Congress, 1851–55; U. S. Senator, 1863–69; and in 1872 was elected governor of Indiana. In 1876 he was the Democratic candidate for Vice-President, with Samuel J. Tilden for President, but was defeated. In 1884 he was again nominated for the same position, with Grover Cleveland for President, and was elected. Mr. Hendricks has for years been recognized as one of the ablest and most influential men of his party.

HEN'LEY-ON-THAMES, a picturesque town of England, in Oxfordshire, on the left bank of the Thames, under shelter of the Chiltern hills, 23 miles S.E. of Oxford, and 35 W. of London by railway. It is a favorite summer resort, and has an inn of high repute. Its trade is in flour, malt, beech-wood, grain, &c. The

river, which here abounds with pike, perch, and eels, is crossed at H. by a bridge of five arches. Pop. (1881) 4604. H. was incorporated in the reign of Elizabeth as *Hemleygang* or *Hanneburg*.

HENRY, JOSEPH, LL.D., an American scientist, born at Albany, N. Y., Dec. 17, 1797, and educated at the Albany Academy. In 1826, he became professor of mathematics at that institution. Shortly afterwards he began a series of investigations, which led to valuable discoveries in electro-magnetism and electricity. In 1832 he was made professor of natural philosophy in the College of New Jersey, and in 1846 was elected secretary of the Smithsonian Institution at Washington. He was made the recipient of numerous honors at the hands of scientific associations and societies, and in 1871 was made chairman of the light-house board of the United States. He published besides numerous papers upon scientific subjects, *Contributions to Electricity and Magnetism* (1839). Prof. Henry's electrical discoveries proved of highest value in that department of science, and constituted a foundation for the many after discoveries and the subsequent rapid advancement in that field. Died in Washington, D. C., March 13, 1878.

HENRY OF HUNTINGDON, an English chronicler of the 12th c., who became canon of Lincoln and archdeacon of Huntingdon, and wrote a Latin history of England to the death of Stephen in 1154; a treatise, *De Mundi Contemptu*, which contains many interesting anecdotes of his contemporaries; several Latin verses, partly in the manner of Martial, &c. The date of his death is not known. H.'s history is, in the early part, based chiefly on Bede —whose style he imitates—and on Geoffrey of Monmouth, but in the later books has an independent value. An edition of it was published by Sir H. Saville among the *Scriptores Post Bedam* (Lond. 1596), and there is an English version in Bohn's *Antiquarian Library*.

HEN'RYSON, ROBERT, one of the best of the old Scottish poets, flourished during the 15th c., but of his birth and early years nothing is known. In 1462 he was made a member of Glasgow University, and is there referred to as the 'venerable.' He spent the most of his life at Dunfermline, where he was schoolmaster, and the date of his death is uncertain, but it must have been shortly before the close of the 15th c., about which time the plague ravaged Scotland. Dunbar, in his *Lament for the Death of the Makaris*, published in 1508, says of Death that—

> 'In Dunfermline he has done roun
> Gud Maister Robert Henrysoun.'

H., as a poet, shows deep, simple feeling, rich humor, varied descriptive power, and a full command of melodious verse. His chief work is *The Testament of Cresseid*, which continues Chaucer's *Troilus and Creseide*, and tells with exquisite pathos and quaint felicity of language how Cressida was punished by leprosy for her faithlessness. His other writings comprise *Orpheus and Eurydice*, mainly interesting as a reflection of the classical learning of the time; *The Bludy Serk*, an allegorical ballad; *The Moral Fables of Æsop in Scottish Metre*, abounding in naïve vivacity and quiet humor; and *Robene and Makyne*, a delightfully natural, animated, and musical Scottish pastoral, in the form of a dialogue between a youth and a girl. See *The Poems of R. H.* edited with a memoir by Laing (Edinb. 1865).

HENTZ, CAROLINE LEE, a popular American authoress, born at Lancaster, Mass., 1800. She was the daughter of Gen. Whiting, and 1825 married a French gentleman by the name of Hentz. She was unusually precocious, having written a novel, a poem, and a play before she was 13 years of age. Among her numerous publications, the following may be mentioned: *Linda* (1850), *Rena* (1851), *Helen and Arthur* (1853), *The Planter's Northern Bride* (1854), and *Ernest Linwood* (1855). Mrs. Hentz's works met with great favor and had an unusually large circulation. After living at various places in the U. S., she died at Marianna, Florida, Feb. 11, 1856.

HEPWORTH, GEORGE HUGHES, D.D., an American clergyman, born at Boston, Mass., in 1833, and, after studying theology, entered the ministry of the Unitarian Church. After filling pastorates in Boston and New York, he renounced Unitarianism, became a Congregationalist, and established the Church of the Disciples in New York. He is now (1885) pastor of a Congregational church in Newark, N. J.

HERAC'LEUM, a genus of umbelliferous plants found in Europe, America, and India. *H. giganteum*, a native of Siberia, which is cultivated in gardens as an ornamental plant, grows from 12 to 14 feet high. *H. sphondylium*, a common British species, popularly known as cow-parsnip, is used for feeding pigs. In the Caucasus, the young shoots of *H. pubescens*, which are aromatic, are used as food.

HERCULA'NO DE CARVAL'HO, ALESANDRO, a well-known Portuguese novelist and historian, was born in 1796 at Guimaraes, and received his education at Paris. Having there imbibed liberal ideas in politics, H. took part in those revolutionary measures which aimed at securing a constitutional government for Portugal, and which in 1820 effected this result. The earliest writings of H. were poetical, but he published in 1828 a volume of poetry called *A Voz do Propheta* ('The Voice of the Prophet'), in which he predicted a most unhappy future for his country, then distracted by civil war. This work produced a great sensation, and was followed in 1832 by *A Harpo do Crente* ('The Harp of the Believer'), a volume of romantic verse. H.'s next literary production was a novel, *Eurich, Priest of the Goths*, which proved less successful than his poetry, and from this time the author gave himself up to historical writing, his chief work, *Historia de Portugal*, appearing between 1845 and 1853. It shows great industry and erudition, is written in a pure and attractive style, and is marked by general fairness and moderation. Another important work of H.'s is *Da Origem e Establecimento da Inquisiçao em Portugal* (1854).

HERKIMER, NICHOLAS, an American general, born about 1720. His father was the owner of a large tract of land in what is now Herkimer Co., N. Y. In 1776 he was made brigadier-general by the State convention, and in that year led an expedition against Sir William Johnson, who was in command of a force of Tories and Indians. He led a force to the relief of Fort Stanwix, which was besieged by St. Leger. On Aug. 5, 1777, he was surprised by the Indians, and defeated in the battle of Oriskany. He was wounded in the leg, and after an unsuccessful amputation, died on Aug. 17th, at Danube, N. Y.

HERMOSILL'O, a town of Mexico, in the state of Sonora, 90 miles N. of Guaymas, a port on the Gulf of California. It is an entrepôt for the produce of the interior, and carries on a large trade in wine and brandy. Pop. 14,000.

HER'ULI, or ER'ULI, a Teutonic people, who seem originally to have dwelt in Scandinavia, and who, along with the Goths, invaded the Roman empire in 262 A.D. Numbers of them afterwards joined Attila's host, and they formed the greater part of the armies with which Odoacer founded a kingdom in Italy in 476 A.D.

HESS, the name of several distinguished painters.—1. KARL ADOLF HEINRICH H., known chiefly for his success in painting horses, left many proofs of his skill in military subjects. He was born at Dresden in 1769, and died near Vienna, 3d July 1849. —2. PETER VON H., a painter of battle scenes, born at Düsseldorf, 29th July 1792, was the son of a famous engraver. He died 5th April 1871.—3. His brother, HEINRICH VON H., devoted himself chiefly to historical subjects in his art. He was born 19th April 1798, became Professor in the Academy at Munich in 1827, and died 29th March 1863.

HETEROGEN'ESIS, a name used synonymously with *Abiogenesis* or *Archebiosis*, and therefore indicating a belief in the origin of living organisms from non-living or inorganic matter, without the pre-existence of parent germs or organisms.

HETEROP'ODA, a division of *Gasteropoda* represented by the genera *Carinaria, Firola, Atalanta*, &c., in which the shell is rudimentary or absent, the 'foot' being converted into a flattened ventral fin-like organ, while the animals are free-swimming and oceanic in habits. The H. are also known by the name *Nucleobranchiata*, the two included families being the family *Atalantidæ* and *Firolidæ*.

HEY'SE, JOHANN CHRISTIAN AUGUST, a German grammarian, born 21st April 1764 at Nordhausen, Prussian Saxony, studied at Göttingen, and after holding various scholastic offices, finally became director of the gymnasium and girls' school in Magdeburg, where he died, 27th June 1829. He was author of *Theoretisch-praktische Deutsche Grammatik* (5th ed. 1838–49), *Deutsche Schulgrammatik* (21st ed. 1868), &c.—KARL WILHELM LUDWIG H., a philologist, son of the preceding, born 15th October 1797 at Oldenburg; from 1819–27 was tutor in the family of Mendelsshon-Bartholdy; in 1829 was appointed Professor of Philosophy in Berlin University; and died there, 25th November 1855. He wrote *Handwörterbuch der Deutschen Sprache* (3 vols. Magd. 1838–49), *System der Sprachwissenschaft* (Berl. 1856), &c.—His son, PAUL JOHANN LUDWIG H., a favorite poet and novelist, was born 15th March, 1830, at Berlin, and educated there and at Bonn. After a lengthened tour in Switzerland and Italy, H. settled (1854) at Munich, where he married, and afterwards resided. Among his numerous works may be mentioned *Ulrica* (1852) and *Thekla* (1858), epics; *Ludwig der Bayer, Colberg*, and *Die Sabinerinnen* (1859), tragedies; and *La Rabbiata* (1858) and *Mexaner Novellen* (1864), romances. A beautiful novelette of Ligurian coast-life by H. appeared in the *Rundschau* (Berlin) of January 1877.

HEY'WOOD, an industrial town of England in Lancashire, on the Roach, 8½ miles N. of Manchester by railway. It has extensive manufactures of cotton goods, iron, boilers, machinery, &c., and in the vicinity are large coal-mines. The town has grown rapidly. Pop. (1871) 12,824.

HEY'WOOD, JOHN, surnamed the 'Epigrammatist,' was born (it is supposed) at N. Mims in Hertfordshire, and was educated at Oxford. He obtained the friendship of Sir Thomas More and of Queen Mary, but left England on the accession of Elizabeth, and died at Mechlin in 1565. H. is remembered in English literature as a writer of interludes or dramatic pieces of a satirical nature, intermediate both in point of time and character between the *Moralities* and the Elizabethan Plays. The best known are *A Merry Play between the Pardoner and the Frere, the Curate, and Neybour Pratt* (1532), and *The Foure P.'s, a very Mery Enterlude of a Palmer, a Pardoner, a Potecary, and a Pedlar*, the date of which is unknown. Besides interludes, H. wrote some 600 epigrams, none of which exhibit a very deadly wit. H. was an ardent Catholic, and his two son ELLIS and JASPER both joined the Society of Jesus. Before entering on an ecclesiastical career they had given evidence of literary talent. Jasper became Provincial of the Jesuits of England, and died at Naples in 1598. He contributed to the *Paradise of Dainty Devices*.—THOMAS H., an Elizabethan dramatist, was a native of Lincolnshire, and was educated at Cambridge; becoming a Fellow of Peterhouse. We find him writing for the stage in 1596, and for upwards of forty years he was a most industrious and prolific author. He died about 1641. Twenty-three of his pieces are still extant. Among others may be mentioned *A Woman Killed with Kindness, The English Traveler, A Challenge for Beauty, Lancashire Witches, Rape of Lucrece, Love's Mistress, Joan as Good as my Lady*, &c. H. has a fine poetic fancy, enriched with classic memories that are sometimes too much for him; his humor is genuine, and his songs have a true lyric flow and dainty sweetness of sentiment.

HICK'OK, LAURENS PERSEUS, D.D., LL.D., an American philosophical writer, born at Bethel, Conn., Dec. 29, 1798; graduated from Union College in 1820; and entered the Congregational ministry in 1824. After having filled pastorates at Kent, Conn., and Litchfield, Conn., he became, in 1836, professor of theology in Western Reserve College, and in 1844 was chosen to the same position in Auburn Theological Seminary. In 1852 he was made vice-president and professor of mental and moral philosophy in Union College, and in 1866 became president of that institution. In 1868 he retired from this position, that he might devote his time entirely to philosophical studies. Besides numerous contributions to the religious magazines, he published *Rational Psychology* (1848), *System of Moral Science* (1853), *Empirical Psychology* (1854), *Creator and Creation* (1872). *Humanity Immortal* (1872), and *Logic of Reason* (1875). Dr. Hickok ranks among the profoundest thinkers of America. Died June 10, 1876.

HIGGINSON, THOMAS WENTWORTH, an American author, born at Cambridge, Mass., Dec. 22, 1823; graduated from Harvard College in 1841, and entered the Unitarian ministry in 1847, but renounced that profession in 1858. Prior to the civil war he was an earnest opponent of slavery, and in 1862 entered the Union service. In November of that year he was made colonel of a South Carolina colored regiment; was wounded in August 1863, and in 1864 was mustered out of the service. Since the termination of the war, he has devoted himself to literary work, and the advocacy of social reforms. Besides pamphlets and magazine articles, he has published the following: *Out-Door Papers; Army Life in a Black Regiment; Atlantic Essays; Malbone, an Oldport Romance; Oldport Days; Young Folks' History of the United States;* and others.

HILDBURGHAUS'EN, a town of Germany, in the duchy of Sachsen-Meiningen, on the river Werra, and the Eisenach-Koburg Railway. It was the residence of the Dukes of Sachsen-H. till 1826; and has some interesting buildings, and also manufactures of cloth, tobacco, machinery, &c. Pop. (1875) 5162.

HIL'DEN, a thriving town of Prussia, in the Rheinland, and on the Itterbach, 9 miles E.S.E. of Düsseldorf by rail. It has extensive manufactures of cotton and linen goods, cassimeres, &c. Pop. (1875) 6799.

HILL, AMBROSE POWELL, an American general, born in Culpeper Co., Va., in 1825, and graduated from West Point in 1847. He participated in the closing scenes of the Mexican war, and was engaged at Huamantla and Atlixco. He served in Florida against the Seminoles, and in 1861 resigned his commission, to enter the Confederate service. As colonel of a Virginia regiment he was engaged at the first battle of Bull Run. Promoted to the rank of brigadier-general he served with great gallantry at Williamsburg, and was made major-general. He soon gained distinction as a division commander. Under Jackson, he took part in the battles of Cedar Mountain, Bull Run, and Chantilly. He was present at Antietam, Fredericksburg, and Chancellorsville. For his gallantry at the last, he was made lieutenant-general, and placed in command of one of the three divisions of the Army of Northern Virginia. He evinced great skill and bravery during the Wilderness campaign, and was present at the final assault before Petersburg, where he was shot and killed, April 2, 1865.

HILL, BENJAMIN HARVEY, an American statesman, born in Georgia, Sept. 14, 1823; graduated from the State University, in 1844; and began to practice law in La Grange, Ga., in 1845. He soon gained a brilliant reputation as a lawyer and public speaker. In 1861 he was a member of the Georgia secession convention, and at first rigorously opposed that step, but eventually voted for the measure. He was elected a member of the Confederate Congress which met at Montgomery, Ala., in that year; and in the fall of the year was chosen to the Confederate Senate. This position he continued to fill until the termination of the war. After the war he was arrested and confined for several months in Fort La Fayette, New York. Subsequently in his life he was prominently connected with the Democratic Party, and was elected to the U. S. Senate. Died from cancer, at Atlanta, Ga., Aug. 16, 1882.

HILLSDALE COLLEGE, at Spring Arbor, Mich., chartered in 1845, and controlled by the Freewill Baptists. It maintains preparatory, classical, and theological departments, and is well endowed. Co-education of the sexes is practiced.

HIL'VERSUM, a village of N. Holland, 15 miles S.E. of Amsterdam, has manufactures of cottons, carpets, spinning and dyeing wool, &c. Pop. 6300.

HIND'LEY, a rapidly increasing town of Lancashire, England, 3 miles S.E. of Wigan by railway, carries on cotton-spinning and cotton manufactures, and is surrounded by numerous coal-works. Pop. (1871) 10,627.

HINGHAM, in Plymouth Co., Mass., on the S.E. side of Boston Harbor, and on the Old Colony Railroad, 17 miles from Boston. It is engaged in manufacturing and is a favorite summer resort. Pop. 4485.

HINGUNGHAT', a town in the Central Provinces, British India, not far from the Wardha coal branch of the Indian Peninsula Railway. Pop. (1872) 9415. It is the emporium of the local trade, especially for raw cotton, of which it exports £120,000 worth in the year. The H. cotton has earned a name in the Bombay market as one of the best indigenous staples, and the seed has been distributed in other parts of India. A model cotton farm was established here in 1868.

HIPPURIS, a genus of aquatic plants, belonging to the natural order *Haloragaceæ*. H. *vulgaris* is the common mare's tail which is abundant in Britain, and also occurs in N. America. It is one of the plants that grow in the hot water proceeding from the geysers in Iceland.

HITCHCOCK, ROSWELL DWIGHT, D.D., LL.D., a distinguished American clergyman, born at East Machaias, Me., Aug. 15, 1817; graduated from Amherst College, in 1836; studied theology at Andover Seminary; taught in Phillips Academy and Amherst College; and was ordained to the ministry, in 1845. In 1852 he was made professor of natural and revealed religion in Bowdoin College, and in 1855 Washburn professor of church history in Union Theological Seminary, New York. Recently he has been chosen president of that institution. Dr. Hitchcock takes high rank as a scholar, instructor, and pulpit orator. He has written extensively for the religious quarterlies, and has published *A Complete Analysis of the Bible.*

HITCH'IN, a town of Hertfordshire, England, 14 miles N.W. of Hertford, on the river Hiz, and a station on the Great Northern Railway. It has large breweries, and carries on a trade in corn, malt, and flour. Straw-plaiting gives employment to a considerable number of females. Pop. (1881) 8434.

HIVAO'A, the island of the Marquesas, in the S. Pacific, about lat. 10° S. and long. 139° W. It is traversed by a mountain range that attains a height of 4200 feet. The inhabitants, 6500 in number, are amongst the wildest Polynesians, and have remained unaffected by various Catholic and Protestant missions.

HOBART, JOHN HENRY, S.T.D., a Bishop of the Episcopal Church in America, born at Philadelphia, Pa., in 1775. He was educated at Princeton College, entered the ministry, and was rector of churches in New Jersey and on Long Island. In 1816 he was made rector of Trinity parish, New York, and Bishop of the diocese. Died in 1830.

HOBBEMA, MINDERHONT, a well-known Dutch landscape painter of the 17th c. Except that he was a contemporary of Berghem, Lingelbach, and J. van Loo, who executed the figures in H.'s landscapes, we know nothing of his life, though, from a similarity of styles, it has been conjectured that he was a pupil of Ruysdael. His pictures, mostly forests with ruins, are scattered over the galleries of Vienna, Berlin, &c.

HO'DOGRAPH of a moving particle is the curve passing through the extremity of those lines which, drawn from a fixed point as origin, represent in direction and magnitude the velocities of the particle at the different points of its path. The H. of a projectile moving in a parabola is evidently a vertical straight line, since the horizontal component of the velocity at every point is constant. Again, the H. of a point moving uniformly in a circle is another

circle whose center is the origin from which the velocities were laid down. The H. of a planet is a circle which is, however, placed excentrically with respect to the origin. The method of construction of this curve shows that, just as the tangent at any point of an orbit gives the direction in which the particle is moving, so the tangent to the H. gives the direction of acceleration. This curve was invented by Sir W. R. Hamilton; and its application to planetary motion has resulted in most simple and elegant geometrical constructions. See Hamilton's *Quaternions*, Thomson and Tait's *Natural Philosophy*, Tait and Steel's *Dynamics of a Particle*, and Clerk Maxwell's *Matter and Motion*.

HOD'SON, MAJOR WILLIAM, one of the leading characters of the Indian Mutiny. In the early years of his service in India, he had been selected for civil employment under the Lawrences in the Punjaub. The outbreak of the Mutiny in May 1857 revealed his peculiar qualities. He was immediately appointed to the staff, and was intrusted with the raising of a new regiment of irregular cavalry—'Hodson's Horse.' Through the siege of Delhi he performed admirable service as chief of the intelligence department, which brought him into close communication with the rebel royal family. On the capture of the city, he received orders to bring in *alive* the last of the Mogul Emperors, who had taken refuge in the tomb of Humayun, outside the walls. This he safely effected, and then went to fetch the Shahzadas, or royal princes. They also surrendered to him; but on the way to the city he ordered his prisoners to strip themselves of their jewels, &c., and then he shot them dead with his own hand. The general wrote, 'H., as a partisan officer, has not his equal.' A few months afterwards H. was himself killed in the final storming of the Kaisar Bagh, the royal palace at Lucknow. See *Life of Major William H.* by his brother, and Sir J. W. Kaye's *History of the Sepoy War*.

HOFFMAN, CHARLES FENNO, an American author, born in New York City, in 1806, and educated at Columbia College. He was admitted to practice law, but gave himself almost entirely to literary pursuits. He was connected at various times with the New York *American*, the New York *Mirror*, and the *Knickerbocker Magazine*. Among his published works are the following: *A Winter in the West* (1835), *Wild Scenes in the Forest and Prairie* (1837), *Greyslaer* (1840), *The Vigil of Faith and Other Poems* (1842), *The Echo* (1844), and *Love's Calendar* (1848). Died in 1884.

HÖH'SCHEID, an important industrial town of Rhenish Prussia, 17 miles S.E. of Düsseldorf. Its chief industries are in lead and iron. Pop. (1875) 9958.

HOLLAND, JOSIAH GILBERT, a popular American author, born at Belchertown, Mass., July 24, 1819; studied medicine at the Berkshire Medical College, Pittsfield, Mass.; and followed that profession for several years. He then engaged in literary work, edited the *Springfield Republican*, and in 1870 became editor of *Scribner's Monthly*. The following are among his best known published works: *History of Western Massachusetts* (1855), *The Bay Path* (1857), *Letters to the Young* (1858), *Bitter Sweet*, a poem (1858), *Gold Foil* (1859), *Miss Gilbert's Career* (1860), *Lessons in Life* (1861), *Letters to the Joneses* (1863), *Plain Talk on Familiar Subjects* (1865), *Life of Lincoln* (1866), *Kathrina*, a poem (1867), *The Marble Prophecy* (1872), *Arthur Bonnicastle* (1873), *Garnered Sheaves*, a collection of poems (1873), and *The Mistress of the Manse* (1874). Some of these were published over the name of 'Timothy Titcomb,' and nearly all have met with popular favor and have had large circulations. Died at New York City, Oct. 12, 1881.

HOLMES, MARY J., an American novelist, born at Brookfield, Mass. She has written numerous works of a light character, which have had a large circulation.

HOLTE'NIA, a peculiar genus of sponges, inhabiting the deep seas, and known as an 'anchoring sponge,' from the fact that the body has no stem or root, but fixes itself in the mud of the seabed by a long beard or bunch of delicate thread-like spicules. The *H. Carpenteri*, named after Dr. Carpenter, one of its discoverers, is the familiar species. H. is one of the *Siliceous* or flinty sponges.

HOMELLSVILLE, in Stuben Co., N. Y., on the Canister River, and the terminus of three divisions of the N. Y., Lake Erie & Western Railroad, whose shops are located here. It is a manufacturing town and center of trade. Pop. 8195.

HONEY BEAR (*Cercoleptes candivolvulus*), a species of Carnivorous mammalia inhabiting S. America, and also known by the names Kinkajou and Potto. Its average size is that of a large cat, and its color is a light brown, marked with darker bands. The tongue is very long and protrusible, and is used, as indicated by the name of the animal, for searching in the nests of wild bees for the honey there accumulated. The tail is prehensile, and assists the animal in climbing upon trees. The H. B. appears to be nocturnal in its habits, and is readily domesticated.

HOOD, JOHN BELL, an American general, born in Kentucky, in 1831, and educated at West Point. At the outbreak of the civil war, he entered the Confederate service, participated in many important battles, and rose to the rank of lieutenant-general. Died in 1879.

HOOKER, JOSEPH, an American general, born at Hadley, Mass., Nov. 13, 1815, and graduated from West Point in 1837. He served against the Seminoles in Florida, and participating in the war with Mexico, was promoted for gallantry at the engagements of Monterey, National Bridge, and Chapultepec. In 1853 he resigned his commission and engaged in agricultural pursuits. At the outbreak of the civil war, in 1861, he entered the Union service, and was made brigadier-general U. S. volunteers. He was present at all the important actions of the peninsular campaign in 1862, rendering gallant service at Williamsburg, Fair Oaks, Frazier's Farm, and Malvern Hill. In this year he was promoted to the rank of major-general, and commanded a division at the battles of Manassas and Chantilly. He was engaged at South Mountain, Antietam, and Fredericksburg, being severely wounded at Antietam. In January, 1863, he was placed in command of the Army of the Potomac, and, in May following, fought the battle of Chancellorsville. Upon the invasion of Maryland and Pennsylvania by Lee in the same year, he was removed from his command, and Gen. Meade substituted in his place a few days before the great struggle at Gettysburg. He was placed in command of a corps of the Army of the Cumberland, and won highest commendation for his daring bravery and heroism at Lookout Mountain, Missionary Ridge, and Chattanooga. In 1868 he retired from the army with the rank of major-general, and spent the remainder of his life very largely at Garden City, Long Island. He was one of the most dashing and gallant soldiers of the civil war. Died at Garden City, Oct. 31, 1879.

HOOSAC TUNNEL, in the north-western part of Massachusetts, on the railroad route from Boston, Mass., to Troy, N. Y., distant from the former place 137 miles, and from the latter 54. This opening through the Hoosac Mountain, is 4¾ miles in length, and is sufficiently wide to permit a double-track railway. The work of tunneling was begun in 1856, and in 1875 it was opened for the passage of railway trains. The entire cost of this gigantic enterprise was nearly $13,000,000.

HOOSICK FALLS, a town of Rensselaer Co., N. Y., on the Hoosick River and the Troy and Boston Railroad, 27 miles from Troy. It is engaged in manufacturing agricultural implements, shirts, and malleable iron. Pop. 4600.

HOP CLOVER is *Trifolium procumbens*, and so called from the resemblance of its heads of flowers to little catkins of hops.

HOPKINS, JOHNS, an American philanthropist, born in Maryland, May 19, 1795, engaged in the grocery business, and accumulated a large fortune. He was a member of the Society of Friends or Quakers. In 1873 he established Hopkins Free Hospital in Baltimore, at an expenditure of $4,000,000; Johns Hopkins University at Clifton, near Baltimore, to which he gave 400 acres of land and $3,000,000; and a convalescent hospital, and orphanage for colored youth. Altogether his gifts to these and kindred objects, amounted to about $8,000,000. Died at Baltimore, Md., Dec. 24, 1873.

HOPKINS, MARK, D.D., LL.D., a distinguished American scholar, born at Stockbridge, Mass., Feb. 4, 1802, and graduated from Williams College in 1824. He was professor of moral philosophy and rhetoric in Williams College, 1830–36; president of that institution, 1836–72; and resumed his former position as professor of moral philosophy and rhetoric in 1872. He has published *Evidences of Christianity; Law of Love, and Love as a Law; An Outline Study of Men;* and others.

HOPKINSON, FRANCIS, an American patriot and author, born at Philadelphia, Pa., in 1737; graduated from Princeton College, in 1763; and was admitted to the bar, in 1765. He was one of the signers of the Declaration of Independence, and wrote numerous patriotic and sentimental pieces in verse, which were exceedingly popular. Among them were the following: *The Treaty, The Battle of the Kegs, Ode to Science*, and *Essay on Whitewashing*. Died at Philadelphia, Pa., May 9, 1791.

HOPKINTON, in Middlesex Co., Mass., on the Hopkinton Railroad. It is engaged principally in the manufacture of boots and shoes. Pop. 4602.

HOPPER, ISAAC TATEM, an American philanthropist, born at Deptford, N. J., Dec. 3, 1771. He was a member of the Friends or Quakers, a successful merchant, and an ardent abolitionist. Died in New York City, May 7, 1852.

HÖR'DE, a town of Prussia, province of Westphalia, on the river Emscher, 33 miles S. of Munster, with which it is connected by railway. It lies in the center of great coal-mines, and has quite recently set up immense ironworks. Pop. (1875) 12,852.

HOR'MAYR, Joseph Freiherr von, statesman and historiographer, was born at Innsbruck, January 20, 1781. In 1801 he became secretary to the court at Vienna, in 1809 planned the operations for the expulsion of the French from the Tyrol, and subsequently, in spite of the greatest difficulties, maintained the defence of the country. Called in 1815 to be imperial historiographer, he in 1828 passed into the diplomatic service of Bavaria, and died at Munich, 5th November 1848. Among his works are *Geschichte der Gefürsteten Grafschaft Tirol* (1806–08); *Œsterreichischer Plutarch* (1807–20, in 20 vols.); *Alleg. Geschichte der Neuesten Zeit* (1817–19, 2d ed. 1851); *Das Land Tirol und der Tirolerkrieg von* 1809 (1845).

HORNE, Richard Hengist, an English poet whose merit is somewhat greater than his fame, was born in London in 1803. Besides certain dramatic pieces, *Cosmo de Medici*, *The Death of Marlowe*, *Gregory the Seventh*, &c., he has written two notable works, an epic poem, entitled *Orion* (1843), and *A New Spirit of the Age* (1844), a collection of critical essays, partly the work of Elizabeth B. Browning. The former, although sarcastically published at a *farthing* (new ed. 1876 at 9s.), is really a poem of some classic purity and eloquence. In 1846 appeared his *Ballad Romances*. From 1852 to 1869 H. lived in Australia, holding the office of 'Gold Commissioner.' In 1877 he published *Letters of Mrs. E. B. Browning addressed to R. H. Horne* (2 vols.), chiefly concerning 'A New Spirit of the Age.'

HOROP'TER, a term used in physiological optics to denote that combination of all those points in space which, for any one position of the eyes, appears single. The H. is really a circular line, of which the chord is formed by the distance between the eyes, whilst the size of the circle is determined by three points, viz., by the two eyes and the point towards which their axes converge.

HO'THAM, a suburb of Melbourne, but under distinct municipal government. It is situated on the N.W. side of the city. Pop. 16,000.

HOUGHTON-LE-SPRING, a town of England, in Durhamshire, 6 miles N.E. of Durham, and 6½ S.W. of Sunderland by rail. It has a large trade in the fine coal, limestone, and freestone of the district, besides extensive iron foundries, breweries, brick-kilns, &c. H. was long the residence of Bernhard Gilpin, 'the Apostle of the North.' Pop. (1871) 5276.

HOUGHT'ON, Richard Monckton Milnes, First Baron, poet and politician, only son of R. P. Milnes, Esq., of Fryston Hall, Yorkshire, was born June 19, 1809. He graduated at Trinity College, Cambridge, in 1831, and entered Parliament as member for Ponterfract in 1837, which seat he held till 1863, when he was created a peer. Originally a Conservative, he afterwards became a supporter of the Whigs, advocating free trade, popular education, religious equality, and concurrent endowment. He sympathized with oppressed nationalities, and interested himself in penal reform, introducing a bill for the establishment of reformatories in 1846. He has published various works of travel and on politics, and has always been a generous friend of struggling merit. Several of his biographical sketches were reissued as *Monographs, Personal and Social*, in 1873. H.'s *Poems of Many Years*, *Palm Leaves*, &c., were collected in 1876, and published with a preface by himself. They display fine fancy, are rythmical, and written in a pure and simple style. Among the most popular are two dainty ballads, *The Brookside* and *Good Night and Good Morning*. H. edited the first complete collection of Keat's poems in 1877.

HOUSEBUILDER MOTH (*Oiketicus Sandersii*), a peculiar genus of moths occurring in the W. Indies, and so named from the habit of the larvæ in fastening bits of wood and leaves together, so as to form a habitation for itself. It (H. M.) appears to possess the power of closing the aperture at will. The females are wingless, and the body of the male is hairy. The antennæ are of comb-like form at the base, and the wings are covered with hairs.

HOWARD, Oliver Ottis, LL.D., an American general, born at Leeds, Me., Nov. 8, 1830; graduated from Bowdoin College in 1850, and from West Point in 1854. He commanded a brigade at the first battle of Bull Run, July 21, 1861; and, in September of that year, was made brigadier-general U. S. volunteers. At the battle of Fair Oaks, June 1, 1862, he was severely wounded, and lost his right arm. Recovering from his wounds, he returned to the army, and was engaged at Antietam and Fredericksburg; was promoted to the rank of major-general; and commanded an army corps at Chancellorsville and Gettysburg. In 1863 he was ordered with his command to Tennessee, where he participated in the actions of Lookout Valley and Missionary Ridge. In 1864 he commanded a corps of the Army of the Cumberland, was present at Resaca, Kenesaw Mountain, the siege of Atlanta, and was with Sherman on his famous march to the sea. After the war he served as commissioner of the Bureau of Refugees, Freedmen, and Abandoned Lands; and was president of Howard University, 1869–73.

HOWARD UNIVERSITY, at Washington, D. C., chartered by Congress in 1867. It was named after Gen. Howard, who was one of its founders, and its president until 1873. It was intended for the colored race, and maintains normal, preparatory, collegiate, theological, law, and medical departments.

HOWE, Elias, an American inventor, born at Spencer, Mass., July 9, 1819, and became a machinist. In 1845 he invented the sewing-machine, and obtained patents for it in the year following. A large part of his life was spent in poverty and distress, but eventually he made a large fortune by means of his invention. Died in Brooklyn, N. Y., Oct. 3, 1867.

HOW'RAH, the chief town of the district of the same name in Bengal, British India, included within Hooghly, on the right bank of the Hooghly river, which is here nearly one mile wide, exactly opposite to Calcutta; pop. (1872) 97,784. It is really a transpontine suburb of Calcutta, with which it was connected in 1875 by a massive pontoon bridge, at a cost of £220,000. H. is the terminus of the East Indian Railway. It has busy dock-yards, flourishing mills and manufactures, the botanical gardens and Bishop's College; here also reside many of the business people of Calcutta. At the end of last century it was a mere village.

HUAS'CO, a seaport of Chili, province of Atacama, at the mouth of a river of the same name, 90 miles S.W. of Copiapo. It owes its prosperity to the mining of copper, of which it exports $1,725,000 worth annually. Pop. 7000.

HUBB (Habb), the only river of Scinde, India, besides the Indus, which finds its way to the sea. It rises in Kelat, forms for some distance the boundary between Scinde and Beloochistan, and after a total course of 100 miles, falls into the Arabian Sea N.W. of Cape Monze. The water has been greatly utilized for irrigation by a Mohammedan proprietor.

HU'BER, Ludwig Ferdinand, a German author of note, was born at Paris in 1764, became secretary to the Saxon legation at Mainz in 1787, was editor of the *Allgemeine Zeitung* from 1798 to 1803, and died 24th December 1804. His *Sammtliche Werke*, consisting chiefly of plays original and adapted from the French, were published by his wife in 4 vols. 1806–9.—Therese H., wife of the preceding, was the daughter of the illustrious scholar Heyne, and was born at Göttingen, 7th May 1764. She was married first to Johann Georg Forster, and after his death to H. As a novelist she has a distinct place in German literature. She wrote for her own sex chiefly. An edition of her works, in 6 vols., was published by her son (Leips. 1830–33).—Victor Aimé H., an historico-literary and political writer, son of Ludwig F. and Therese H., was born at Stuttgart, 10th March 1800, became Professor of the History of Literature at Rostock in 1833, went to Marburg three years later as Professor of Modern Languages and Literature, and from 1843 to 1850 held the same appointment in the University of Berlin. He died at Wernigerode in the Harz, 19th July 1870. H. had a wide knowledge and a fine appreciation of the Romance literatures. Among his chief works are the *Geschichte des C.* (1829), *Chronica del lid* (1844), *Die Neu-Romantische Pœsie in Frankreich* (1833), *Die Skizzen aus Spanien* (1828–35), *Reise briefe aus Belgien* (1855).

HU'BERT, Saint, Bishop of Liège, son of Bertrand of Guienne, was chief functionary at the court of the Frankish king Theodoric. At the suggestion of his friend and teacher Bishop Lamprecht of Maastricht, and through sorrow for the death of his wife Floribane, he sought a hermit's life, but after the martyrdom of Lamprecht, returned to succeed him as Bishop of Maastricht and Liège in 1708. He died in 727, and the legend tells that long afterwards his body was found still undecayed. In 827 he was canonized, and his corpse buried in a Benedictine monastery named Ardenne, whose name was changed to St. H. Another legend tells how, when H. was hunting one Good Friday in the Ardennes Hills, he came upon a stag with a gleaming crucifix between its horns, which admonished him for his passionate love of the chase, and persuaded him to a life of contemplation. Oddly enough, this story made him the patron saint of hunters. Many orders of knighthood were formed in his honor, courts held great hunting feasts on his name-day (3d November), and the common people believed that St. Peter had intrusted him with the *key* to the cure of possessed persons and those bitten by mad dogs.

HU'BERTSBURG, a former royal hunting-castle in the circle of Leipsic, Saxony, near Mügeln, was built by Augustus III in 1721. It is now an asylum and prison. The peace of H., which ended the Seven Years' War, was signed here, 15th February 1763.

HUB'LI, a flourishing town in the district of Dharwar, province of Bombay, British India, 290 miles S.E. of Bombay. Pop. (1872) 37,961. It stands on the main road from the S. Mahratta country to the Malabar coast, on the line of the proposed State Railway, and is a great emporium for cotton.

HUGHES, Rev. John, D.D., a distinguished prelate of the Roman Catholic Church in America, born in County Tyrone, Ireland, June 24, 1797, came to America in 1817, and was educated at St. Mary's College, Emmittsburg, Md. He was admitted to the priesthood in 1825, and after filling several pastoral charges, became, in 1842, bishop of New York, and in 1850 was made archbishop of New York. He was a learned scholar and an eminent theologian; and was universally beloved by those over whom he ministered. Died Jan. 3, 1864.

HULL, Isaac, an American naval officer, born at Derby, Conn., March 9, 1775; entered the merchant-marine service when very young; and in 1798 became a lieutenant in the U. S. Navy. He was a member of the Barbary expeditions, where he won distinction by his bravery. In July, 1812, he sailed from Annapolis, Md., in command of the *Constitution*, was pursued for several days by a British fleet, and at last gave battle to one of their number, the *Guerriere*, and after a severe struggle compelled her to surrender. The *Guerriere* had been so injured, however, in the battle that it was found necessary to burn her. For this capture Hull was presented with a gold medal by Congress. Died at Philadelphia, Pa., Feb. 13, 1843.

HULL, William, an American general, born at Derby, Conn., Jan. 24, 1753, and was admitted to the bar in 1775. He entered the Continental service, and rendered gallant service in the war of the Revolution. After peace had been restored with England, he resumed the practice of law at Newton, Mass., where he met with great success. From 1805 to 1814 he was Governor of the Territory of Michigan. In the war of 1812, he was appointed brigadier-general, and placed in command of the Army of the Northwest. For surrendering Detroit to the British under Gen. Brock, he was court-martialed, convicted of cowardice, and sentenced to be shot. He was pardoned, however, on account of his age and former services. Died at Newton, Mass., Nov. 29, 1825.

HULL'AH, John P., musical composer and teacher, was born at Worcester in 1812. He studied theory under W. Horsley, and singing under Cruvelli (1829–35). H. exerted himself in spreading the knowledge of music among the middle classes by the system which bears his name. From 1844 to 1874 he was Professor of Vocal Music at King's College, London, and in 1876 the degree of LL.D. was conferred upon him by the University of Edinburgh. Among his works are *History of Modern Music* (1862–75), and *Lectures on the Transition Period of Musical History* (1865–76).

HUMAYUN', the second of the Mogul Emperors of India, son of Baber, and father of Akbar the Great. He reigned from 1530 to 1543, when he was defeated and driven out by his Afghan rival, Sher Khan. In 1555 he recovered his kingdom, but died in the following year. He lies buried under a white marble mausoleum at Delhi, erected by his widow, Hamida Banu, at a cost of $750,000.

HU'MEA, a genus of composite plants, of which *H. elegans*, a native of Australia, is the best-known species, and grown in gardens for its ornamental and graceful drooping habit. The plant when bruised emits a balsamic odor.

HUM'ERUS (Lat.) is the bone of the upper arm, extending from the scapula to the bones of the fore-arm, with which it is articulated.

HUMIRPORE', the chief town of the district of the same name, in the N.W. Provinces, British India, at the confluence of the Betwa and Jumna rivers, 155 miles S.E. from Agra, and 110 N.W. from Allahabad. Pop. (1872) 7007.—The *district* of H. has an area of 2287 sq. miles; pop. (1872) 529,137. It is noted for artificial lakes encircling rock temples, now used for irrigation. The principal crops are. gram, wheat, millet, and oil-seeds, with a little cotton; the trade is insignificant. As in the rest of Bundlecund, the Mutiny of 1857 was made the occasion for murder and rapine.

HU'MORALISTS, a term used in medical literature to designate a sect who based their pathology upon the influence of the humors.

HU'MULUS, the genus of plants to which the hop belongs.

HUN'GERFORD (formerly *Ingleford*, originally *Englaford*, 'the ford of the Angles'), an English market-town, partly in Wilts, partly in Berkshire, 61½ miles W. of London by railway, stands on the Kennet, a fine trout-stream, and is traversed by the old Roman road to Bath. Pop. (1871) 3064. Here William III. met James II.'s agents in 1688.

HUNTER, David, an American general, born at Washington, D. C., July 21, 1802, and graduated from West Point in 1822. In 1861 he was made brigadier-general of volunteers, and was in command of a division at the first battle of Bull Run. In August of the same year he was promoted to be major-general of volunteers. In 1862 he was placed in command of the department of the South, and while holding the position, declared slavery abolished in that department. This order was subsequently annulled by President Lincoln. In 1864 he commanded the department of West Virginia, and in 1865 was a member of the commission that tried the conspirators who were accessory to the assassination of Mr. Lincoln. In 1866 Gen. Hunter retired from active service.

HUNTING DOG (*Lycaon venaticus*), a species of Canidæ or dogs found in S. Africa, and also known by the name 'hyæna dog. These dogs live in packs, and in a natural state are wild and bold. The color is a reddish brown marked with black and white. The ears are large and prominent, and the nose and muzzle are black. The tail is bushy, and is white at its base and black at the tip. The fore feet possess four toes only.

HUNTING SPIDER (*Salticus scenicus*). sometimes also named the zebra spider, from its brown color being variegated with white bands, is a common British spider of active habits, found on walls and on trees, pursuing its prey with great persistence and agility. Three pairs of spinnerets exist in the H. S., which has also very long legs.

HUNTINGTON, Daniel, an American artist, born in New York City, Oct. 14, 1816; was educated at Hamilton College; and, in 1853, began to study art. He rapidly attained distinction as a portrait painter. Among his best known works are the historical pieces, *Henry VIII. and Catharine Parr*, *Mary Signing the Death-Warrant of Lady Jane Grey*, and *Lady Jane Grey in the Tower*.

HUNTINGTON, Jedidiah Vincent, an American writer and poet, born at New York, Jan. 20, 1815, graduated from the University of New York in 1835, and from the medical department of the University of Pennsylvania in 1838. He was a brother of Daniel Huntington, the artist. He entered the Episcopal ministry, but in 1850 became a Roman Catholic. He is best known to the public by his writings: *Poems* (1842), *Lady Alice* (1849), *Alban, The Forest* (1852), *The Pretty Plate* (1852), *Rosemary* (1860), *Blonde and Brunette* (1858), and *America Discovered*. Died at Pau, France, March 10, 1862.

HUNTINGTON, a town of Cabell Co., W. V., on the Ohio River. It has large car and other factories, and is a shipping point for coal, lumber, iron, and salt from the Kanawha region. Pop. 3147.

HUNTINGTON, a town of Huntington Co., Ind., on the Wabash River, 24 miles from Fort Wayne. It has two railroads and is on the Wabash & Erie Canal. It is actively engaged in manufacturing, and produces large quantities of lime. Pop. 6000.

HUNTINGTON, a town of Huntington Co., Pa., on the Juniata River, at the junction of two railroads, 96 miles from Harrisburg. It is engaged in manufacturing and mining. Pop. 4800.

HUP'FELD, Hermann, an eminent German linguist and theologian, was born at Marburg in 1796, studied Hebrew and exegesis under the guidance of Gesenius at Halle, he became Professor of Oriental Languages at Marburg in 1827, and was called to Halle as the successor of Gesenius in 1843. He died 24th April 1866. H. was a thoroughly scientific scholar in the circle of Oriental languages, and his work, though fragmentary, is of great value for the grammar and exegesis of the Old Testament. His masterpiece is the *Uebersetzung und Auslegung der Psalmen* (4 vols. Gotha, 1855–61). Other important productions are *Ueber Begriff und Methode der sog. Biblischen Einleitung* (Marb. 1844). *Die Quellen der Genesis aufs Neue untersucht* (Berl. 1853), and *Untersuchungen über die Feste der Hebräer* (Halle, 1851–64).

HURDUI, the chief town of the district of the same name, in the province of Oude, British India, and a station on the railway, 62 miles N.W. of Lucknow. Pop. (1869) 6415.—The *district* of H., which lies between the Ganges and the Gumti, has an area of 2292 sq. miles. Pop. (1869) 930,977.

HURRYHUR' (*Harihara*), a British cantonment in the State of Mysore, Southern India, on the right bank of the Tungabudra river, a tributary of the Kistna, 132 miles N.W. of Seringapatam, and 320 N.W. of Madras. Pop. (1871) 6401.

HURST, John F., D.D., an eminent American divine of the Methodist Church, born in Dorchester Co., Md., Aug. 17, 1834, and educated at Dickinson College, Pa., and Halle University, Germany. He entered the Methodist ministry in 1858. In 1870 he was made professor of historical theology in Drew Seminary, Madison, N. Y., and in 1873 was made president of that institution, but has since been made a Bishop of the Methodist Church. He has translated for publication Hagenbach's *History of the Church in the Eighteenth and Nineteenth Centuries*, Lange's *Commentary on Romans*, and Van Oosterzee's *Lectures on John's Gospel;* and has published *History of Rationalism. Outlines of Bible and Church History*, and *Martyrs of the Tract Cause*.

HUSCH, the chief town of the circle of Faltchi, Moldavia, near the border of Bessarabia, 8 miles W. of the Pruth, and 40 S.E. of Jassy. It was founded over 400 years ago by Hussites, is the seat of a Greek bishop, and has a trade in corn and wine. Here the Russians and Turks signed the treaty of 1701. Pop. 18,000.

HUSHIARPUR', the chief town of the district of the same name, in the Province of the Punjaub, British India, 90 miles E. of Lahore, and close by the old city of Hurrianah, has a special manufacture of white damask cotton cloth. Pop. (1868) 13,022.—The *district* of H., which lies in the Jullundhur Doab, between the Sutlej and Beas rivers, has an area of 2086 sq. miles; pop. (1868) 938,890. The crops are wheat, Indian-corn, barley, rice, cotton, and sugar-cane.

HUTCHINSON, Lucy, a Puritan lady, who has won a place in literature by an admirable memoir of her husband, Colonel John Hutchinson, was born 29th Jan. 1620, and married in 1638. Colonel Hutchinson was a member of the high court of judiciary that sentenced Charles I. to death. At the Restoration he was arrested, and died a prisoner in Sandown Castle, 11th Sept. 1664. His wife survived him many years. The work which has made both herself and her husband famous was not published till 1806. In a graceful and appreciative review, Lord Jeffrey compares her to 'the Valerias and Portias of antiquity.'

HU'ZARA (*Hazara*), the most northerly district of British India, province of the Punjaub. Area, 3000 sq. miles; pop. (1868) 367,218. It is bounded on the W. by the Indus; and the country is mainly mountainous. Snow falls as low as 4000 feet. The crops are maize, wheat, and barley, and there are large flocks of sheep and goats. The chief town is H. or Abbotabad, 125 miles E. of Peshawur, where there are cantonments for 1500 men. In 1857 the sepoy regiment mutinied, and was pursued and cut to pieces among the mountains.

HY'ADES (Gr. 'rainers,' from *hyein*, 'to rain,' Lat. *Pluviæ*), five stars clustered in the face of the constellation Taurus, the rise of which simultaneously with the sun was thought by the ancients to portend rainy weather. The story connected with them is variously given.

HYB'LA, three towns in Sicily, from one or other of which came the honey so often alluded to by ancient poets, namely, *H. Major*, on the S. slope of Ætna; *H. Minor*, or *Megara Hyblæa*, founded on the E. coast by Dorians of Megara in Greece in 728 B.C., under Syracuse from the earlier part of the 5th c. B.C., but insignificant after its sack by the Romans during the second Punic War; and *H. Heræa*, in the S., between Agrigentum and Syracuse.

I.



IANTHI'NA, a peculiar genus of *Gasteropodous* Mollusca, popularly known by the name of 'violet snails.' They inhabit the sea and are included in the family *Haliotidæ* or 'ear shells,' but may also form the type of a special family, that of the *Ianthidæ*. The shell exactly resembles that of the common snail in shape. It is of delicate texture, and of a deep violet hue at the base, the spire being white. The foot is small, but secretes a remarkable 'raft' or 'float,' formed of air cells, to the under surface of which the eggs are attached, the animal and its eggs thus floating about at the surface of the water. The I. occur in great numbers on the Atlantic Ocean, and may be driven by storms on the S. coasts of Britain.

IB'SEN, Hen'rik, a Norwegian poet, born at Skienin 1828. His chief works are dramatic, and divide themselves into two classes—his early dramas, drawn from middle-age history, *Gyldet paa Solhaug* (1856); *Fru-Inger paa Osterraad* (1857); *Hærmændene paa Helgeland* (1858); *Kongsemnerne* (1864); and his later ones, *Brand* (1866); *Peer Gynt* (1867); *De Unges Feorbund* (1869), in which subjects from the present time are treated with rare knowledge of human nature and the keenest irony. The last especially entitles him to high esteem, but his lyric poems, of which a collection came out at Copenhagen in 1871, are also very fine. Most think the drama *Kaiser og Galilæer* (1873, English translation by Catherine Ray, 1876) his greatest work. I. received a pension from the Storthing in 1866.

ICH'THUS (Gr. 'a fish'), the name given to the earliest kind of Christian amulets, because the initials of the Greek for Jesus Christ, Son of God, Saviour, made up this word.

IC'ICA, a tropical genus of *Amyridaceæ*, consisting principally of large trees, belonging to mid-America, and possessing the balsamic juice for which the order is noted. So highly saturated is *I. heptaphylla* with this odoriferous resin that the timber is used for torches, and is called in Guiana, incense-wood. Another species, *I. altissima*, from its fragrant smell, is termed cedar-wood. Like the cedar, it is distasteful to insect vermin, and is consequently in request for household furniture. On account of its large growth, its durability, and the facility with which it is wrought, it is also chosen by the Indians for the manufacture of their canoes. A third species of the same region yields elemi.

IGNAT'IEFF, Nicolas Paulovitch, a Russian general and diplomatist, born about 1830. While still young he became a general, and was sent on a mission to Pekin, where he negotiated a favorable commercial treaty with China. He had for some time charge of the Asiatic department in the Russian Foreign Office, and became Minister at Constantinople, July 26, 1864. Here he exercised great influence over the Sultan Abdul Assiz. On the latter's dethronement and the outbreak of the war with Servia and Montenegro, he strongly championed the Slavonian cause, and an ultimatum presented by him in October 1876 forced the Porte to grant an armistice. He was the Russian plenipotentiary at the Conference at Constantinople, Christmas 1876, and on its failure withdrew with the other ambassadors temporarily from that capital. In March 1877 he visited the principal courts of Europe on the Eastern question, and in London was the guest of the Marquis of Salisbury, his colleague at the Conference, the result of which was the signature of the London Protocol. He is understood to have great conversational powers, to be a master of diplomacy, and to be marked out for even greater advancement in the Russian state.

IGNATIUS, St., Patriarch of Constantinople, son of the Emperor Michael I., was born about 800. His original name was Nicetas, which he changed to I., when, on the deposition of his father by Leo V. (813), he was forced to become a monk. As such, I. was ordained priest by Basil of Paros, became abbot of the monastery of Satyrus at Constantinople, and in 846 succeeded Methodius in the patriarchate of that city. I. was a vigorous opponent of the Iconoclasts, and in this opposition was supported by Theodora, the regent for her infant son, Michael III.; but the latter, on attaining majority, was led by the intrigues of his uncle, Bardas, whose vices I. had reproved, to depose I. (858) and secure the election in his place of the iconoclastic Photius. Although Pope Nicholas I. refused to recognize the transaction, Photius retained the patriarchate till 867, when, under Basil I., he was in turn deposed and I. reinstated, an eighth general council assembling at Constantinople in 869 to ratify both events. I. died Oct. 23, 878.

ILHA'VO, a town of Portugal, province of Beira, 38 miles S. of Oporto, near the sea-coast, has large glassworks in its neighborhood at Vista Alegre. Pop. 8200, mostly fishermen.

ILION, a town of Herkimer Co., N. Y., on the Mohawk River, the New York Central and West Shore railroads, and the Erie Canal, 12 miles from Utica. It is engaged in manufacturing arms, sewing-machines, agricultural implements, and other articles. Pop. 4000.

ILLINOIS INDIANS, a confederacy composed of several tribes, occupying the territory, which now constitutes the State of Illinois. They probably belonged to the Dakota race. But few of this once powerful confederacy now remain, and they are found in the Indian Territory.

ILLINOIS INDUSTRIAL UNIVERSITY, at Urbana, Ill., established in 1861. Congress bestowed upon it a grant of 480,000 acres of land; Champaign County, in which Urbana is located, made a gift of $550,000 in buildings and lands; and the State donated $300,000 for certain specified purposes. There is connected with the institution a farm of 410 acres. There are seven departments, viz.: a college of agriculture and horticulture; a college of engineering and architecture; a college of natural sciences and natural history; a college of literature and art; a school of commerce; a military school; and a women's school of domestic science. Co-education of the sexes is practiced.

ILLU'SIONS are mental phenomena, depending upon a morbid condition of the organs of the special senses, but especially of the organ of sight.

ILYAN'THUS, a familiar genus of *Actinozoa* or sea-anemones, differs from its common neighbors by its conical shape, and its slender and pointed base. Probably I. lives with its base attached in the mud of the sea. The family *Ilyanthidæ* includes the nearly-allied genus *Arachnactis*, an anemone which lives a free life, and fixes itself at will. The common sea-anemones, on the other hand, are usually firmly rooted and fixed to rocks and stones. *I. Scoticus*, or the 'Scottish Pearlet,' is a familiar species.

INAJA' PALM. The I. P. of the Brazilians—the 'Cocurito' of Humboldt's writings—is the *Maximiliana regia* of botanists, a magnificent palm forming one of the most conspicuous ornaments of the primitive forests of the Amazon region. It frequently reaches 100 feet in height, bearing a crown of gigantic pinnate leaves 30 to 40 feet long. The woody boatlike spathes remain on the trunk for years after flower and fruit have fallen. They are used by the Indians for baskets, cradles, and cooking utensils.

INCH, in linear measure, is the twelfth part of a foot, or the thirty-sixth part of the imperial standard yard.

INCH'BALD, ELIZABETH, *née* SIMPSON, an English actress, dramatist, and novelist, born of Roman Catholic parents at Stanningfield, Suffolk, 15th October 1753, went to London at the age of sixteen to seek a theatrical engagement. From the dangers and temptations to which her youth and beauty exposed her she was only freed by her marriage in 1772 with Mr. I., an actor to whom she had applied for counsel and protection. The same year she made her début at Bristol, acted subsequently with her husband at Edinburgh, Glasgow, York, &c., and made a short tour in France. Mr. I. dying at Leeds in 1779, she contracted an engagement at Covent Garden, London (1780–89), and during this period produced a farce, *The Mogul Tale*, and other pieces, the success of which led her finally to quit the stage and apply herself wholly to literature. Mrs. I. died at Kensington, 1st August 1821. She published in all ten plays, three collections of plays, and two novels; but of these, the last—*A Simple Story* (1791) and *Nature and Art* (1796)—are the works by which she is now remembered, and have indeed taken their place among the standard novels of the language. Her Memoirs were published by J. Boaden (2 vols. 1833), but an autobiography, for which Philips the publisher had offered £1000, she destroyed by the advice of her director.

IN COENA DOMINI, or PASTORALIS, is the name of a Papal bull, which has been traced back to Gregory XI. (A.D. 1370), and which was regularly published at Rome every Holy Thursday down at least to 1773. It relates to discipline, and recognition has been denied to it by almost every country in Europe. Its rejection is made the subject of Article XVII. of the famous Declaration of the liberties of the Gallican Church. The bull anathematizes heretics and their abettors, those who read or print their books, schismatics, all persons and universities who appeal to a future council, pirates and wreckers, those who impose or augment tolls without leave of the Pope, those who supply the Saracen or Turk, or other enemies of Christ, with arms or aid, those who prevent persons coming to Rome, or stop supplies, those who appeal to secular power against the execution of the letter apostolic, secular judges who bring ecclesiastical persons before their tribunals, and those who exact contributions from such persons. It was the attempt of Clement XIII., in 1768, to enforce the bull in Parma, that led to a strong expression of opinion against it by several European powers, and ultimately to the triumph of the *Regalisti* party at Rome, and the suppression of the Jesuits. The English Roman Catholics hold the bull to be obsolete. See *Lord Arundel's Letter to Mr. Plumptre* (Lond. 1848), and various pamphlets published in the same year by Hatchard.

IN'CUS, one of the small bones in the middle ear. Shaped somewhat like an anvil or bicuspid tooth, it unites on the one side with the *malleus*, or mallet (which is connected with the membrane of the drum), and on the other with the *stapes* or stirrup, which fits into the oval window of the internal ear. It is thus the middle link in the chain of bones, and it transmits the vibrations of the *membrana tympani*, or drum of the ear, to the internal ear.

INDEFECTIBIL'ITY of the Church includes its Perpetuity, by which it is free from failure of its members, and its Inerrancy and Infallibility, by which it is free from failure in holding and declaring the truth. For the perpetuity of the Church such passages of Scripture are cited as Isa. lxi. 9; Dan. ii. 44; Matt. xvi. 18. xxviii. 20; John xiv. 16, 17, and the following arguments adduced: that 'the consummation of all things is delayed only till the servants of God are sealed' (1 Cor. xv. 28; Rev. vi. 9–11), so that when faith fails the end will be (Luke xviii. 8), and that as God will have all men to be saved, and come to the knowledge of the truth, the Church could not fail without a failure of God's mercy.

INDIAN RED, or PERSIAN EARTH, is a marone-colored ferruginous earth used as a painter's pigment, and obtained from the hills near Chingleput as well as from Persia. An imitation is manufactured in this country by mixing oxide of iron with colcothar.

INDU'SIUM, a thin membrane often covering the clusters of capsules or sporangia of ferns.

INFUNDIBULATA, the name given to one of the divisions of the class *Polyzoa*, distinguished by having the tentacles arranged in a round or orbicular fashion, and by the absence of an *epistome* or valvular lid for closing the mouth of the cells. The sea-mats or *flustræ* exemplify this group.

IN'GELOW, JEAN, an English poet and novelist, was born in Boston, Lincolnshire, about 1830. She published *Tales of Orris* in 1860. A collection of *Poems* which appeared in 1863, containing *Divided*, *Songs of Seven*, *The Letter I*, *Divided*, *The High Tide*, &c., established her fame, and has passed through many editions. Her subsequent works include *A Story of Doom and other Poems* (1867), *Mopsa the Fairy* (1869), *Little Wonder Horn* (1872), and *Off the Skelligs* (a novel in 4 vols. 1873). Her poems are remarkable for depth of feeling and high artistic power, and her tales for children are charming.

INGERSOLL, ROBERT G., an American infidel, born at Dresden, N. Y., in 1833. He studied law and located at Peoria, Ill., where he soon became prominent in his profession and as a political speaker. Of late years he has devoted much of his time to lecturing against Christianity. His method is to caricature it and then ridicule the creation of his own fertile imagination. By his brilliant oratorical powers and keen sense of humor he has drawn large audiences to hear him, and his lectures have undoubtedly proved profitable financially (an admission fee is always charged), although their coarse blasphemy has shocked the more sober-minded part of the community. For several years I. has resided at Washington, D. C.

INGLIS, THE RIGHT HON. JOHN, an eminent Scottish lawyer, son of the Rev. Dr. Inglis, a minister of the Established Church, was born in 1810, and studied at Glasgow and Oxford. He was called to the Scotch bar in 1835, was made Solicitor-General for Scotland in 1852, and shortly afterwards became Lord Advocate. He was appointed Lord Justice-Clerk of Scotland in 1858, and in the same year was returned for Stamford. In 1859 he was made D.C.L. and a member of the Privy Council. He was appointed Lord Justice-General and President of the Court of Session in 1867, and Chancellor of Edinburgh University in 1869. I. is one of the keenest, strongest, and most legal intellects adorning the Scotch Bench.

INGRAHAM, JOSEPH H., born at Portland, Me., in 1809. He engaged in mercantile pursuits, then taught in the South, and afterwards entered the ministry of the Protestant Episcopal Church and became rector of a church at Holly Springs, Miss. Among other works he published *Prince of the House of David*, *Pillar of Fire*, and *Throne of David*. Died in 1866.

IN'MAN, HENRY, an American artist, born at Utica, N. Y., Oct. 28, 1801. Early in life he turned his attention to art, studied under Jarvis, and soon gained a brilliant reputation as a portrait-painter. After having resided at Boston and Philadelphia, he traveled abroad for his health. In 1845 he returned to America, and soon afterwards died. Besides many portraits, he executed the following well-known works: *Birnam Wood*, *Rydal Water*, *Lake of the Dismal Swamp*, *Rip Van Winkle Awaking*, *Scene from the Bride of Lammermoor*, and *Mumble the Peg*.

INN'ES, COSMO, was born September 9, 1798, at Durris, on Deeside, Aberdeenshire, England, admitted to the bar in 1822, became Sheriff of Morayshire in 1840, and occupied that position with much credit until 1852, when he was appointed Clerk to the Second Division of the Court of Session. I. was elected to the Chair of History in the University of Edinburgh in 1846. In the labors of the Bannatyne, Maitland, and Spalding Clubs he took a prominent part, the fruits of which were shown in the collating and editing of nearly all the Chartularies of the religious houses. His patient study of public records and contemporary documents is seen to greatest advantage in *Scotland in the Middle Ages*, and in *Sketches of Early Scottish History*, whilst his keen insight into the political and ecclesiastical constitution of antique Scotland may be judged from his introduction to the first volume of *Scots Acts*. From 1865 until his death at Killin, July 31, 1874, he was chiefly engaged in preparing for the press the *Rescinded Acts*, in indexing the folio edition of the *Acts of the Scots Parliament*, a task for which his incomparable skill in deciphering and extracting the meaning of old writings rendered him peculiarly fit, and in preparing for the press his *Lectures on Scottish Legal Antiquities* (1872). Shortly before his death he wrote a brief and appreciative memoir of Dean Ramsay. See *Memoir of C. I.* (Edinb. Paterson, 1874).

IN'NESS, GEORGE, an American artist, born at Newburg, N. Y., May 1, 1825; studied engraving, but was compelled to renounced it on account of ill-health; and then turned his attention to landscape-painting, in which he soon rose to fame. Among

his best-known works are the following: *Peace and Plenty, The Sign of Promise, A Vision of Faith, The Valley of the Shadow of Death,* and *The Apocalyptic Vision of the New Jerusalem and the River of Life.*

IN'OSITE ($C_6H_{12}O_6$), a variety of glucose found in certain animal organs and in the unripe fruit of certain plants. Its prismatic crystals dissolve in water; and though not fermenting in yeast, it undergoes lactic fermentation when in contact with cheese or flesh.

INTERNA'TIONAL, The, a cosmopolitan association of trades unions, which has spread its ramifications throughout Europe, and whose primary principle was not political but social revolution, was organized at London in 1862, the year of the International Exhibition, 'to establish common interests among the working classes in different countries of the world.' At a meeting attended by delegates of ten nationalities held at St. Martin's Hall, London, September 28, 1864, under the presidency of G. Odger, a new character—that of political action—was imparted to the society by its voting the publication of the revolutionary statutes and manifestoes of Dr. Karl Marx, whose programme of administration was finally adopted, in preference to those of Mazzini and Bakunin, at meetings held in the four following years at Geneva, Lausanne, Brussels, and Basel. In 1868, the French branch of the I. was prosecuted by the Government, the names of Assi, Duval, and nine other leaders of the subsequent Paris Commune first emerging in the course of this trial. Among the avowed aims of the advanced members of the I. at this period should be noted the abolition of marriage, religion, and inheritance, and the constitution of land as collective property; while its workings were shown in the support of the Paris bronze-workers in their strike of 1867, and of the Geneva builders in 1868, by English trades unions, the latter in turn being upheld in their strikes by the prohibition on the part of the I. against the importation of cheap labor into England from the Continent. With the struggle of the Paris Commune in 1871, the I. may be said to have at present culminated. At a meeting held at the Hague, September 4, 1872, Marx, the president, denounced Favre as a wretch and Trochu as a traitor, and a resolution was passed expressing 'admiration for the heroism of the champions who have fallen for the rights of the people,' and sending 'a greeting to all those who are still in chains.' Still, these sentiments failed to find favor with a large body who desired simply an international trades union, while the leaders were bent on political revolution in their own communistic sense, and two days later the congress broke up in dissension, the English, Swiss, Spanish, and Italian delegates forming a European confederation apart from the extreme section, which, under Marx and the French Communists, has transferred its headquarters from London to New York. Except in Spain, where in 1873 Internationalist revolts broke out in Murcia, little has been heard during the last five years of the society. Its members are stated to be still on the increase in Europe; but in America, though possessing branches in most of the large cities, the I. cannot be said as yet to command a numerous or influential following, only 2000 persons taking part in the 'demonstration' held at New York, December 17, 1871. See Onslow Yorke, *The Secret History of the I.* (Lond. 1874).

IN'TROIT, music sung in the Roman Catholic service while the priest goes to the altar to celebrate the mass, and that sung in the corresponding part of the Anglican service.

IN'ULA, a genus of the *Compositæ* family, numbering some fifty species, of which six are natives of England, notably the ploughman's spikenard, the golden samphire, and the flea-bane; whilst elecampane is perhaps only naturalized from former cottage-garden cultivation.

IN VENTRE SA MERE, a term in English law denoting an unborn child. It is especially applied to the fœtus whose father dies before its birth. A child so born has the same legal rights as if born during the lifetime of its father.

IO'DOFORM (CHI^3), is a substance which is analogous in composition to chloroform, but differs from it in properties: it has been used in medicine in cases of neuralgia and sciatica, and in certain virulent diseases. It is prepared by acting on alcohol, and many other bodies, with iodine and potash. It is obtained in yellow crystalline scales, and has a peculiar smell. It is insoluble in water, but dissolves in chloroform and in ether, and sparingly in alcohol.

IONIA, a town of Ionia Co., Mich., on Grand River and the Detroit & Milwaukee and the Detroit, Lansing & Lake Michigan railroads. It is in the midst of an agricultural and lumber region. Pop. 4327.

IOWA COLLEGE, at Davenport, Ia., founded in 1847 by joint action of Congregationalists and Presbyterians, but since 1852 under the control of the former alone. In 1860 it was removed to Grinnell, Poweshick Co., where a colony of Eastern people had become established.

IPSWICH, in Essex Co., Mass., on the Ipswich River and the Eastern Railroad, 27 miles from Boston. It is engaged in manufacturing woollen and cotton hosiery. Pop. 4300.

IRIS, in physiology, is a muscular curtain in the eye, perforated by a hole known as the pupil. The I. is formed of involuntary muscular fibres arranged in two sets—(1) A radiating set, under the control of the sympathetic nerve, which on contraction dilate the pupil; and (2) a circular set, found chiefly near the margin of the pupil, under the control of the third cranial nerve, which have the effect of contracting the pupil. These fibres, through their nervous supply, are stimulated to contract by the action of light on the retina of the eye. Thus the amount of the dilatation of the pupil is regulated by the strength of the stimulus of light. With a strong light the pupil contracts, and with a weak light the pupil dilates. Certain substances have a definite action on the I. Thus atropine, the active principle of Belladonna, dilates, while physostigmine, the active principle of Calabar bean, contracts it. The functions of the I. are—(1) to regulate and moderate the amount of light passing into the eye; (2) to correct the defect of spherical aberration by cutting off the outer rays of the pencil of light; (3) to assist in accommodation for near objects by contracting and thus cutting off the outer divergent rays. Without the intervention of the I., these outer rays would, by the sphericity of the cornea and lens, be brought to a focus in front of the retina, and thus there would be an uneven or blurred image.

IRONTON, a city of Lawrence Co., O., on the Ohio River, 145 miles above Cincinnati. It has several railroads; is engaged in iron and coal mining; carries on an important river commerce; and has iron manufactories, machine shops, nail mills, and tool works. Pop. 10,500.

IRVING, John Henry Brodribb, a modern actor, was born February 6, 1838, and made his first appearance on the stage at Sunderland, September 29, 1856. He received a ten years' theatrical training in provincial theaters, playing successively in Edinburgh, Glasgow, Manchester, and Liverpool. His first London engagement was as Doriconrt in the *Belle's Stratagem,* at the Lyceum Theater. In the popular comedy of the *Two Roses* he played Digby Grand for three hundred nights at the Vaudeville. On November 20, 1871, he appeared at the Lyceum as Mathias in *The Bells,* a performance which caused a great sensation. At the last-named theater he appeared as Charles I., Richelieu, Eugene Aram, Hamlet, Macbeth, Othello, and Richard III., with great approbation. His first provincial tour in 1876 was an almost unprecedented triumph. In his Shakspearian impersonations he has shown a tendency to break through stage tradition, and may be regarded as the leader of the Realistic school. Critics differ as to the merits of these performances, but all agree that he is an actor of striking force and singular originality. In melodrama he has no living rival.

IS'ATIN ($C_{16}H_{10}N_2O_2$), the body produced by boiling indigo with nitric acid till the blue color disappears through oxidation. Brilliant red prismatic crystals form when the hot solution cools. It is soluble both in alcohol and in water, and turns violet on addition of an alkali.

IS'CHIUM is the name given to a portion of the innominate or pelvic bone. It forms the posterior and lower portion of this bone (in man), and in the sitting posture the body rests chiefly on the two ischia.

ISHPEMING, in Marquette Co., Mich. It has two railroads; and iron, marble, gold, and silver are found in the neighborhood. The iron mines of the vicinity are very profitable. Pop. 8763.

IS'MAELITES (*Ismaili*), a branch of the Mohammedan sect of the Shiites, or upholders of the claims of Ali to the califate, derived their name from Ismail (*circa* 722 A.D.), the seventh Imaum in descent from Ali. They seem to have existed under the early Abbasides, but were first organized in the 10th c. by Abdallah Ibn Maimun, a Persian, to whose influence may be ascribed the singular compound of Islamism and Zoroastrianism observable in the tenets of the I. This Abdallah preached the advent of a Messiah who should be greater than Mohammed, and by his esoteric interpretation of the Koran laid himself and his followers open to charges of atheism and immorality. The I. in their turn gave birth in the 11th c. to the Assassins; and by the remnants of that sect, after its suppression in 1272, Ismaelite doctrines have been handed down to our own time. At present there are the Syrian I. of Massyad, and the Persian I. of Rudbar in Khorassan.

ISMAIL PASHA, Khedive of Egypt, second son of Ibrahim Pasha, was born in 1830, and educated at Paris. He became general-in-chief of the Egyptian army in 1862, and succeeded his uncle, Said Pasha, as fifth viceroy in 1863, securing in 1866, by enormous presents to the Porte, a direct line of succession for his house. In the same year he sent 30,000 troops

to subdue the insurrection in Crete. In 1867 he received the title of Khedive. His assumption of sovereignty, and the regal style in which he entertained several crowned heads and 10,000 guests at the opening of the Suez Canal in 1869, excited the jealousy of the Sultan, and he was ordered to reduce his naval and military establishments. By a firman in 1873, however, he obtained complete control over his army, and several important concessions. Meanwhile, ostensibly to suppress the slave trade, he had sent various expeditions far southwards along the basin of the Nile, which greatly extended his sway. He employed many foreigners in the embellishment of his capital, and spent excessive sums for civil and warlike purposes. Notwithstanding the huge capital raised by him by loans in 1868 and 1873, his finances were in 1876 in so unsatisfactory a condition that he was compelled to sell his Suez Canal shares to the British Government, who sent Mr. Cave, as special commissioner, to investigate his accounts. Neither this mission nor that of Mr. Goschen and Monsieur Joubert later, in the interest of the British and French bondholders, restored his credit in any great degree. In the war of the Turks with Servia in 1876, and with Russia in 1877, he rendered the Porte active military assistance.

ISOCAR'DIA, a genus of *Lamellibranchiate* Molluscs, belonging to the family *Cyprinidæ*, and familiarly known as 'heart-cockles' from the form of the shells, the beaks of which are widely separate, and of sub-spiral arrangement. *I. cor* is a familiar species. These shells are first found as fossils in the Triassic rocks, and are very abundant in the Oolitic formations and in the Chalk system.

ISOCLIN'IC and ISOGON'IC LINES are lines of equal magnetic inclination and declination respectively.

ISTH'MIAN GAMES, forming one of the four Pan-Hellenic festivals, derived their name from the Corinthian Isthmus on which they were celebrated in honor of Poseidon (Neptune). The temple of Poseidon was situated at the narrowest part of the isthmus, and near it were the theater and stadium of white marble. This festival was said to have been instituted by Sisyphus and restored by Theseus, and was originally held every eighth year, but after Olymp. 49 every third year. The games were the same as those held at Olympia, including, besides athletic exercises and horse and chariot racing, contests in music and poetry. Victors were crowned with a simple pine-garland, and their statues were placed in the famous temple, while their envied success reflected high honor alike on their family and birthplace. The management of the games was conducted by the Corinthians, but certain honorable distinctions were reserved for the Athenians. In 228 B.C. the Romans were privileged to take part in the games, and it is conjectured that soon after the time of Cæsar, there began to be introduced fights with wild beasts. At a late period of the Roman Empire the games had been sunk into coarse gladiatorial shows, but they continued to be celebrated till the 4th c. A.D.

IT'RI, a town of S. Italy, in the province of Caserta, half-way between Fondi and Gaeta, is a poor but picturesque place, with a ruined castle, and is best known in connection with Fra Diavolo, who was born here in 1760. Pop. (1871) 6542.

I'TU, or Y'TU, a town of Brazil, in the province of São Paulo, 3 miles from the S. bank of the Tiete, and 48 N.W. of São Paulo, is a thriving center of agricultural produce, and has some fine churches, two convents, a lazaretto, &c. Large quantities of sugar are produced in the neighborhood, and I. has celebrated breeds of horses and mules. Pop. about 10,000.

IVAN'OVA, a village of Russia, on the river Uvod, in the government of Vladimir, 215 miles N.E. of Moscow, in a territory possessed by the Counts Sheremetieff since 1714. From the extent of its manufacturing industry, I. has been called the Russian Manchester. It has itself 130 calico factories, annually preparing one million pieces, and as the center of the cotton manufacture of Russia, gives employment to 50,000 operatives here and in the surrounding district, producing goods yearly to the value of 2⅛ million pounds sterling. Pop. (1870) 6000.

IXI'ON, according to early Hellenic tradition, was a Thessalian prince, and king of the Lapithæ or Phlegyes. After his marriage with Dia he treacherously murdered her father, Deïoneus, who had demanded certain bridal gifts. All the gods were indignant, but Zeus purified him of the crime, after which the ingrate strove to win the love of Hera. Zeus created a phantom resembling her, and by it I. became the father of the Centaurs. For his lust and treachery he was chained by Hermes to a winged or fiery wheel, which whirled perpetually in the lower world or in the air.

IXMIQUIL'PAN, a town of Mexico, in the state of Hidalgo, on the river Montezuma, 80 miles N. of the city of Mexico. In its vicinity are several silver-mines, owned by English companies. For several months in 1861 it was the headquarters of General Zuloaga, who claimed to be President of the Republic. Pop. 10,000, mostly Otomi Indians.

IZUCAR', a thriving town of Mexico, in the state of Puebla, near the base of Popocatepetl, and in the rich valley of the Mescala. It is the S. terminus of a railway from Puebla (constructed in 1875), and has a trade in the sugar and other products of the country. Pop. 12,000. General Matamoros gained a great victory at I. over the Spaniards, 24th February 1812.

J.

JABORAN'DI, a plant of the natural order *Rutaceæ*, said to be the *Pilocarpus pennatifolius* of Lemaire. An alkaloid named *Pilocarpine* has been extracted from the leaves and bark, and in lesser quantity from the wood, by Mr. Gerrard; and experiments on the lower animals showed the following results:—A $\frac{1}{10}$th of a grain injected into the jugular vein produced profuse salivation almost instantly, caused a retardation of the heart's action, and had a marked influence on the blood pressure. In frogs, the smallest doses produced an extremely viscid condition of the skin; larger doses, well-marked neurotic symptoms, and larger still, powerful tetanic spasms. J. applied to the eye contracts the pupil. More recent experiments show that J. has powerful chologue properties, and hence its denomination *vegetable mercury*. In the human subject J. is the most powerful sialogogue and sudorific known. See *Year-Book of Pharmacy* (Lond. 1875), *Edinburgh Medical Journal*, article J., by Dr. W. Craig (1876).

JAB'UA, the capital of the State of the same name, in connection with the Bheel Agency in Central India, 92 miles W. from Mhow. Area of the *state*, 1500 sq. miles; pop. 55,000, mostly Bheels; revenue, £25,000; tribute, £147. The chief is a Rajput, who was loyal during the Mutiny; he is tributary to Holkar.

JACITA'RA PALM (*Desmoncus macracanthos*), one of a genus peculiar to tropical America. The flexible stems climb or trail 50 or 60 feet, and the hooked spines of the leaves are a great annoyance to the traveler. The Indians plait strips of the stems into strainers to extract the poisonous juice from the mandioc.

JACKSON, Abraham Reeves, a distinguished American surgeon, born at Philadelphia, Pa., June 17, 1827, graduated from the Central High School of Philadelphia, Pa., in 1846, and received the degree of M.D. from the Pennsylvania Medical College, Philadelphia, in 1848. He practiced his profession at Strandsburg, Pa., and in 1870 removed to Chicago, Ill., where he took an active part in founding the Woman's Hospital of Illinois, and was made its surgeon-in-chief. He has published numerous papers upon medical themes of great value to the profession.

JACKSON, William, an English composer of great originality and grace, was born at Exeter, May 1730, studied under Travers of the Chapel Royal in London, and returning to his native city, was appointed organist of the cathedral in 1777. He published four collections of vocal and one of instrumental music, besides three operas, and was the author of *Thirty Letters on Various Subjects, On the Present State of Music*, &c. J. was also a landscape painter, closely following his friend Gainsborough. He died at Exeter, 12th July 1803.

JACKSON, in Madison Co., Tenn., on Forked Deer River and the Illinois Central and Mobile & Ohio railroads. It is a cotton market for several adjoining counties, and railroad repair shops are here located. Pop. 7500.

JACK'SONVILLE, a city of Illinois, situated in a fertile prairie, near the Mauvaiseterre Creek, a branch of the Illinois

River, 30 miles W. of Springfield by rail. It is known as the 'Athens of the West,' and among its public buildings are various State asylums and the Illinois College (Congregational), Illinois Female College (Methodist), Illinois Conservatory of Music, &c. Its industries in woollens, ironwares, and flour are rapidly developing. Pop. (1880) 10,928.

JACKSONVILLE, a city of Duval Co., Fla., on the St. John's River, and the terminus of three railroads. It is a popular winter resort, and is engaged in commerce and carries on an extensive lumber trade. Pop. 7648.

JACOBABAD, or KHANGURH, the chief town of the Upper Frontier district, Scinde, British India, near the border of Beluchistan, about 200 miles N. of Hydrabad. Pop. (1872) 10,714. It contains the cantonments of the Scinde Horse and Jacob's Rifle Regiment. The town was founded in 1847 by General Sir J. Jacob, to whom it owes its excellent roads, canals, and public buildings. It contains the stone mausoleum of its founder, who died here in 1858. See *Gazetteer of Scinde*, by A. W. Hughes (Lond. 1874).

JAC'OBUS, MELANCTHON WILLIAMS, D.D., LL.D., an American scholar and theologian, born at Newark, N. J., Sept. 19, 1816; graduated from the College of New Jersey, 1834; and graduated from Princeton Theological Seminary, 1838. He was instructor in Hebrew in Princeton Seminary, 1838–39; was called to a church in Brooklyn, 1839; and in 1851 was made Professor of Oriental and Biblical Literature in Alleghany Theological Seminary. He has published a series of popular commentaries on the New Testament, and a commentary on Genesis. Died at Alleghany, Pa., Oct. 28, 1876.

JAGELL'O, or JAGJELL'O, born in 1354, succeeded his father, Olgerd in 1381 as Grand-Duke of Lithuania. In 1386 he received the crown of Poland as Vladislav II., being chosen by the Polish nation husband to Hedwig, daughter of Lewis the Great of Hungary, on condition of renouncing and abolishing paganism. He founded the bishopric of Wilna and the University of Cracow (hence called the 'Academy of J.'), gained a decisive victory at Tannenberg (1410) over the Teutonic knights, and died May 31, 1434. His two sons, Vladislav III. and Casimir IV., followed him in succession, and J. was thus the founder of the *Jagellon Dynasty*, which ruled Poland till the death of Sigismund in August 1572, and gave Hungary three kings, of which the two last were also kings of Bohemia. By the marriage of Sigismund II.'s sister, Catharina Jagellonika, with the Swedish king Johan III., was formed a female line of Jagellons in the House of Vasa, which gave Poland three kings.

JAMESTOWN, a rapidly growing town of Dakota, on a branch of the Northern Pacific Railroad. The country about it is being rapidly settled. Pop. 3400.

JAMESTOWN, the first settlement of the English in the United States. On April 26, 1607, three vessels, bearing a company of 107 English colonists, under Wingfield, Christopher Newport, and Bartholomew Gosnold, sailed up the James River, Va. On the 13th this little band began the building of Jamestown, which, as well as the river upon which it was situated, they named in honor of England's reigning sovereign. The only remaining vestiges of this settlement to-day, are the ruins of a fort and a few houses.

JANAUSCHEK', FANNY, a distinguished actress, born at Prague, Bohemia, July 20, 1830. Educated for the stage, she, early in life, developed great tragic force. She has several times visited America, and has met with brilliant success, particularly in Shakspearian plays.

JANNY, SAMUEL M., an American author and member of the Society of Friends, born in London Co., Va., Jan. 11, 1801. Among other works he has published *The Country Schoolhouse*, a poem (1825), *Conversations on Religious Subjects* (1835), *Historical Sketch of the Christian Church* (1847), *Life of Penn* (1852), *Life of Fox* (1855), and *History of the Friends* (1867). Died April 30, 1883.

JAN OF LEYDEN (properly JAN BOCKELSON or BOCKOLD), born at Leyden about 1510, was a tailor in his native town, where he also kept an inn, amusing his guests with his poetry and acting. Making the acquaintance of Jan Mathison of Haarlem, a baker, in 1533, he accompanied him to Münster, where he soon became the chief of the Anabaptists. After his friend's death in 1534, B. was proclaimed king of 'the new Zion,' and gave himself out as a prophet. In order to marry Mathison's widow he introduced polygamy, and had at last seventeen wives. He lived with great magnificence, and practised the utmost cruelty. Considering himself the founder of the millennium, this madman sent out twenty-eight apostles, and appointed twelve 'dukes' to rule the world under him. The town was long besieged in vain by the Bishop of Münster, but was taken (24th June 1535) after a valiant defence; B. was seized with his ministers Knipperdolling and Krechting, and put to death, 23d January 1536.

JASPER, WILLIAM, an American patriot, born in South Carolina, about 1750. At the outbreak of the Revolution, he entered the Continental service, and at the bombardment of Fort Moultrie by the British, won distinction by leaping through an embrasure, and in the face of a severe cannonade, recovering the State flag, which had been shot away. Governor Rutledge was so impressed by the gallantry of the action, that he presented Jasper his own sword. He was killed Oct. 9, 1779, in an assault upon Savannah.

JAT, JUT, or JAUT, the name of the dominant tribe throughout the Punjaub, also found in Scinde, Rajputana, and the N.W. Provinces. In religion the Jats are indiscriminately Mohammedans, Hindus, or Sikhs, but the first of these three form the majority. In physiognomy they are decidely Aryan, and they make excellent soldiers. Their methods of cultivation are good, and they are also breeders of cattle and camels. The democratic village community exists among the Jats in its full perfection. Their language is a derivative of Sanscrit, not widely differing from the Hindi. A plausible theory assigns to the Jats a Scythic origin. See Campbell's *Ethnology of India*, in the *Journal of the Asiatic Society* for 1866.

JAY, WILLIAM, LL.D., son of John, born in New York, N. Y., June 16, 1789, and distinguished for his efforts to promote the cause of abolition and that of temperance. He was an active member of the anti-slavery, and for many years president of the peace society. He published several works, relating to these subjects. Died Dec. 27, 1853.

JEFFERSON, a city of Morgan Co., Tex., at the head of navigation on Big Cypress Bayou, which opens into the Red River. It is an important commercial center, and annually sends to New Orleans large quantities of cotton, beef, tallow, and wool. It was first settled in 1843, and is a place of rapidly growing importance. Pop. 5000.

JEFFERSON, JOSEPH, an American comedian, was born at Philadelphia, Feb. 20, 1829, and became an actor when very young. His *Rip Van Winkle*, which has been played almost continually since its first production at the Adelphi Theater, London, 1865, is admired as much in England as America as one of the finest of modern dramatic creations.

JEFFERSONVILLE, a city of Clarke Co., Ind., on the Ohio River. It is connected with Louisville, Ky., which is on the opposite bank of the Ohio, by a railroad bridge. It has excellent shipping facilities, extensive manufactures, and contains the Southern State penitentiary, and a large government depot of supplies. Population, 10,422.

JEFF'REYS, GEORGE, BARON, was born at Acton, Denbighshire, in 1640, educated at Shrewsbury and Westminster, entered the Inner Temple, and commenced pleading without being regularly called to the bar at Kingston Assizes in 1666. A drunkard and bully, but of quick and vigorous parts, he won an extensive Old Bailey practice as a Roundhead and persecutor of the Catholics. In 1677, however, he turned renegade, found a patron in James Duke of York, was knighted, and the year after appointed Recorder of London. Created successively King's Sergeant, Chief Justice of Chester, and baronet (1681); J. acted as crown's counsel or judge against Russell and Sydney, Baxter and Oates, was made Chief Justice of the King's Bench in 1683, and on the accession of James II. was raised to the peerage with the title of Baron J. of Wem. In the 'Bloody Assize' that followed Monmouth's revolt, J. found work after his own heart, hanging 350 prisoners and transporting 841 as slaves to the plantations. For these services he was rewarded by the Lord Chancellorship. He showed himself a ready tool to all the king's misdeeds, notably as head of the new High Court of Commission (1686), and in the trial of the Seven Bishops (1688). He sought to follow James's example of flight, but was caught disguised as a sailor in Wapping, and committed to the Tower, where he died, April 18, 1689.

JEHAN'ABAD, (1) a town of India, in the district of Burdwan, with a pop. (1872) of 13,409, is a center of the weaving trade; (2) a town in Gya District, India, with a pop. (1872) of 21,022, is also the home of cotton-weavers and of general commerce.

JEHANGIR' (*Jahangir*), a Moghul emperor who reigned at Delhi from 1605 to 1628. He was the son and successor of the great Akbar, and it was in his reign that the Rajputs first submitted to the Mohammedan power. J. himself married a Rajput princess; but his better-known wife was the beautiful Nur Jehan, whose name was placed on the imperial currency, and who lies buried with him in a marble mausoleum near Lahore.

JEISK, a town in the country of the Kuban Cossacks, in Cis-Caucasia, Russia, on a tongue of land between the Sea of Azov and the river Jeja, 50 miles S.W. of Taganrog, was founded in 1849, and is in a very flourishing state, being an agricultural center, with a pop. of 16,747.

JELLINGHI (*Jalangi*), a river of Bengal, the second offshoot of the Ganges, which branches off from the main stream at the

village of J., and joins the Bhagirutti at Nuddea to form the Hooghly. It is the least obstructed of the direct river routes to Calcutta; the annual boat-traffic is about 30,000 tons a year.

JELL'YFISH, the name given popularly to *Cœlenterate* animals belonging to the class *Hydrozoa*, and to the section *Discophora*. They are very common in the summer season around the British coasts. Each J. is a clear glassy bell, the clapper being represented by the *manubrium* or mouth of the animal. The smallest J. are the floating reproductive bodies of Zoophytes, the true J. or *Medusidæ* corresponding to the 'Naked-eyed' Medusæ of the earlier zoologists.

JENNER, Sir William, Bart., was born at Chatham in 1815, and was educated at University College, London. In 1844 he graduated as M.D., and four years later was appointed Professor of Pathological Anatomy in the University College. In 1852 he was elected Fellow of the Royal College of Physicians, and in 1862 was gazetted Physician in Ordinary to the Queen, and in the same year became Professor of the Principles and Practice of Medicine at the University College. In 1863 he was appointed Physician to the Prince of Wales, whom he attended during his severe illness in 1871–72. In recognition of his services then rendered he was made a K.C.B., having previously been created a baronet in 1868. He has written several papers of medical interest, and is widely known as the first who established that typhus fever and typhoid fever differed in kind.

JE'SI (the ancient *Æsis*), a town in the province of Ancona, Italy, 17 miles S.W. of the town of Ancona, with important manufactures of paper, silk, linen, and woollen hosiery, and trade in wine and olives. J. was the birthplace of the Romano-German Emperor, Friedrich II., and of Spontini, the composer. Pop. (1871) 13,472.

JEV'ONS, William Stanley, an English political economist, was born at Liverpool in 1835, and educated at University College, London, where he graduated in 1862. In 1866 he was appointed Professor of Logic, Mental and Moral Philosophy, and Cobden Lecturer in Political Economy, in Owen's College, Manchester, and in 1875 received the honorary degree of LL.D. from Edinburgh University. He has written several pamphlets bearing upon questions of political economy, but is best known by his *Elementary Lessons in Logic* (1870), and *Principles of Science* (1874).

JEW'EL, John, an English Protestant divine, born 24th May 1522, at Berrynarbor, Devonshire, entered Merton College, Oxford, at the early age of thirteen, but migrated to Corpus, whence he took his B.A. degree in 1540, and became a tutor of that college. On the accession of Edward VI. J. openly professed the Reformed faith, which he had previously practised in secret, and he acted as secretary to Peter Martyr on occasion of a public discussion at Oxford between the latter and certain Catholic divines. In 1551 he took his B.D., and at the same time obtained the living of Sunningwell, Berks, only to lose it in 1553 on the restoration of Catholicism by Mary. A temporary recantation was followed by flight, and for four years J. lived in exile at Frankfurt and Strassburg, at the latter place acting as vice-master of a college founded by his old friend Peter Martyr. Returning home at Mary's death, he was made Bishop of Salisbury by Elizabeth in 1559, and in that position signalized himself by his animosity to the old religion, and specially by a challenge, issued in a sermon preached at Paul's Cross, to produce a single writer of the first six Christian centuries who held the tenets of the Roman Church. This led to a controversy between the Jesuit Harding and himself, in the course of which he published his *Apologia Ecclesiæ Anglicanæ* (Lond. 1562), which has been translated into six different languages. J. died at Monkton Farleigh, Wilts, 21st September 1571. His *Works* have been edited by Dr. R. Jelf (8 vols. Oxf. Clar. Press, 1847).

JEWELL, Marshall, an American statesman, born at Winchester, N. H., Oct. 20, 1825. He was at first a tanner, but in 1850 engaged in business in Hartford, Conn., in which he was very successful. During the civil war he was an ardent supporter of the Union. He was elected governor of Connecticut in 1869, 1871, and 1872; was U. S. minister to Russia, 1873–74; and was made postmaster-general in 1874. Died at Hartford, Conn., Feb. 10, 1883.

JIKAD'ZE, or SHIKAT'ZE, the capital of the district of Zang, in Tibet, on the right bank of the Zangbo, 190 miles W. of H'Lassa. It contains a number of palaces, temples, and tombs, richly ornamented. The chief building is an immense palace or temple, the residence of one of the principal lamas, who has a suite of over 4000 persons. Pop. supposed to be about 100,000.

JOC'ELIN OF BRAKELOND, a Norman Englishman, native of St. Edmundsbury, who lived in the reign of King John, was monk and chaplain of the monastery of his native place. He wrote *Chronica Jocelini de Brakelonda* when in that position, recording the deeds of Abbot Samson, his superior, in a 'kind of monk or dog-Latin.' Carlyle in *Past and Present* gives a vivid, if occasionally strained, account of his book and contents, comparing him to Boswell, and describing him as a man 'of patient, peaceable, loving, clear-smiling nature.' 'Then also he has a pleasant wit.' See *Chronica*, edited by J. G. Rokewood (Camden Society, London, 1840).

JOHANN' VON SCHWABEN, also called Johann the Parricide, born about 1288, was the son of Rudolf, Duke of Swabia, and grandson of Rudolf, Duke of Habsburg. His uncle, the Emperor Albrecht I., having refused to make over to him, on his coming of age, the Duchy of Kyburg, which he had inherited from his mother Agnes, a Bohemian princess, J. conspired with some other Upper Swabian knights and killed him near Windisch, while he was crossing the river Reuss on an expedition to punish the mountaineers of the three rebel cantons of Switzerland. The conspirators fled, and all, save one Von Wart, died in wretchedness and obscurity, J., it is said by some, as a monk at Pisa in 1360.

JOHN I., afterwards canonized, was Pope from 523 to 526. Sent on a successful mission to the emperor at Constantinople by the Arian king Theodoric, he was nevertheless thrown into prison at Ravenna on his return, and died there.

JOHNSON, Bushrod R., a Confederate general, born in Ohio, Sept. 6, 1817, and graduated from West Point in 1840. He served in the Mexican war, and at the outbreak of the civil war, entered the Confederate service, and was made brigadier-general. He was engaged at Fort Donelson; was wounded at Shiloh; and was in command of a division at the time of Gen. Lee's surrender. He was promoted to the rank of major-general in 1864. Died in Illinois, Sept. 11, 1880.

JOHNSON, Eastman, an American artist, born at Lovell, Me., July 29, 1824. In 1845 he went to Washington, D. C., and soon acquired reputation by the merit of his works. In 1846 he removed to Boston, and in 1849 visited Düsseldorf, where he studied for a year. In 1858 he took up his residence in New York City. Among his numerous works the following are the most prominent: *The Card Players*, *The Savoyard*, *The Old Kentucky Home*, *The Drummer Boy*, *The Pension Claim Agent*, *The Boyhood of Lincoln*, *The Stage-Coach*, *The Kitchen at Mt. Vernon*, *Drop on the Sly*, *The Chimney-sweep*, *Post-boy*, *Organ-boy*, and *Lady at Prayer*.

JOHNSON, Edward, a Confederate general, born in Chesterfield Co., Va., April 16, 1816, and graduated from West Point in 1838. He served gallantly in the Mexican war, and was promoted for valuable services at Chapultepec and the city of Mexico. In 1861 he resigned his commission, and entered the Confederate service. He was made brigadier-general in 1862, and major-general in 1863. He was in command of a division at Gettysburg, and, with his entire command, was taken prisoner at Spottsylvania. At the close of the war, he retired to his farm in Virginia. Died at Richmond, Va., Feb. 22, 1873.

JOHNSON, Herschel V., an American statesman, born in Burke Co., Ga., Sept. 18, 1812, graduated from the State University in 1834, and entered the legal profession. He soon gained prominence as a lawyer and politician. He was elected governor of Georgia in 1853, and again in 1855; and in 1860 was a candidate for Vice-President, running on the same ticket with Stephen A. Douglas of Illinois. In 1863 he was elected a member of the Confederate Senate, which position he continued to fill until the fall of the Confederacy. After the war he was elected U. S. Senator, but was not permitted to take his seat under the reconstruction acts. Died in Jefferson Co., Ga., Aug. 16, 1880.

JOHNSON, Reverdy, an American lawyer and statesman, was born at Annapolis, Md., May 21, 1796. He was admitted to the bar in 1815, elected a Maryland senator in 1821, was a U. S. senator 1845–49 and 1863–68, and Attorney-General of the United States 1849–53. In June 1868 he was sent as ambassador to London, where he negotiated a treaty on the Alabama Claims. This was, however, rejected by the Senate, and he was recalled in 1869. Died at Annapolis, Md., Feb. 10, 1876.

JOHNSON, Richard Mentor, an American soldier and statesman, born in Kentucky, Oct. 17, 1780, was educated at Transylvania University, and entered the legal profession. He was a member of Congress, 1807–19, and in 1813 raised a regiment of volunteers, and rendered brilliant service under Gen. Harrison at the battle of Thames, where he was severely wounded. He was a member of the U. S. Senate, 1819–29, and a member of Congress, 1829–37. In 1836 he was a candidate for the Vice-Presidency, running upon the ticket with Martin Van Buren for President. The election was thrown into the Senate, no candidate having a majority of the electoral votes, and Mr. Johnson was chosen Vice-President by that body. Died at Frankfort, Ky., Nov. 19, 1850.

JOHNSON, Thomas, an English botanist, was born at Selby in Yorkshire, brought up as an apothecary in London, the University of Oxford conferring on him the degree of doctor of

physic, and died in September 1644 from a wound received whilst fighting in the royal cause at Basing. He was the first who published an account of a botanical exploration in England (*Iter Cantianum*, 1629), the first who gave a catalogue of a defined botanizing ground (*Ericetum Hampstediense*, 1632), the first who separated British plants from foreign ones (*Mercurius Botanicus*, 1634), and from his greatly improved edition of Gerard's *Herbal*, describing 2850 plants (1633).

JOHNSTON, Albert Sidney, an American general, born in Kentucky in 1803, and graduated from West Point in 1826. In 1836 he resigned his commission in the army, and removing to Texas, entered the Texan army. Beginning as a private, he was rapidly promoted until he was chief in command. His last promotion led to a duel with Gen. Felix Houston, whom he succeeded, in which he was wounded. In 1838 he was made Secretary of War of Texas, and in 1839 led a successful expedition against the Cherokee Indians. In 1840 he became a planter, and in 1846 entered the U. S. service against Mexico, in command of a regiment of Texan volunteers. He served gallantly throughout the war, especially distinguishing himself at the battle of Monterey. In 1857 he commanded a U. S. expedition against the Mormons, in conducting which he showed much energy and prudence. In 1861 he resigned his commission, and entered the Confederate service. He commanded the Confederate army at the battle of Shiloh, and was killed on the first day of that action, April 6, 1862.

JOHNSTON, Joseph Eccleston, an able Confederate general, was born in Virginia, February 1807. In 1829 he entered the U. S. army. He served as captain of engineers in the Mexican war and became a colonel. In 1860 he was made quartermaster-general, resigning April 22, 1861, to enter the Confederate service. He led the Southern soldiery at Bull's Run, and in the spring of 1862 held the command at Richmond. Wounded at Fair Oaks, May 31, 1862, on his recovery he was made general of the army in Tennessee. Here and in Georgia he sustained a series of reverses, and finally was superseded by Hood, July 17, 1864. Later he was called to lead the scattered forces in Georgia, S. Carolina, and Florida, but was unable to stem Sherman's victorious march. On hearing of Lee's surrender of the main army he capitulated to Sherman, April 26, 1865. Since the war he has resided in Georgia actively laboring for the resuscitation of the shattered South. See his *Narrative of Military Operations* (New York, 1874).

JOHNSTOWN, a town in Pennsylvania, between the Conemaugh River in the N. and Stoney Creek on the S., 79 miles E. of Pittsburg by rail. It is on the Pennsylvania Canal, and has a rolling-mill and Bessemer steel work (in 1875 employing 6000 men), a wooden-mill, tannery, cement works, &c. The surrounding hills are rich in iron, bituminous coal, limestone, cement and fireclay. Here are the extensive works of the Cambria Iron Company. Pop. (1880) 8386.

JOHNSTOWN, in Fulton Co., N. Y., on Cayadutta Creek, and the Fonda, Johnstown & Gloversville Railroad, 4 miles from Fonda. It is engaged in mercantile pursuits and manufacturing, and has a large number of glove and mitten factories. Pop. 5013.

JOHORE', a Mohammedan state on the most southern point of the Malayan peninsula, 15 miles S. of Singapore, founded in 1511 by the inhabitants of Malacca, who had been driven out by the Portuguese. Area, 20,000 sq. miles; pop. 40,000 Malays and 60,000 Chinese. Exports, gambier, pepper, and tea. British relations with the Sultan of J. date from 1818; six years later he ceded the island of Singapore. The present ruler is a most enlightened prince, and has greatly developed the resources of the country. In 1866 he visited England, and was created a Maharajah. He has also received the orders of the Star of India, and of St. Michael and St. George.

JOLIET, a city of Illinois, on the Aux des Plaines River and the Illinois and Michigan Canal, 36 miles S.W. of Chicago by rail. It is the seat of the state penitentiary, perhaps the largest institution of the kind in the country, usually containing 1300 convicts, who are employed industrially. J. has an immense iron and steel work (employing some 2500 men), large building-stone quarries, cement works and brickfields. It is near the Wilmington coalfields, and draws an abundant water supply from sixteen artesian wells. Pop. 20,000.

JONES, Owen, the Mæcenas of Welsh literature, was born in the Vale of Myvyr, Denbighshire, in 1741, and came early to London, where he made a considerable fortune as a furrier in Thames Street, and where he died September 26, 1814. He founded the Gwyneddigion Society (1771), published an edition of the poems of Davydd ab Gwilym (1789), the *Myvyrian Archæology of Wales* (3 vols. 1801–7), &c., and formed a collection of transcripts of ancient Welsh MSS. (50 vols. 4to.), which is now in the British Museum.

JOPLIN, a city of Jasper Co., Mo., 336 miles W. of St. Louis. It has two railroads, and is engaged in lead and zinc mining, manufacturing, and agriculture. Pop. 10,000.

JORTIN, John, D.D., an English divine and author of Huguenot descent, was born at London, Oct. 23, 1698. Passing from the Charterhouse to Jesus College, Cambridge, he gained a fellowship in 1719, and was ordained priest in 1723, having already published a volume of Latin poems, *Lusus Poetici* (Camb. 1722). In 1727 he accepted the college living of Swavesey, Cambridgeshire, but resigned it the year following, and repairing to London soon attracted notice by his eloquent sermons. After holding the rectories of St. Dunstan-in-the-East (1751) and Eastwell in Kent, he was appointed in 1762 domestic chaplain to Dr. Osbaldeston, Bishop of London, who also gave him a prebend of St. Paul's, the living of Kensington, and in 1764 the archdeaconry of London. He died Sept. 5, 1770. Besides sermons, J. published eleven works, which have been issued in an uniform edition, and of which may be noticed *Remarks on Ecclesiastical History* (3 vols. 1751–54), *Life of Erasmus* (2 vols. 1758–60), and *Remarks upon the Works of Erasmus* (1760).

JOWAR' (*Jawar*), the chief town of the native state of the same name, in India, 68 miles N. of Bombay. It is an insignificant place, lying within the British district of Tanna. The *state* of J. has an area of about 534 sq. miles; pop. (1872) 37,406; revenue about £6000; no tribute is demanded, but a nuzzurana or relief of £2000 is paid to the British on the accession of the Rajah. Timber is the most valuable of the productions. The dynasty is said to have been very powerful when founded 500 years ago.

JOWETT, Rev. Benjamin, D.D., an English scholar and theological critic, born at Camberwell in 1817, was educated at St. Paul's School, London, and became a student of Balliol College, Oxford, in 1835, a fellow in 1838, and tutor in 1842, in which year he was also ordained. In 1853 he served on and compiled the report of a commission to consider the application of the competitive system to the Indian civil service, of which Macaulay and Lord Ashburton were also members, and in 1855 was appointed, through Lord Palmerston, Regius Professor of Greek. An article by J., *On the Interpretation of Scripture*, in the famous *Essays and Reviews* (1860), led to his trial and acquittal in the Vice-Chancellor's court on a charge of heresy. In 1870 he succeeded Dr. Scott as Master of Balliol, and in 1875 received from the University of Leyden the honorary degree of D.D. J. has published a commentary on three of the Pauline epistles (1855), a translation of the *Dialogues of Plato* (4 vols. Oxf. 1871; 2d ed. 5 vols. 1876), and an edition of the *Republic*. He is a refined, subtle, suggestive, but inconclusive thinker.

JUDGMENT, The Day of, the day foretold by Christ, when He shall reappear to judge solemnly and finally the entire human race. The prediction in St. Matthew xxiv. 14, glances at the approaching destruction of Jerusalem both as a warning to His hearers of the doom which their obstinate incredulity is bringing on themselves, and as a pledge to those who are soon to behold the fulfillment of His prophecy, that the Great Day, 'the end,' 'the consummation,' announced by Him shall surely come. The near approach of His own death, and the gathering in Jerusalem for the Paschal celebration of the dispersed Jews from all parts of the Roman Empire, imparted a touching solemnity to our Lord's last pregnant instructions, and of themselves suggested the scene and the motive of the Last Day, with the preceding resurrection and the bringing together men and angels on the theater of the Redeeming Sacrifice.

1. There are to be visible, striking, and unmistakable events, forerunners of this termination of the present order of things, and signs held up before the nations warning them to prepare for Christ's second coming. 'This Gospel of the Kingdom shall be preached in the whole world, for a testimony to all nations, and thus shall the consummation come' (Ibid.). He does not say that all nations shall accept the Gospel and enter into the bosom of the Church before the Last Day. But they shall hear the saving truths of Christianity fairly proposed to them, so that they shall have no excuse for rejecting Christ and refusing to profit by His salvation. 'Representatives of all nations will, however, come into the Church, and bow to the Kingly power of the Father.' With this event of the Gospel brought home to every tribe of earth is coupled the conversion of the Hebrew race. 'I would not have you ignorant,' . . . St. Paul writes to the Romans, 'of this mystery . . . that blessedness in part has happened in Israel, until the fulness of the Gentiles shall come in, and so all Israel should be saved' (xi. 25, 26).

Probably the reappearance on earth and the preaching of Enoch and Elias, will have for immediate purpose the bringing to the feet of the Saviour of the entire descendance of Jacob. The sublimest poetry is thus intimately mixed up with the mighty events which are to close the terrestrial history of mankind. 'Elias indeed shall come, and restore all things!' Christ says in answer to His disciples, who had just inquired, 'Why then do the

Scribes say that Elias must come first?' Yes, Elias shall come; nay, as the question was asked immediately after the Transfiguration, Christ adds: 'But I say to you that Elias is already come, and they knew him not.' This our Lord meant of John the Baptist, as we are positively assured in St. Matthew xi. 14. He was the living image of Elias. But this coming by proxy, and his transient appearance upon the Mount of Transfiguration, were only a reaffirmation of the traditional belief among the Hebrews, that Elias would indeed walk the earth once more and preach before the end of all things. St. Augustine, in his turn, re-echoes the prophesy of Our Lord, and that of Malachias iv. 5, 'Behold I will send you Elias the Prophet before the coming of the great and dreadful day of the Lord.' Another sign is the general revolt from Christ consequent upon the appearance among the nations of that dreadful power called Antichrist. There are other physical and moral convulsions described by Our Lord in the Gospel. Still, He will not allow any one of His disciples to fix the precise time for the coming Doom. 'Concerning that day or hour no man knoweth, not even the angels in heaven, nor the Son, but the Father.' Ever since the first age of Christianity, the most saintly and learned men in the Church, have been led away by the calamities of their own times to predict the nearness of the Last Day. It is a temptation to which many such men have yielded in our own.

The best biblical scholars of our day, profiting by the mistakes of their predecessors as well as by the light let in upon this difficult subject by modern criticism, take a broad view of the divine plan with regard to the labors of the church and the extension of the Kingdom of God, that is, of His rule over the minds and hearts of men of all nations. The church has not, until now, had a fair chance to preach the Gospel, and foster the growth of Christian life and civilization among the peoples of Central Africa, let alone the vast and swarming regions of Asia, the countless tribes of South America, and those who inhabit Australia and Oceanica. Steam, electricity, and the constant advance of geographical and ethnological science, are only preparing pathways for the missionary hosts of the near future.

As to the mysterious power so much and so fanatically discussed as 'Antichrist,' it is sufficient to say, that we may adopt safely in the nineteenth century the description of that power or its impersonation given by the Apostle St. John in the very first century of the Christian era. 'Little children, it is the last hour: and as you have heard that Antichrist cometh, even now there have become (*i. e.*, there have been) many Antichrists; wherefore we know that it is the last hour. . . This is Antichrist, who denieth the Father and the Son' (1 Ep. of St. John ii. 18–22). In chapter iv.: 'Every spirit which confesseth that Jesus Christ is come in the flesh, is of God: and every spirit that dissolveth Jesus, is not of God: and this is Antichrist, of whom you have heard that he cometh; and he is now already in the world.' The Docetic heresy in the last years of the Apostle's lifetime, taught that Christ bore only the semblance of our human nature; this denial of His humanity was made by several other cotemporaneous sects. This is what St. John meant by saying that 'many Antichrists' had already come. This spirit of error which denied in Christ the union of the two natures, divine and human, the Apostle rightly designates as Antichrist. This spirit continued to disturb the Christian world for centuries after St. John. It reappeared under one form or another in every century down to the eighteenth, when Voltaire boldly raised the Antichristian standard and made open war on revealed religion with the watchword *Erasons l'Infame!* His spirit has waxed more and more powerful in France and throughout the ancient Christendom ever since his day. The scientific materialism of England and the Continent goes further than Voltaire; and all the governmental forces of France and even Italy are now employed in openly dechristianizing education, and in killing the faith in Christ in the minds and hearts of the French and Italian populations. So the spirit of Antichrist is, to all seeming, more threatening, more powerful, more aggressive, more deadly, than at any former period. But the spirit of Christ is also abroad, possessing itself of all the forces of modern science and civilization, and firing men's souls to spread the reign of Christ into every land and among every tribe of human kind. That the day shall come—a far-distant day—when 'the Antichrist,' some one awful power or personage, will be permitted to try men's souls to the utmost, must be admitted by anyone who has studied carefully the letter of the New Testament writings, and the authorized interpreters of Holy Writ down to our own days. It is the belief of the Fathers, beginning with St. Irenæus, and ending with the latest Doctors of the Church, that the Antichrist of the last days is a real, individual personage. Before his brief reign, however, is to come the glorious spread of Christianity over the whole earth, an era of Christian progress and civilization such as the world has not yet beheld. As history ever repeats itself, to this epoch will succeed one of downward reaction, when man, lifted up to the highest degree of enlightenment and possessed of the most abundant and accessible means of enjoyment, will imitate the example of the patriarchal nations before the Deluge, consider themselves too great to obey God. The degeneracy which is to come after this era of progress and enlightenment, is predicted as 'a revolt,' as 'an opposition to' and 'a being lifted up above all that is called God or that is worshiped.' No wonder that some pious souls who read of Nihilist conspiracies, or of the bold Anarchist associations of our time, should consider that the motto of these last named rebels against all law and society, *Ni Dieu, ni Maitre*, 'no God, no Master,' should portend the near approach of Antichrist. But the end is not yet—'The mystery of iniquity,' St. Paul tells us (2 Thess. ii. 7), 'already worketh. . . And that WICKED ONE shall be revealed, whom the Lord Jesus shall kill with the Spirit of His mouth and shall destroy by the brightness of His coming.' There will be no mistaking this capital enemy of God and man. It will require the personal reappearance on earth of Christ Himself to annihilate the impostor. Christian Art has left us one magnificent representation of this coming and of the gigantic impiety which is to be its occasion, in the frescoes of Luca Signorelli in the Sanctuary of Orwiets. The glorious masterpiece of the painter shows how clearly and firmly Catholic teaching placed all these prospective scenes of the last days of the world before the popular mind. The grandest Christian Temples of Catholic lands were pictorial Bibles recalling the history of the race of the past, and setting forth for the instruction of the people, as illuminated by the prophetic utterances of the Apostolic writings in the New Testament, the terrible and sublime scenes connected with the second coming of Him who is the Restoror of all things and the Judge of the whole earth.

St. Augustine, who wrote his great work *On the City of God*, while the Barbarians were overrunning and destroying the Roman Empire and the old order of things, and after they had taken, pillaged, and partially destroyed Rome itself, might have been justified in identifying Arius and Arianism with 'the spirit that dissolveth Jesus,' and in seeing in the general social disruption and the advancing lines of flame which marked the progress of the victorious Barbarians, the real fire sent before the face of the Lord to destroy and purify, and to prepare the world for judgment. His mind, however, reaches forward to the end of time, and calmly surveys, in the light of the divine oracles, the events immediately preceding the Day of Doom. He conjectures that the appearance of Elias will be the first certain warning of its near approach; then will come the conversion of the Hebrew race, the persecution of Antichrist, Christ's second coming, the resurrection, the separation of the good from the wicked, the destruction and renovation of the world. St. Thomas Aquinas differs from him in believing that there will be a general conflagration before the Judgment destroying all life on the earth, and purifying it for the coming of the Judge.

2. This brings us to the last day itself with the mighty events in which we shall all take part. St. Thomas says, that 'much cannot be known to a certainty as to the way in which that judgment will take place and in which men are to be brought together.' Jerusalem, in which the great sacrifice of Redemption was accomplished, is to be—such is the most probable opinion—the seat of these great assizes of the human race. We are not to forget, in estimating the possibility of collecting all mankind and the angelic hosts who had ministered to them, in any one limited spot of earth, that after the Resurrection and the ending of the present period of time, all the relations both of time and space will undergo a complete change. The blessed, once reunited to their bodies, will be like Christ Himself—the First-Born from among the dead—spiritualized in their whole being and elevated above the present conditions and laws of sense. At the 'Sound of a Trumpet,' the mere agent or symbol of the Creative Word which said, 'Let there be light, and there was light,' the new creation will take place; the dead will arise and come to judgment. To Christians who believe in the recital of the doings of that Eternal Word contained in the very first page of the Bible, there will be no questioning the power which gathers instantaneously the dust of these myriads of human bodies, without mistake or confusion. We believe in the Infinite God and in the almost infinite number of the angelic spirits who minister to His will, and guard throughout all the cycles of all the ages the sacred dust of every human body, made in the likeness of His body who became incarnate for us, and to prepare us for the glory and triumph of that Last Day. The dead having arisen and come together around these hills of Sion, the heavens will become suddenly illumined by 'the Sign of the Son of Man,' the effulgent Cross preceding the Crucified. 'You shall see'—it is the Saviour who speaks—'the Son of Man sitting on the right hand of the Power of God, and coming in the clouds of heaven' (St. Matth. xxvi. 64). The Angels who escort him—'the angels of His power, in a flame of fire yielding vengeance to them who know not God,' complete the heavenly apparition. This is the mighty army which has swept over the whole earth destroying Antichrist and all the Sons of Pride. The

Judge is seated. It is the great day for which the Eternal and all-patient God has been waiting, in order to vindicate, in presence of all intellectual beings ever created, his dealings with man and angel, to compel even Lucifer and his followers to proclaim that His ways are both wise and just.—The good are separated from the wicked, conscience itself and the irresistible force of truth, apart from the agency of the Angels, effecting this eternal separation, just as the long-compressed flames leap heavenward when set free, and the lead sinks by its own weight into the depths of the ocean. The good extend their shining ranks on the right hand of the Throne, gazing with rapture unspeakable on that thorn-crowned King, on the radiant wounds in hands and feet and side,—the scars received in the battle which He fought and won alone, and on whose issue depended the Eternal Years now beginning for them. The wicked look on Him, and read on His face, in the wounds of feet and side and outstretched hands, as in the Book written by Infinite Love and Truth, the condemnation of their own blindness, ingratitude, and inconceivable perversity. Catholics are taught that Death is the great revealer, tearing the mask from our own face, and removing the veil which hides from us in this life the invisible world,—the only real and eternal.

No angel and no man present on that day,—the triumph of Truth and Justice,—but must confess that God, the Father present and half-revealed to the Just in that 'Power' at whose right hand the Judge is seated, did indeed love the world and every soul in the world in giving the Son to the shameful death of which yonder cross is the emblem. Nearest to the Throne are the Apostles, the witnesses of His labors and death, of His resurrection and ascension, who sealed their witness with their blood and their mission with miracles as great as His and greater, while bearing His name to the nations. Nearer even to Him than these, is the Mother, the woman stronger than all womankind, who gave birth to Him in a stable and stood, comforting and supporting, beneath His cross.—In this presence, then, the examination and judgment proceed. The Apostles, the Fathers and Teachers of the new people whom Christ created for Himself on earth, are the Assessors of the Divine Judge. The Apocalypse (xx. 12) says the books will be opened. That is, as theologians explain it, the divine light in which the Infinite Intelligence holds the remembrance of all things, will so flood the memory of each person there as to bring the whole life into distinct and vivid recollection. The life of each will be made clearly visible to all as to one's self. Even the sins of the Just as well as their heroic repentance, and their generous imitation of the Master will stand forth to proclaim the Divine Mercy and the victory of Christ's grace. So with the wicked: in the overwhelming light of that Truth they will examine the guilt incurred by a long line of willful transgressions, of warnings neglected, opportunities lost, time ill-spent, God set at defiance, and all the advantages of birth, education, position, and intercourse with the virtuous turned against the God who gave them.

It is the belief of the most enlightened teachers, that each individual will be arraigned and sentenced separately. Here, again, we must make our Christian knowledge enlighten and correct our imagination. That Last Day will not be measured by the light of our longest in midsummer tide. The Creator of the light, who will preside at that solemn session knows how to dispense it according to the need of His creatures and His own wise purposes. And then, as St. Thomas Aquinas and all the great Schoolmen teach, for the human mind after the Resurrection, as for the Angelic, the measure of duration will be far different from that which is based on the revolution of the planets. Eternity will have begun for us, when the Resurrection Trump has sounded; they who stand for judgment on that awful day, will have little thought of reckoning the hours. Christ Himself describes the uttering of the sentence, and the general doom pronounced on the just and the unjust.

St. Thomas thinks that no oral utterance will be used toward each person in particular. The secret voice of God in the conscience would, in this supposition, seal the fate of the individual. To the multitude of the elect Christ will say: 'Come, ye Blessed of My Father, possess you the kingdom prepared for you.' And to the lost: 'Depart from Me, you cursed, into everlasting fire, which was prepared for the Devil and his angels.' Not the least noteworthy circumstance in this twofold utterance, is the fact that Christ bases the award in each case on the fulfillment or the neglect of the divine virtue of brotherly charity, making the discharge of its manifold offices as obligatory as if performed toward Himself. Thus the practical love of our brethren around us in the society in which we live, a love exalted by having our Saviour and Benefactor as its object, is to be the measure of our merit on that Last Day.

The neglect of these social charities, obligatory on all because the discharge towards our brethren of the infinite debt of gratitude due to the Creator and Redeemer of our souls, will be the cause of damnation to most men. 'I was hungry, and you gave Me to eat. I was thirsty, and you gave Me to drink. I was a stranger, and you took Me in; naked, and you covered Me; sick, and you visited Me. I was in prison, and you came to Me. . . Amen I say to you, as long as you did it to one of these My least brethren, you did it to Me' (St. Matth. xxv.). Never did human wisdom or the philosophy of the most cultured nations, or the far-seeing statesmanship of the most renowned legislators, conceive of such obligations as these or dream of such a sanction to their laws. It was reserved for One who was at the same time both very man and true God to make of our fellow-men His brethren, to transfer to them the debt of gratitude and practical love which all human beings owe Him; and on the loving discharge of this debt to found the title of each one of us to Eternal Life, on its non-discharge to base our doom to Eternal Death. The wonder is that our Socialists do not take up this twenty-fifth Chapter of St. Matthew, and with it appeal to all who believe in Christ to live up to its spirit and thus help to make of earth an image of Paradise, of this life a scene of brotherly love preparatory to Heaven.

JUDSON, ADONIRAM, D.D., an American missionary, born at Malden, Mass., Aug. 9, 1788; graduated from Brown University, 1807; and from Andover Theological Seminary, 1810. He engaged in teaching at Plymouth, Mass., and while so engaged published *Elements of English Grammar and Young Ladies' Arithmetic*. In 1812 he set sail for Burmah as a missionary, but changing his views relative to baptism on the way, he united with the Baptists. In Burmah he endured great hardships, spending two years in prison in momentary expectation of death; but he lived to see his work abundantly prosper, thousands of the natives being converted to Christianity. Died at sea, April 12, 1850.

JUG'ULAR VEIN, one of the large veins on either side of the neck, so named from Lat. *jugulum*, the collar-bone, which 'joins' (*jungere*) the neck and shoulders.

JULIAN. GEORGE WASHINGTON, an American statesman, born at Centreville, Ind., May 5, 1817; was educated at the public schools, and began the practice of law in 1840. He was a member of Congress, 1849–51, and was one of the organizers of the Republican Party. In 1861 he was again elected to Congress, which position he held until 1869. He has been an earnest advocate of woman's suffrage.

JÜ'LICH (Fr. *Juliers*), formerly a duchy (1600 sq. miles), on the W. bank of the Rhine, is now a part of Rhenish Prussia. It was a countship before its union with Berg in 1348.—J. (Lat. *Juliacum*), once capital of the duchy, on the river Roer, 26 miles W. of Köln, is said to have been founded by Julius Cæsar, has lively trade, and a pop. of 4802.

JUMALPORE' (*Jamalpur*), a town in the district of Monghyr, Bengal, British India, 721 miles N.W. of Calcutta; pop. (1872) 10,453. It contains the largest iron workshops in India, the property of the East India Railway.

JUNGIPORE' (Jangipur), a town in Murshedabad district, Bengal, British India, on the left bank of the Bhagirutti, 130 miles N. of Calcutta. Pop. (1872) 11,361. It is a great mart of river traffic, and also of the silk trade.

JUSTIN I. *the Elder*, Eastern Roman Emperor, was born in the hamlet of Tauresium (450 A.D.) in Dardania. Originally a Slav or Gothic shepherd, he went to Constantinople to seek his fortune. Being enrolled in the guards he made himself famous for courage in the wars with Persia, and rose from tribune to senator and commander-in-chief. On the death of Anastasius I. in 518 he was proclaimed emperor, though he could neither read nor write. J. left the administration of affairs to Proclus, allied himself with the adherents of the Orthodox Church, and (520) adopted his nephew Justinian. A war with the King of Persia, the occurrence at Antioch of a disastrous earthquake, and the measures he adopted for making good its ravages, are the chief events of his later career. He died August 1, 527.—J. II. *the Younger*, nephew of Justinian, ruled from 565 to 574, when he became insane. He died 26th September 578. In his reign the Lombards wrested Italy from the empire.

K.

KAISER-I-HIND (Emperor of India), the Persian, or rather Hindostani, title by which Queen Victoria was proclaimed Empress at the great Durbar at Delhi on 1st January 1877. This title, which was settled after much consideration, commends itself to Persian scholars. The term 'Kaiser' has been erroneously conjectured from its spelling to be borrowed from the German, but it is, in truth, a well-known Persian word, derived through the Arabic from the Greek, and is to be found in a hackneyed quotation from the epic poet Firdousi. Persian is the court and diplomatic language of India; and under the disguise of Hindostani, was until lately the regular language of British administration.

KÁKAPO, the Maori name of the ground or night parrot of New Zealand, *Strigops habroptilus*, belonging to the family Psittacidæ. It is remarkable as possessing a considerable development of wing, and yet never attempting to fly. On this account it is being rapidly exterminated, chiefly by dogs and rats, and is already very rare, except in the wild and uninhabited region at the S.W. extremity of the colony.

KALAFAT', or CALAFATU, a fortified town in the S.W. of Wallachia, on the left bank of the Danube, opposite the Turkish Widdin. It commands a winding stretch of the Danube, and was the scene of severe conflicts between the Russians and Turks in 1829 and again in 1854. Pop. 2500. There was continuous cannonading between K. and Widdin at the beginning of the Russo-Turkish war in May 1877.

KALAKAU'A, DAVID, seventh king of the Hawaiian Islands, born at Honolulu, Nov. 16, 1836, and educated at the royal school of Honolulu, an institution under English management. He was a descendant of one of the ancient kings of Hawaii. Upon the death of Lunalilo in 1874, Kalakaua was elected king of Hawaii.

KALI', the goddess who figures most prominently in the Hindu religion. As Parvati, she appears as the wife of the destroyer, Siva; as Durga, she has given her name to the Durga Pujah festival, the great annual holiday of Bengal; her other names are Bhawani and Devi. She has been identified with the Isis of Egypt and the Greek Hecate. K. was not known in the earliest period of the Mahabharata; and there is much plausibility in the theory that her bloody worship, with that of her husband, was borrowed from the aboriginal tribes. It is abundantly established that human sacrifices were, even to a recent period, offered in her honor, though such a practice is most abhorrent to the primitive spirit of Hinduism. K. is represented of a dark blue color, with distorted countenance, and a necklace of human heads. It is said that the name of Calcutta is derived from K.-ghat.

KAMEHA'MEHA I., a king of the Hawaiian, or Sandwich Islands. On the death of his uncle, Kalaniopu, King of Hawaii, he became head chieftain over a part of that island. A man of aspiring ambition and indomitable courage, he instituted a series of conquests, which made him monarch not only of Hawaii, but of the entire Hawaiian group. He has been called 'the Napoleon of the Pacific.' Died May 8, 1819.

KAMEHAMEHA II., LIHOLIHO, eldest son and successor of Kamehameha I. He failed to inherit the sterner virtues of his father, and was intemperate and dissolute. In 1820 he permitted missionaries to land upon Hawaiian shores and begin their work among his subjects. He visited England in 1823, taking with him his favorite queen, in the hope of securing the friendship of that nation, and was favorably received. But both he and his queen were taken sick with measles, and died in London, July, 1824. Their remains were returned to Hawaii by the British government.

KAMEHAMEHA III., KANIKEAVULI, a brother of Kamehameha II. He was educated by the missionaries, and in 1833 ascended the throne, two queens having acted as regents from 1823 to that time. Although somewhat dissipated in his earlier years, he was always willing to receive good advice on national matters, and usually pursued a wise course as ruler. He conferred upon his people a constitution and a code of laws; and treaties were made with the principal European nations. Great progress was made during his reign in education and agriculture—indeed, in all matters pertaining to civilization. He has justly been called 'Kamehameha the Good.' Died in Dec., 1854.

KAMEHAMEHA IV., ALEXANDER LIHOLIHO, a nephew of Kamehameha III. He was educated by the missionaries, and became King in 1854, upon the death of his uncle. He traveled abroad, visiting the United States, England, and France. He was a polished gentleman, and was fond of military pursuits and pageantry. He established the Queen's Hospital in Honolulu, by means of subscriptions which he himself had solicited in England. Died Nov. 30, 1863.

KAMEHAMEHA V., LOT KAMEHAMEHA, a brother of Kamehameha IV. In his early career he had been dissolute, but changed the manner of his life before ascending the throne, which he did in 1863, upon the death of his brother. His reign was marked by numerous dissensions with the foreign element, beyond which it was uneventful. Died Dec. 11, 1872.

KANGAROO APPLE, the popular name of the plant *Solanum laciniatum*, found in Australia, Tasmania, and Peru. When ripe the fruit is wholesome, but when unripe it is acrid and dangerous.

KANKAKEE, in Kankakee Co., Ill., on the Kankakee River. Four railroads pass through the place, and it carries on a large trade with the surrounding country. It has one of the finest water powers in the state, and is extensively engaged in manufacturing. It is the seat of the State Hospital for the Insane. Pop. 5783.

KARENS, a hill tribe in British Burmah, numbering about 330,000 souls. Some wander about the hills, while others have settled as cultivators on the plains. Their traditions have a singular Jewish tinge, and they have afforded to the American Baptist and French Roman Catholic Missions a most successful field of labor. Out of 330,000 in all British Burmah, about 30,000 have become converted. They have also signalized themselves by their readiness to accept British rule. See *The K. of the Golden Chersonese*, by Colonel Macmahon (Lond. 1876).

KARLS'BAD ('Karls' bath'), a celebrated watering-place of Bohemia, in the pine-clad valley of the Tepel, a tributary of the Eger, 76 miles W.N.W. of Prag by rail. The springs, according to a tradition, were discovered by Karl IV. in 1347. They have a maximum temperature of 167° F., and gush forth with violence from apertures in the hard rock (*Sprundelschale*) on which the most of the town is built. The oldest, hottest, and most copious spring is the Sprundel, which arises in a volume 1½ feet in diameter to a height of 3 feet (formerly 6 feet). Especially efficacious in liver complaints, the waters chiefly contain sulphur, salt, and carbonate of soda. About two million gallons are discharged daily. There were 18,000 visitors in 1872. K. has a theater and many fine hotels, reading-rooms, and cafés. Goethe frequently resided here. Pop. (1869) 7291.

KASANLIK', a town of Turkey, in the vilayet of Adrianople, at the entrance to the Balkan Pass, 85 miles N.W. of Adrianople. It lies in a fertile and well-irrigated plain, and produces fine attar of roses (5000 lbs. of blossoming rose-leaves yielding 1 lb. of perfume, valued at about $90), walnuts ($99,000 worth yearly), and beautiful walnut timber. Pop. 10,000.

KAUFF'MANN, ANGELICA, a well-known painter, born October 30, 1741, at Chur in the Grisons, received her first instruction from her father, and after 12 years' study in Italy removed to London (1765), where she achieved a brilliant success, painting the portraits of the royal family, and being elected one of the thirty-six original members of the Royal Academy. A marriage with a Swedish adventurer, the *soi-disant* Comte de Horn, was followed by a separation (1768), and in 1781 Angelica married a landscape-painter, Antonio Zucchi, who had followed her from Venice. Returning to Italy the year after, she there lost both husband and fortune (1795), and died at Rome. November 5, 1807. Her pictures—graceful but feeble allegories, often introducing her own beautiful portrait—abound in all the galleries of Europe; and a fresh interest has lately been lent to her history by its forming the basis of a charming fiction by Miss Thackeray—*Miss Angel* (Lond. 1875).

KAUF'MANN, K., VON, a distinguished Russian general of German descent, was educated at the Military School for Engineers, served with brilliant success in the Caucasus, acquiring the rank of general and the post of chief of the field officers under Mouravieff. During the Crimean War he was chosen to settle

with General Williams the conditions for the capitulation of Kars. He was successively appointed chief of the staff of the Grand Duke Nicholas, Minister of War, and Governor of Lithuania *vice* General Mouravieff, in 1865. To K. and Milliutin is due the credit of entirely re-organizing the army. In 1867 K. was nominated Governor-General of the vast Asiatic territories of the Sir Daría and Semivetshkaia. After long negotiations with the refractory Emir of Bokhára, K. defeated the forces sent against him, and concluded a treaty (1868) by which Samarcand and a large territory was ceded to Russia. In 1873 followed the taking of Khiva. K.'s masterpiece of generalship. Surrounded on all sides by immense deserts, Khiva was approached by three columns, comprising 12,000 men, from the Caspian, from Orenburg, and from Tashkend, the last of these being under his own command. The troops were skillfully extricated from the hardships of their terrible march, and Khiva was taken on the 10th June 1873. In consequence of a treaty between Russia and England the army was withdrawn from Khiva, but the campaign greatly extended Russian dominion, and established the unconditional authority of Russia in Central Asia.

KAYE, Sir John William, the distinguished chronicler of various epochs in the history of the British rule in India, was born in London in 1814. In 1822 he passed from Addiscombe into the Bengal Artillery, but resigned military service for literary pursuits in 1841. He founded the *Calcutta Review;* and eventually entered the Home Service, and filled the appointment of Secretary in the Secret and Political Department of the India Office from 1859 to 1874. K. died 24th July 1876. Among his works may be mentioned *The History of the War in Afghanistan; The History of the Sepoy War in India*, of which he lived to publish only the third volume, out of a promised four; and *The Life and Correspondence of Sir John Malcolm.* His peculiar merit is to have used his official and private sources of information so as to popularize among Englishmen the great events and leading heroes of Indian history.

KAZALY, a Russian town and fort in Turkestan, and on the Sír-Daría (anc. *Jaxartes*) 40 miles from its mouth. It is the first of the forts on the so-called 'line of the Sír-Daría,' and was founded in 1847. The earthworks of the fort, which is garrisoned by 1000 men, are 200 yards square, surrounded by a ditch. Between the fort and river is the navy yard, and on the land side is the thriving town of K. with a pop. of over 5000. There is here a Cossack colony, and the chief products are cotton and a wine of excellent quality.

KEARNEY, Dennis, born in Ireland, in 1847, and came to America when a boy. After following the sea for some time, he settled, in 1872, in San Francisco. He took an active part in politics and became noted for his violent speeches against capitalists and the Chinese. At one time he had large influence with the laboring classes of California, but this he has now lost. In 1880 he was sent to prison for six months, for the public use of incendiary language.

KEARNEY, Philip, an American general, born at New York, June 2, 1815, educated at Columbia College, and studied law. In 1837 he entered the army, and soon afterwards visited Europe. He pursued military studies in France, and served with the French in Algiers, where he was decorated with the Cross of the Legion of Honor. In 1840 he returned to the United States, and served in the Mexican war, winning promotion by his gallantry at Contreras and Churubusco, and losing an arm in the final assault upon the city of Mexico. In 1851 he again visited Europe, where he served in the Italian war of 1859, with the French. He was engaged at Magenta and Solferino, and by his gallantry again won the cross of the Legion of Honor. At the outbreak of the civil war he returned to America, and entered the Union service with the rank of brigadier-general of volunteers. He was in command of a division at Williamsburg and Fair Oaks, where he won distinction. In 1862 he was promoted to be major-general, and was killed at the battle of Chantilly, Sept. 1, 1862.

KEARNEY, Stephen Watts, an American general, uncle of Philip Kearney, born at Newark, N. J., Aug. 30, 1794, and entered the army in 1812. During the war of 1812 he rendered valuable services, particularly distinguishing himself at Queenstown Heights, and was promoted to the rank of brigadier-general. He also served with distinction in the Mexican war. For services in New Mexico and California he was made major-general. He published the following: *A Manual for the Exercise and Manœuvring of U. S. Dragoons. Organic Law, and Laws for the Government of the Territory of New Mexico.* Died at St. Louis, Mo., Oct. 31, 1848.

KEBLE COLLEGE, Oxford, England, founded by subscription as a memorial to the late Rev. John Keble, was incorporated by royal charter bearing date June 6, 1870, by which it is declared to be 'founded and constituted with the especial object and intent of providing persons desirous of academical education, and willing to live economically, with a college wherein sober living and high culture of the mind may be combined with Christian training, based upon the principles of the Church of England.' The college is governed by a warden and a council of not less than nine, nor more than twelve members. In 1876 it had five tutors, four lecturers, a precentor and a bursar, eleven scholars, five exhibitioners, three students of music, and 122 commoners. It presents to three livings. The buildings, of red brick, are from the design of Mr. W. Butterfield. The foundation-stone was laid April 25, 1860, and the dedication took place June 23, 1870. A splendid chapel has since been erected.

KE'DRON (Heb. 'turbid') is a 'mountain ravine (not a "brook," as in the A. V.), in most places narrow, with precipitous banks of naked limestone,' although in places the easy slopes and bottom are capable of cultivation. It begins in a slight depression on the summit of the plateau 1¼ mile N.W. of Jerusalem. Running for about ½ mile towards the city it turns to the E., and holds that direction for about ⅔ mile, at a distance of about ½ mile to the N. of the city. It then turns to the S. and widens; but is soon contracted again by the Mount of Olives on the E. and Bezetha on the W. Farther down, Moriah on the W. and Olives on the E. rise precipitously from a torrent bed. Below the point where it is joined by the Tyropœon, K. again expands into a level fruitful tract, which extends to the mouth of Hinnom, where K. ends, at a distance from its head of about 2¾ miles.

KELLEY, William Darrah, an American statesman, born at Philadelphia, Pa., April 12, 1814. He began life as a printer, but afterwards became a lawyer. In 1860 he was elected to Congress, and has remained a member of that body down to the present time (1885). He has given much attention to the monetary problem, and is an able debater.

KELLY, John, an American politician, born in New York City, N. Y., in April, 1822. He was first a rope-maker, then a printer, and afterwards a mason. Entering into politics, he soon rose to prominence, and in 1876 became the acknowledged leader of the Tammany Democracy, which position he continues to hold (1885). He has held various municipal offices, and, although he has been violently assailed by his political enemies, his personal integrity has never been questioned.

KELLOGG, Clara Louise, an American vocalist, born at Sumpterville, S. C., in July, 1842, and removed with her parents, when an infant, to New Haven, Conn., and later, to New York. Here she received her musical education at the hands of such masters as Millet, Rivarde, Albites, and Manzochi. In 1861 she appeared in opera in New York, and met with immediate success. In 1867 she appeared in London and there met with equal favor. She still remains one of the brightest ornaments of her profession.

KEM'PEN, a town in the province of Düsseldorf, Prussia, 27 miles N.W. of Düsseldorf, has manufactures of silks, cottons, linens, and hosiery, and was the birthplace of Thomas à Kempis. Pop. (1875) 5390.

KENNEDY, John Pendleton, LL.D., an American author and soldier, born at Baltimore, Md., Oct. 25, 1795, and graduated from the University of Maryland in 1812. In 1814 he was present at the battles of Bladensburg and North Point, as a volunteer, and in 1816 entered the legal profession. After filling various offices in his own state, he was, in 1835, elected to Congress; and in 1852 was appointed secretary of the navy, by President Fillmore. He was strongly opposed to slavery as an institution, and, during the civil war, his sympathies were with the Union cause. During his entire life, he devoted a considerable portion of his time to literary pursuits. Among other works, he published the following: *The Swallow Barn, Horse-shoe Robinson, Rob of the Bowe, Quodlibet,* and *Memoirs of William Wirt.* Died at Newport, R. I., Aug. 18, 1870.

KENOSHA, a town of Kenosha Co., Wis., on Lake Michigan, 35 miles S. of Milwaukee, and on the Chicago, Milwaukee & St. Paul Railroad and a branch of the Chicago & Northwestern Railroad. It has a good harbor, and carries on a considerable lake commerce. It is engaged in manufacturing wagons, furniture, organs, and numerous other articles. It is surrounded by a grazing and farming district. Pop. 6,000.

KENSETT, John Frederick, an American artist, born at Cheshire, Conn., March 22, 1818, and, while young, studied engraving. In 1840 he visited England and began to devote himself to landscape-painting. He attained great eminence in this art, and his works found ready purchasers. Died at New York, Dec. 14, 1872.

KENT, James, LL.D., an American jurist, born in Putnam Co., N. Y., July 31, 1763; graduated from Yale College in 1781; was admitted to the bar in 1787, and began the practice of law at Poughkeepsie. He removed to New York in 1793, was made a master in chancery, and became a professor in Columbia College Law School. In 1798 he was made a judge of the supreme court,

and chief-justice of that tribunal in 1804. He held this position for ten years, when he was made chancellor of New York. He remained chancellor until 1823, and in 1824 resumed his labors in connection with Columbia College Law School. He published *Commentaries on American Law* in 4 vols. (1826–30), which has been universally recognized as one of the greatest legal works in the English language. Died in New York, Dec. 12, 1847.

KENTON, a town of Hardin Co., O., on the Scioto River and the Indiana, Bloomington & Western, and Chicago & Atlantic railroads, 74 miles from Sandusky. It is surrounded by an agricultural and lumber district. Pop. 5000.

KENYON COLLEGE, at Gambier, O., established at Worthington, O., in 1825, and removed to its present site in 1828. It is under the control of the Episcopal Church, and maintains grammar, college, and theological departments. It is liberally endowed.

KERNAN, Francis, an American statesman, born at Tyrone, N. Y., Jan. 14, 1816. He was admitted to the bar, and began the practice of law in Utica, N. Y. For many years he was one of the leading spirits of the Democratic party, was elected to Congress, and was made U. S. Senator in 1875.

KEWANEE, a town of Henry Co., Ill., on the Chicago, Burlington & Quincy Railroad, 132 miles from Chicago. Coal-mining and manufacturing are its principal industries. Pop. 4500.

KEY, Francis Scott, born in Frederick Co., Md., 1779. He is famous as the author of *The Star Spangled Banner*, written during the bombardment of Fort McHenry, while a prisoner on an English vessel. Died at Baltimore, Jan. 11, 1843.

KEY, or KÉ ISLANDS (pron. K), a small group in the Banda Sea, between 5° and 6° S. lat., and in about 133° E. long. They consist chiefly of two islands, Great and Little K., the former of which measures 50 miles by 10. The islands are very mountainous and densely timbered. They are inhabited by Papuans, and by a mixed race who profess Mohammedanism. The inhabitants trade in trepang, wild nutmegs, and tortoise-shell, but especially excel in boatbuilding. They annually turn out some hundreds of boats, some of 30 tons each, of which Mr. A. R. Wallace says they 'can hardly be surpassed for beauty of form and goodness of workmanship.' See *The Malay Archipelago* (vol. ii. p. 107).

KHOI, a town in Azerbijan, Persia, 77 miles N.-W. of Tabiez, stands in a fertile valley. The houses are of mud, but the bazaars of brick, are, next to those of Shiraz, the finest in Persia. Cloths, linen, caps, socks, and copperware are the chief articles of trade. Near K. 30,000 Persians, under Shah Ismail, defeated 300,000 Turks, under Selim I. (1514), and the town was held by a Russian garrison (1827–28). Pop. 25,000—35,000.

KHUNDWA' (Khandwa), the chief town of the district of Nimar, Central Provinces, British India, 352 miles N.-E. from Bombay; pop. (1872) 14,119. It is a station on the Great Indian Railway, and the terminus of the Indore State Line; and as such, it is the center of a growing transit trade. K. is a place of great antiquity, the town being built on a mound which is full of ruins of old Jain buildings. It was burned by Tantia Topee during the Mutiny in 1858.

KIDD, William, better known to the public as Robert Kidd of piratical renown. He was the son of a Scotch minister, and in early life became a sailor. He set sail from Plymouth, England, in 1696, in command of the *Adventure*, a vessel fitted out for the suppression of piracy. It is generally believed that he turned pirate himself. In 1698 he came to New York with a large treasure, part of which was seized by the earl of Bellomont. Other treasure was discovered at Shelter Island, where Kidd had concealed it. He was sent to England and there hanged May 24, 1701.

KILPATRICK, Hugh Judson, an American general, born at Deckertown, N. J., Jan. 14, 1836, and graduated from West Point in 1861. In May of the year of his graduation he was made captain of volunteers and took part in the battle of Big Bethel, where he was wounded. On his recovery he was assigned to duty in the cavalry service, and in 1863 was made brigadier-general of volunteers. He commanded a division at Gettysburg, where he distinguished himself by his bravery. In 1864 he was attached to the army under Gen. Sherman, and was severely wounded at the battle of Resaca. He subsequently commanded the cavalry under Sherman on his march to the sea. He resigned his commission in 1866, and was minister to Chili from 1865 to 1868. Since the close of the civil war he has been an active member of the Republican party.

KIMBERLEY, Earl of, an English statesman, born Jan. 7, 1826, succeeded his father as third Baron Wodehouse, May 29, 1846. He was Under Foreign Secretary, 1852–56; Envoy at St. Petersburg, 1856–58; Under Foreign Secretary, 1859–61; Lord-Lieutenant of Ireland, 1864–66; Lord Privy Seal, 1868–70; and Colonial Secretary, 1870–74. His administration of Ireland during a critical period was firm and able. He was created Earl of Kimberley, June, 1866.

KIMMERIDGE COAL MONEY, a name given to the circular discs of Kimmeridge shale found abundantly in Dorsetshire, England, by antiquaries, who were long puzzled as to the origin and use of the discs. They are now believed to be the refuse parts of the solid pieces of shale from which the Britons and Romans turned bracelets and armlets.

KIMPOLUNG, a town of Wallachia, Roumania, 79 miles N.W. of Bucharest, and 18 S.E. of the Törzburg Pass, in the Carpathians, by which it carries on an active trade with Transylvania. Pop. 10,970.

KING, John P., an American statesman, born in Barren Co., Ky., April 3, 1799; studied law, and was admitted to the bar in 1819. He settled at Augusta, and rapidly rose to prominence in his profession. He was a member of the Georgia constitutional convention in 1883, where he played a prominent and influential part. In 1834 he was elected to the U. S. Senate, where he distinguished himself by his vigorous thought and eloquent oratory. In 1838, believing himself to have been unjustly censured by the press of his state for a speech against President Van Buren's administration, he retired from public life, and resumed the work of his profession.

KING, Rufus, LL.D., an American statesman, born at Scarborough, Me., March 24, 1755; graduated from Harvard College, 1777; admitted to the bar, and began the practice of that profession, in 1780, at Newburyport, Mass. In 1784 he was a member of the Continental Congress, and introduced a resolution prohibiting the introduction of slavery into the North-west Territories. In 1787 he was an active member of the convention that framed the U. S. Constitution. Removing to New York City in 1788, he was elected one of the first U. S. Senators from that state, his colleague being Gen. Schuyler. In 1796, President Washington, who had previously offered him the position of Secretary of State, appointed him minister to England. Returning to the U. S., he was at first opposed to the war of 1812, but after the burning of the capitol by the British, became one of its ardent supporters. In 1819 he was again elected to the U. S. Senate, where he opposed the admission of Missouri to the Union, as a slave state. Died at Jamaica, L. I., April 29, 1827.

KING, Thomas Starr, a distinguished Unitarian clergyman, born in New York, Dec. 16, 1824. Owing to the straitened circumstances of his father, a Universalist minister, he was denied the privilege of a liberal education, and spent the earlier years of his life as a clerk and teacher. His first pastorate was at Charleston, Mass., and in 1848 he was called to the Hollis Street Unitarian church in Boston, Mass. He removed to San Francisco, Cal., in 1860, to take charge of the Unitarian church in that city. During the civil war he rendered great service to the Union cause by his writings and addresses. He was a man of eloquent and forcible oratory. He published *The White Hills, their Legends, Landscapes, and Poetry* (1859). Died at San Francisco, Cal., March 4, 1864.

KING'BIRD (*Tyrannus intrepidus*), or Tyrant Flycatcher, a species of *Insessorial* birds belonging to the section *Dentirostres*, and to the family *Muscicapidæ*, or Flycatchers. The K. arrives in the United States in April, and leaves on its southward journey at the close of autumn. It derives its popular name from its tyrannical and active habits. The plumage is ashen-grey above; the head black, and provided with an erectile crest of feathers of an orange hue at their bases. The tail is black, tipped with white; the under parts, of a greyish-white hue. The average length is 8 inches.

KING-CHU, a walled city of China, province of Hu-pe, on the left bank of the Yang-tsi-Kiang. It lies 150 miles W. of Hankow, and is of some military importance. Pop. 500,000.

KING'S MOUNTAIN, Battle of, an engagement of the American Revolution, near the southern end of a mountain range of the same name, in South Carolina, Oct. 7, 1780. A British force under Lieutenant-Colonel Ferguson, was surprised and attacked by a body of Continental militia, commanded by Colonel Benjamin Cleaveland, and, after a desperate and bloody struggle, was captured.

KING-TE-CHING, a town in the province of Kiang-Si, China, on the Tchang-Kiang, 56 miles from its entrance into Lake Po-jang. It is the chief seat of the porcelain industry in the empire, and has a pop. of 200,000.

KIP, William Ingraham, D.D., a Bishop of the Protestant Episcopal Church in America, born at New York, N. Y., Oct. 3, 1811. In 1853 he was elected bishop of California. He is the author of several historical and devotional works.

KIRBY, Edmund, an American general, born in Jefferson Co., N. Y., 1840, and graduated from West Point, 1861. He was engaged at the battles of Bull Run and Ball's Bluff, and commanded

manded a battery at the battles of Yorktown, Fair Oaks, Savage Station, Glendale, Malvern Hill, Fredericksburg, and Chancellorsville. At the last he received severe wounds, from the effect of which he died at Washington, D. C., May 28, 1863, receiving his promotion to the rank of brigadier-general as he lay upon his death-bed.

KIRK KILISS'IA, or SARAN'TA-EKKLES'IÉS ('forty churches'), a town of Turkey, in the vilayet of Edirné, 32 miles E. of Adrianople. It carries on an active trade in wine, corn, cheese, and butter, and is famed for its sweetmeats prepared from grapes and walnuts. Pop. 14,000.

KIRKLAND, CAROLINE MATILDA, an American authoress, born in New York in January, 1801. Her father was named Stansbury, and she was married to Prof. William Kirkland of Hamilton College, N. Y. She lived for several years in Michigan, and afterwards conducted a successful school for young ladies in New York City. She wrote many of her works under the pseudonym of Mary Clavers. Among her works are the following: *A New Home, Who'll Follow?* (1839), *Forest Life* (1842), *Western Clearings* (1846), *Holidays Abroad* (1849), *The Evening Book* (1852), and *Personal Memoirs of George Washington* (1857). Died in New York City, April 6, 1864.

KISCHENEV', the capital of the government of Bessarabia, Russia, on the malarious Byk, an affluent of the Dniester, 95 miles N.W. of Odessa by rail. It lies in a hilly and finely wooded district, and has fourteen churches, a government library, many fountains, a theater, and a large trade in wheat, linseed, tallow, cattle, tobacco, &c. Its wine is famous. Pop. (1870) 102,427, extremely mixed, and in great part consisting of Jews. K. was little more than a village when it passed to Russia in 1812. It was the rendezvous of the Russian army, and the place where the declaration of war against Turkey was proclaimed, April 1877.

KIZ'IL-IRMAK' ('red river') the ancient *Halys*, a river of Turkey in Asia, rises on the Kösse Dagh, 97 miles W. by N. of Ersingan, flows first S.W., then N.W., and finally N.E. to the Black Sea, 40 miles E. of Sinope. It has a length of 450 miles.

KJÖLEN (Norse, 'The Keel'), the watershed stretching between Sweden and Norway from the Finmark to Röraas, with numerous peaks 6000 feet high.

KNOW NOTHINGS, a secret political party of the United States, which was organized in 1853, and in 1854 carried several of the Northern States. In the year 1856 it nominated Millard Fillmore for the presidency, taking as its name the 'American Party.' It was organized for the purpose of opposing the naturalization of foreigners. After 1856 it rapidly disappeared from existence.

KNOX, HENRY, an American general, born at Boston, Mass., July 25, 1750, and in his early life engaged in mercantile pursuits. At the outbreak of the American Revolution, he entered the Continental service, and soon acquired distinction as an artillery officer. He distinguished himself at Trenton and Princeton, and was rewarded by Congress with the rank of brigadier-general. He participated with gallantry in the battles of Brandywine, Germantown, and Monmouth, where he was in command of the artillery. He was present at Yorktown, and shortly afterwards was made a major-general. In 1785 he was made secretary of war and of the navy, which position he held for six years. In 1795 he removed to Maine, where he spent the remainder of his life. Died at Thomaston, Me., Oct. 25, 1806.

KOBELJAKI, a town in the government of Poltáva, Russia, on the Vorskla, 140 miles by rail S.W. of Kharkov. Pop. (1870) 12,989.

KOKOMO, a town of Howard Co., Ind., on the Wildcat River, 54 miles from Indianapolis. Four railroads pass through it, affording direct communication with Cincinnati, St. Louis, and other large cities. It is engaged in agriculture, stock-raising, lumbering, and manufacturing. Pop. 5,000.

KOLTSOF, ALEXIS VASILJEVITCH, a popular Russian lyrist, born in Voronezh, 14th October 1809. His father, a cattle-dealer, gave him only the merest rudiments of education; but a few books bought at fairs awoke his imagination, and in his wandering life as a herdsman it was roused to an enthusiasm for the steppe that reflects itself in all his songs. After imitating for a time the verse of such poets as Derzawin and Pushkin, K. went in 1831 to Moscow on business, and there found friends who inserted some of his poems in the journals. A visit to St. Petersburg in 1838 introduced him to Pushkin, Jonkovsky, and a wide circle of appreciative friends. He longed more and more to be rid of trade, and was just about to settle in St. Petersburg for a literary life, when he sickened and died, 31st October 1842. In June 1846 appeared a complete edition of his poems, with a biography by Bjelinsky. They are marked by deep poetic feeling, force of conception, and a charming naïveté of expression.

KOND, or KHAND, an aboriginal hill tribe of India, chiefly found in Orissa, where they number 77,000, and also in the N.E. of Madras. They are supposed to be of Dravidian origin, akin to the Gonds. Until the last few years they were notorious for human sacrifice, which they used to carry out in the most systematic and horrible manner. This practice demanded a military force for its suppression in 1847, when more than 1500 victims were rescued. It is said that all inclination to it has now died out. See Dr. W. W. Hunter's *Orissa*, and Colonel Dalton's *Descriptive Ethnology of Bengal* (Calcutta, 1872).

KOS'LOV, a town in the Russian government of Tambov, on the river Voronezh, 42 miles W. by N. of the town of Tambov by rail, with a large trade in corn and tallow. Pop. (1870) 25,522.

KÖ'THEN (Ger. 'the place of huts'), an old and well-built town in the duchy of Anhalt, S. Germany, 12½ miles W.S.W. of Dessau. It has a handsome railway station, and is at the junction of lines from Magdeburg, Bernburg, Halle, and Dessau. The old castle has a valuable zoological museum. Pop. (1875) 14,408.

KOTRI, a town in the district of Kurrachi, Scinde, British India, on the right bank of the Indus, opposite Hydrabad, and 105 miles N.E. by rail from Kurrachee; pop. (1872) 7949. K. occupies an important position, as the terminus of the Scinde railway, where goods and passengers are transhipped into the Indus steamers. It happens to be situated on a permanent bank of the river. There is a floating-dock here, and a steam ferry to Gidu Bundar, the port of Hydrabad.

KOTT'BUS, a town of Prussia, in the province of Brandenburg, on the Spree, 70 miles S.E. of Berlin, at the junction of lines of railway from Berlin, Halle, Leipzig, Breslau, and Posen. It has an old royal castle, and large manufactories of cloths, woollens, and linens. Pop. (1875) 22,650.

KRAUTH, CHARLES PORTERFIELD, S.T.D., LL.D., an eminent American theologian and scholar of the Lutheran Church, born at Martinsburg, Va., March 17, 1823; graduated from Pennsylvania College, Gettysburg, 1839; and was ordained to the ministry, 1842. After filling several pastorates, he was made Norton professor of systematic theology and ecclesiastical polity in the Lutheran Seminary at Philadelphia, in 1864; and in 1868 professor of moral and intellectual philosophy in the University of Pennsylvania; and in 1873 vice-provost of the latter. Besides numerous sermons and addresses he has published the following: *Pastoral Office, Chrysostom, Transfiguration, Popular Amusements, The Bible a Perfect Book, Poverty, Christ and His Kingdom in Shadows*, and others. Died in Philadelphia, Pa., Jan. 3, 1883.

KRIL'OF, ALEXIS ANDREJEVICH, a Russian poet and fabulist, born at Moscow, February 14, 1768, obtained in 1812 a post in the imperial library at St. Petersburg, and in 1830 a seat in the cabinet. He stood in high favor with the Czars Alexander I. and Nicholas, who loaded the closing years of his life with wealth and honor. K. died at Vassily-Ostrov, on the 21st November 1844. When a young man, K. wrote prose comedies; but his fame rests on his fables (published in 1808, 1811, and 1816), which are truly national poems, full of native thought and humor, and wholly free from the imitation of French models universally found in earlier Russian literature. They are familiarly known by all classes of society in Russia, and have been translated into German by Torney (Mitau, 1842). See W. R. S. Ralston's *K. and his Fables* (1871).

KRIS, or CREESE, the name for a dagger with wavy blade and carved wood hilt carried by the Javanese, and worn throughout the Malayan Archipelago generally. It is with this weapon that fanatical Bugis or Malays run *amok*, that is, under some sudden impulse, rush wildly through a village, wounding every person in their path.

KRUPP, FRIEDRICH, a celebrated German metal-founder, was born at Essen, in Rhenish Prussia, April 11, 1812. There, in 1827, his father established a foundry, which under the proprietorship of the son has grown to one of the most extensive manufactories in the world. In 1851 he exhibited in London at the Great Exhibition a block of steel, weighing 45 hundredweights, and cast after a method invented by him. The steel manufactured by this process is called Krupp's steel, and can now be cast in 100-ton blocks. His great fame, however, rests upon his steel guns, which were used so successfully by the Prussians at the siege of Paris during the late war (1870–71). He has cast an 80-ton breech-loading gun in steel, which is nearly 30 feet long, and will throw a projectile ¾ of a ton in weight, and has designed besides a 124-ton gun, to be made upon the same plan, whose projectile will weigh 1 ton.

KRU'SENSTERN, ADAM JOHN CHEVALIER VON, a Russian voyager, born 8th Nov. 1770 at Haggud in Esthonia, served (1793–1799) in the English navy, and after his return to Russia, commanded (1803–6) a Russian expedition to the N. Pacific in the interest of science and trade, described by himself in *Reise um die*

Welt (3 vols. 1810–12); Eng. trans. by Hoppner, 1813). Other works of his are *Atlas de l'Ocean Pacifique* (2 vols. St. Petersb. 1824–27), and *Beiträge zur Hydrographie der grösseren Oceane* (Leips. 1819). K. became a vice-admiral in 1829, and an admiral in 1841, and died Aug. 24, 1846.

KUE'NEN, ABRAHAM, a famous Dutch theologian, was born at Haarlem, 16th September 1828, and after attending the gymnasium there, was enrolled a student of theology at Leiden, 4th September 1846. On the 21st of June 1851 he was made a doctor of theology, after having defended as his thesis a *Specimen theologicum, continens Geneseos Libri Capita triginta quatuor priora ex Arabica Pentateuchi Samaritani Versione nunc primum edita cum Prolegomenis* (Leiden, E. J. Brill). After passing the ecclesiastical examinations (which give access to the office of a preacher in the Reformed Church), he was appointed on the 1st October 1851 *Adjutor Interpretis Legati Warneriani*, and as such charged under Professor F. W. J. Juynboll, *Interpres Legati Warneriani*, with the care of the Oriental MSS. of the University Library of Leiden. On the 30th December 1852 he was appointed Professor Extraordinary of Theology in Leiden. At his entrance on this office (12th March 1853) he delivered a discourse, *De accurato Antiquitatis Hebraicæ Studio Theologo Christiano magnopere commendando* (Leiden, P. Engels). On the 1st October 1855 he was appointed Ordinary Professor. In the academical year 1861–62 he was Rector of the University of Leiden, and on laying down office (8th February 1862) he delivered a discourse, *De Religione Christiana, per continuas Theologiæ Commitationes sibi constanti et incolumi* (Leiden, Van Doesburgh).

Before entering on the office of professor, K. was made Doctor of Literature *honoris causa* by the senate of the University of Leiden (2d February 1853). K.'s writings are *Liber Geneseos secundum Arabicam Pentateuchi Samaritani Versionem* (Leid. E. J. Brill, 1851); *Libri Exodi et Levitici secundum Arab. Pent. Versionem* (*Ibid.* 1854; in the *Bijbelsch Woordenboek voor het Christelyk Gezin* (Biblical Dictionary for the Christian Family), published in three vols. (Amst. P. N. Van Kampen, 1852–59), the articles *Jerusalem Samaritanen* (Samaritans), and a number of others on the books of the Old Testament; in the *Godgeleerde Bydragen* (Theological Contributions), published at Amsterdam, for 1855–66, a number of dissertations and sometimes extensive reviews of books, and among other things, a number of essays under the common title, *Het O. Testament in het N. Testament* (The Old Testament in the New Testament); in the periodical, *De Bijbelvriend, Nieuw end Oud, ter verklaring van den Inhoud en den Geest des Bijbels* (The Bible-friend, New and Old), for the explanation of the contents and the spirit of the Bible (Nymegen, H. C. A. Thieme, 1860—1872), a number of essays and articles, among which there is a series of sixteen *Schetsen uit de Geschiedenis van Israël* (Sketches from the History of Israel); *Historisch-kritisch Onderzœk naar het Onstaan en de Verzameling van de Boeken des Oudén Verbonds* (Historico-critical Inquiry into the Origin and Collection of the Books of the Old Covenant, 3 vols. Leid. 1861–65); [French Transl. of part 1, by A. Pierson, with an introduction by M. Renan (Par. M. Lévy, frères, 1866); Eng. transl. of chaps. i. and ii., *Pentateuch and Joshua*, by Bp. Colenso (Longmans, Lond. 1865)]. In the *Theologische Tijdschrift* (Theological Journal; Amst. and Leid. Loman and Van Doesburgh; later Leid. Van Doesburgh) for 1867 and following years, K. wrote a great number of essays, articles, shorter and larger reviews and notices, among other things, a series of ten *Critische Bydragen tot de Geschiedenis van den Israëlietischen Godsdienst* (Critical Contributions to the History of the Religion of the Israelites); *De Godsdienst van Israël tot den Ondergang van den Joodschen Staat* (The Religion of Israel to the Fall of the Jewish State, 2 vols. Haarl. 1868–70); *De vijf Boeken van Moses, eine Voorlezing* (The Five Books of Moses, a lecture, Leid. 1872); *De Profeten en de Profetie onder Israel: Historisch-dogmatische Studie* (The Prophets and Prophecy in Israel, an historical and dogmatic inquiry, 2 vols. Leid. 1875). There are English translations of the three last-mentioned works. Smaller brochures —published separately, or in collections of sermons—are not mentioned here. In the *Theological Review*, No. liv. (July 1876) appeared *Yahveh and the 'other Gods,'* and in the reports and communications of the Royal Academy of Sciences (Section of Literature), *De Samenstelling van het Sanhedrim* (The Composition of the Sanhedrim, 1st ser. vol. x.); *De Stamboom van den Masoretischen Tekst der O. Testament* (The Pedigree of the Masoretic text of the Old Testament, 2d ser. vol. iii.), translated into French by A. Carrière (Paris E. Leroux, 1875); *De Mannen der Groote Synagoge* (The men of the Great Synagogue, 2d ser. vol. vi.).

KU-KLUX KLAN, the name of a secret society, organized in the Southern states, during the period of reconstruction, which followed the civil war. Its object seems to have been to terrorize the colored population and white Republicans from the North.

KUNNOJ' (*Kanauj*; Sansc. *Kanyakubja*, 'round-shouldered girl'), a town in the district of Furruckabad, N.W. Provinces, British India, on the Kali stream, 52 miles N.W. of Cawnpore. Pop. (1872) 17,093. At present little more than 'an expanse of ruins, where the cultivated fields are composed of brick-dust and mortar.' K. was for many centuries the capital of Hindustan, being second in antiquity only to Oude, and it has given its name to the most honored sept of Brahmins. The Hindu dynasty was overthrown by Mohammed of Ghur in 1194; but the city owes its ruin chiefly to a change in the course of the Ganges, which now flows 2 miles to the E. In 1540 K. was the scene of the decisive defeat of the Mogul Emperor Humayun by his Afghan rival, Shere Shah.

KURIA MURIA ISLANDS belong to England (since 1854), and are situated in a bay of the same name on the S.W. coast of Arabia. They are six in number, have a total area of 21 sq. miles, and are inhabited by some thirty fishermen. There is a slight export of inferior guano.

KU'TUB MINAR' (the 'pillar of Kutub-ud-din,' the first Mohammedan emperor of Delhi), the name of the celebrated column or tower at Delhi, which is unique in the world. It is now 238 feet high, but was once higher. The base, which is of red sandstone, is a polygon of twenty-four sides. The shaft is circular, and tapers gradually to the summit. There are five stories, each with a balcony; the two upper ones are of white marble. It can easily be ascended by a spiral staircase inside. It was struck by lightning in 1368, and again in 1803 it required to be thoroughly repaired by the British Government. After much controversy, it has been decided that it was built in honor of Mahammed of Ghur (1200–20), and that Hindu artificers were probably employed.

L.

LABORDE', ALEXANDRE LOUIS JOSEPH, COMTE DE, born at Paris, 15th September 1774, was the youngest son of an eminent financier (guillotined 18th April 1794). Entering the Austrian service, he served through five campaigns against the French Republic, but returned to France after the Peace of Campo Formio, and having won the confidence of Napoleon, attended him in 1808 on his Spanish, and in 1809 on his Austrian invasion. On the fall of the empire, L. retired for a while from politics and devoted himself to the cause of education, visiting England in 1815 to study the Lancaster system, but in 1823 he entered the Chamber of Deputies as a member of the extreme Left, signed the Protestation of 1830, and after the July Revolution received the prefecture of the Seine. He died at Paris, 24th October 1842. L. was the author of many valuable works on travel and antiquarian research, of which may be mentioned *Voyage en Espagne* (4 vols. Par. 1807–18); *Itinéraire de l'Espagne* (5 vols. Par. 1809–27; 3d ed. with additions by Humboldt and St. Vincent, 6 vols. 1827–28); and *Les Monuments de la France* (2 vols. Par. 1832–36).—His son LEON EMANUEL, COMTE DE L., born at Paris, 15th June 1807, studied at Göttingen, traveled in the East, and was secretary to the French embassy at Rome (1829), London (1830), the Hague (1832), and Kassel (1834). Quitting diplomacy, he held the post of curator of modern sculpture in the Louvre (1848–51), and of director of the imperial archives from 1856 till his death, which took place at Paris, March 30, 1869. Like his father, he was a member of the Academy, and like him he published a multitude of works on travel, art, and archæology, as

Voyage de l'Arabie Pétrée (Par. 1830–33); *Voyage en Orient* (Par. 1837–64); *Histoire de la Gravure* (Par. 1839); and *Archives de la France* (Par. 1866).

LA BOURDONN'AIS, Bertrand François Mahé de, one of the great Frenchmen in India in the 18th c., was born at St. Malo, February 11, 1699. Destined for the sea from his youth, he became a captain in the service of the French East India Company in 1723, and in 1725 took Mahé, on the Malabar coast, which was called after him. In 1746, as governor of the Isles of France and Bourbon, he led a fleet to Pondicherry and put the British squadron to flight. In conjunction with Dupleix, he then attacked Madras, which surrendered; but he quarreled with Dupleix about the terms of the capitulation, and forthwith sailed away. On his return to France he was thrown into the Bastille; though acquitted on his trial, he died of a broken heart, September 9, 1753. See Colonel Malleson's *French in India*.

LACE-WINGED FLIES, the name given to certain species of *Neuropterous* insects belonging to the family *Hemerobidæ* (Leach). The genus *Chrysopa* includes the best known species. *C. perla* is a familiar form, which is notable for the habit of its larvæ, which prey upon the aphides or plant-lice so destructive to plants. The wings are of a delicate, gauze-like texture; the body is green, the eyes golden. These flies emit a disagreeable odor when touched. The eggs are supported on pedicles or stalks; the pupa stage being attained late in summer, and the winter being passed within a cocoon generally hidden in the crevices of the bark of trees. *C. oculata* is a familiar American species.

LACKAWANN'A, a small river of Pennsylvania, flows for some 30 miles of its lower course through, and gives name to the largest and richest anthracite coal-basin in America. The bed has an area of 198 sq. miles, and a thickness of 5–14 feet, at a depth of 100–400 feet below the surface. The annual out-put is over ten thousand tons.

LADD, William, an American editor, and author of some repute, born at Exeter, N. H., May 10, 1778, and graduated from Harvard in 1797. He helped to found the American Peace Society, and was its president for a number of years. He edited the *Friend of Peace*, and the *Harbinger of Peace*. Perhaps the most important of his writings was *An Essay on a Congress of Nations*. Died April 9, 1841.

LADY FERN (*Asplenium Filix-fœmina*), a beautiful and variable British fern of world-wide distribution, Australia excepted.

LAFAYETTE COLLEGE, at Easton, Pennsylvania, was chartered in 1826, and has now classical, scientific, and law (since 1875) schools, and technical ones of mining, civil engineering, and chemistry. It grants degrees, and the number of resident professors and tutors is 28, of non-resident lecturers 4, and of students 319.

LAG'OPUS, a genus of Rasorial birds, represented by the grouse (*L. Scoticus*), ptarmigan (*L. vulgaris*), and allied forms. The tarsi and toes are provided with hair-like feathers giving to the legs rather a clumsy appearance. The bill is short and broad, and the nostrils are feathered.

LAING, Malcolm, a Scottish historian, born 1762 at Strynzia, in Orkney, was educated at Kirkwall. He passed advocate at the Scottish bar in 1785, but was little employed as a lawyer, and devoted several years to historical study, after which he spent the later portion of his life in agriculture on his paternal estate in Orkney, and died there in 1818. His chief works were a *History of Scotland from the Union of the Crowns* (1603) *to the Union of the Kingdoms* (1707); *with Two Dissertations, Historical and Critical, on the Gowrie Conspiracy, and on the Supposed Authenticity of Ossian's Poems* (1800), an able, though prejudiced work, in which he is equally severe on Macpherson and on Mary; *The Poems of Ossian, &c., Containing the Poetical Works of James Macpherson, Esq., in Prose and Rhyme, with Notes and Illustrations;* and a second edition of his history in 1804, with a *Preliminary Dissertation on the Participation of Mary Queen of Scots in the Murder of Darnley*. L.'s works have few graces of style, but have gained him the character of an acute and judicious historian.

LAKE, Viscount, a distinguished Anglo-Indian general, born in 1744, was appointed commander-in-chief in India in 1800, during the administration of Lord Wellesley. He commanded the army in Hindustan Proper during the second Mahratta War of 1803–4; took Aligarh, Delhi, and Agra, and won the battles of Coel and Laswari, by which the power of Scindiah and Holkar was broken and that of England established in the N.W. Provinces. In two months he destroyed thirty-one battalions officered by Frenchmen, and took 426 guns. L. was created baron in 1804 and viscount in 1808, and died in 1809 after his return to England. See *Selection from the Wellesley Despatches* (Oxf. 1877).

LALLEMAND, Charles François Antoine, a French officer and adventurer, born at Metz, June 23, 1774, and entered the army in 1792. He won distinction in the Egyptian, Spanish, and Russian campaigns, and was made baron in 1811. He was with Napoleon during the campaign which terminated so disastrously at Waterloo, and, after Waterloo, was sent to Malta as a prisoner. He afterwards came to the U. S. with the intention of establishing a colony for imperialist refugees. After an unsuccessful attempt in Texas, the state or canton of Marengo was founded in Alabama, and the city of Eagleville laid out. Funds for this enterprise were secured by subscriptions opened in Paris. In 1823 he fought in the Spanish war, after which he returned to America, and conducted a successful school in New York. After the revolution of 1830 he was restored to all his military and political honors in France, whither he returned, and died in Paris, March 9, 1839.

LAMAR, Lucius Quintus Cincinnatus, an eminent American stateman, born in Georgia in 1826, and educated at Emory College of his native state. He moved to Mississippi; was elected to Congress in 1856, and was re-elected upon the expiration of the term, but upon the outbreak of the civil war, resigned his seat, and entered the Confederate army. Since the conclusion of the war he has been several times elected to Congress, where he has distinguished himself by his ability and eloquence. In 1877, he was elected to the U. S. Senate, and on the expiration of his term, in 1883, he was re-elected. He is now (1885) Secretary of the Interior under President Cleveland's administration.

LAMBAYE'QUE, a town of Peru, in Libertad, on the river L., 15 miles from the Pacific, and 425 miles N.W. of Lima. It has manufactures of woollens and cottons. Pop. 10,000.

LAMB'S-WOOL, a beverage of strong ale and pulped roasted apples, formerly much esteemed in England. In some parts of Scotland anything very delicious is said to 'gang down like lam'-oo.' The name is a corruption of the Cymric *la maes abhal* (pronounced *lamasool*), 'the feast or ingathering of apples.'

LANCASTER, a town of Fairfield Co., O., at the junction of two railroads, and connected by the Hocking Canal with the Ohio Canal. The surrounding country is devoted to farming. Pop. 7000.

LANDER, Frederick West, born at Salem, Mass., Dec. 17, 1822. He became engineer, but in 1861 entered the Union army, with the rank of brigadier-general, and served with gallantry in the civil war until the time of his death, at Paw Paw, Va., in 1862.

LANDER, Louisa, an American sculptor, born at Salem, Mass., in 1835. Her best works are *To-Day*, *Galatea*, *Virginia*, *The Exile of Siberia*, *Ceres Mourning for Proserpine*, and *A Sylph Alighting*.

LANDSKRONA ('the crown of the land'), a town in Sweden, in the lan of Malmohus, on a large harbor 30 feet deep on the E. shore of the Sound, 16 miles N.-E. of Copenhagen, and connected by rail with the interior of Sweden. It has iron foundries, and manufactures sugars and woollens. In 1870, 1189 vessels entered the port; cleared, 1175. Its fortifications were kept up till 1870, when its castle was made a prison.

LANE, Edward William, an English Orientalist, who for life-long devotion to study worthily bears comparison with the great Germans. He was born at Hereford in 1801, and spent many years in Egypt, where he was induced by the fourth Duke of Northumberland, who bore the main share of the expense, to undertake his great work, the *Arabic Lexicon*. The first volume was published in 1863; four more appeared before his death at Worthing, 10th August 1876, and the remaining three were left completed in his own manuscript. He also wrote *Manners and Customs of the Modern Egyptians* (Lond. 1835), and translated *The Thousand and One Nights*.

LANE, James Henry, an American soldier and statesman, born at Lawrenceburg, Ind., June 22, 1814, and began the practice of the law in 1840. In 1846 he entered the army with rank of private, and was rapidly promoted to colonel. He commanded a brigade at the battle of Buena Vista. Was a member of Congress from Indiana from 1853 to 1855. In 1855 he moved to Kansas, and took an active part in the struggle there waged between the free-soil and pro-slavery parties—on the side of the former. At one time he was compelled by the pro-slavery party to flee from the territory upon a charge of high treason. After the admission of Kansas as a state, he was elected to the U. S. Senate in 1861, and again in 1865. He committed suicide at Leavenworth, Kan., July 11, 1866.

LANG'ENBECK, Konrad Johann Martin, a German anatomist and surgeon, was born December 5, 1776, at Horneburg in Hanover. In 1804 he became professor in Göttingen, and in 1807 established there a surgical and ophthalmic hospital. He died January 24, 1851. His chief writings are *Nosologie und Therapie der Chirurgischen Krankheiten* (5 vols., 1822–40), *Icones Anatomicæ* (8 vols., 1826–39), *Handbuch der Anatomie* (4 vols., 1831–47).

LANG'HORNE, John, was born at Kirkby Steven, Westmoreland, England, in March 1735, and studied at Clare College, Cambridge. He spent the earlier years of his life teaching and

writing for the press, but obtained preferment in the Church through the influence of his wife's relatives, who were rich. He was first preacher at Lincoln's Inn Chapel, and afterwards prebendary of Wells Cathedral. Of his prose works nothing remains but his well-known translation of Plutarch's *Lives* (1770), executed with the help of his brother. L. died 1st April 1779. His poems, with a biographical memoir, were published by his son in 1804.

LANGSTON, JOHN MERCER, LL.D., born a slave, in Virginia, in 1829. He was liberated when six years of age, and afterwards going North, graduated from Oberlin College, O., in 1849. He became a lawyer; became professor of law in Howard University, D. C.; and, in 1877, was made minister to Hayti, which position he still holds (1885).

LANMAN, CHARLES, an American author and editor, born at Monroe, Mich., June 14, 1819. He followed mercantile pursuits for several years, and in 1846 became associate-editor of the Cincinnati *Chronicle*, and afterwards became a writer for the New York *Daily Express*. Subsequently he acted as American correspondent to the *Illustrated London News* and the *London Athenæum*. His principal published works are *Essays for Summer Hours*, *A Summer in the Wilderness*, *A Tour to the River Saguenay*, *Letters from the Alleghany Mountains*, *Occasional Records of a Tourist*, *The Japanese in America*. *Dictionary of Congress*, *Private Life of Danial Webster*, *The Red Book of Michigan*, and *Adventures in the Wilds of America*.

LAN'SINGBURGH, a post village of New York, on the Hudson River, nearly opposite the mouth of the Mohawk, 200 miles N. of New York City by rail. It is perhaps the chief point in the United States for the manufacture of brushes, oil-cloth, and crackers, and communicates with Waterford by a bridge over the Hudson. L. is named after Abraham Lansing, who settled here in 1771. Pop. 7437.

LA PAZ DE AYACUCHO, the chief commercial city of the republic of Bolivia, beautifully situated at the elevation of 12,226 feet, and on both sides of the Chuquiapo. It has a fine cathedral, 14 other churches, a university, &c., and carries on a large foreign trade with the Peruvian ports of Arica and Islay, with the latter by means of the Arequipo Railway to Puno on Lake Titicaca. It was founded in 1548. Pop. 76,372.

LAPHAM, INCREASE ALLEN, LL.D., an American civil engineer and scientist, born at Palmyra, N. Y., March 7, 1811. He was employed in the construction of several canals, and became secretary of the Ohio canal commission in 1833. He soon attained wide reputation among scholars by his geological and botanical researches, and published many valuable papers upon numerous scientific subjects. In 1836 he moved to Milwaukee, Wis., and in 1873 conducted a geological survey of that state with great skill. Died Sept. 14, 1875.

LAREDO, a town of Webb Co., Tex., on the E. bank of the Rio Grande River, 152 miles W. of San Antonio. It has an active Mexican trade, and is also extensively engaged in wool-producing and stock-raising. Pop. 7500.

LARYNGOT'OMY is performed by making a vertical incision in the mesial line, between the sterno-thyroid muscles, about an inch in length, and then a cross cut through the crico-thyroid membrane. A silver tube, curved on the flat, is then introduced into the air-passage and retained by tapes round the neck. The operation of L. is occasionally necessary, in order to save life, in cases of acute disease, more especially supervening on chronic laryngitis. In some cases the more difficult and dangerous operation of tracheotomy is necessary.

LAS VEGAS, a growing town of San Miguel Co., N. M., on the Atchison, Topeka & Santa Fe Railroad, about 40 miles E. of Santa Fe. The famous Las Vegas hot springs are located six miles from here. Pop. 9000.

LASWA'RI, a village in the Rajput state of Alwar, Central India, 128 miles S. of Delhi, famous for the battle in which Lord Lake, in 1803, defeated the army of Scindia. This victory, in conjunction with that of Wellington at Assaye, broke the Mahratta power, and established the British in the N.W. of India. A commemorative medal was presented to the survivors in 1851. See *Wellesley Despatches* (ed. Oxon. 1877).

LAURENS, HENRY, an American merchant and statesman, born at Charleston, S. C., in 1724, and early acquired a large fortune in mercantile pursuits. In 1776 he became a member of Congress, and in 1779 went as U. S. Minister to the Netherlands. In 1781 Congress appointed him a member of the commission to negotiate peace. Many of his writings have been given to the public in pamphlet form. Died at Charleston, S. C., Dec. 8, 1792.

LAURENS, JOHN, an American patriot, born in 1753, and in 1777 entered the Continental army, and was attached to the staff of Gen. Washington. He participated in many of the most important battles of the Revolution, and was wounded at Germantown and Cooshahatchie. In 1780 he went to France and negotiated a much needed loan. Returning to America he served under Gen. Green, and was killed in battle, Aug. 27, 1782. Laurens has been called 'the Bayard of the American Revolution.'

LAUR'VIK, a seaport town in Norway, 70 miles S.W. of Christiania, on a fjord of the same name at the mouth of the Numedalslaagen, which affords motive power to many manufactories. It has considerable trade, especially in timber, though much of its former importance has now been transferred to Horten, a sea-port 37 miles N.N.E. In 1873, 694 vessels entered the harbor of L., which is large and deep. Pop. (1875) 6509.

LAWRENCE, a beautiful city of Kansas, on the Kansas River, founded in 1854 by the free-soil party, which was at that time engaged in a fierce struggle with its antagonist, the pro-slavery party. In 1863 the city was burned by a band of southern freebooters, under the command of the notorious Quantrell, but was quickly rebuilt. It is the second city of its state in importance, and is the seat of large manufacturing interests. Pop. 10,000.

LAWRENCE, JAMES, an American naval officer, born at Burlington, N. J., Oct. 1, 1781, and entered the U. S. navy in 1798. He participated in the Tripolitan war, and in 1810 was placed in command of the *Hornet*. In Feb. of 1813 he captured, after a short but fierce engagement, the British sloop-of-war *Peacock*. In a few moments after its surrender, the *Peacock* sank, with many of her own crew and some of Lawrence's on board. Upon his return home, he was presented with a gold medal by Congress, promoted captain, and placed in command of the *Chesapeake*. On June 1, 1813, just outside of Boston harbor, he fought the British frigate *Shannon*, commanded by Capt. P. V. Broke. The result of the conflict was that Lawrence was severely wounded and his vessel taken by the enemy. As he was being carried below deck, he uttered the memorable and oft-quoted words, 'Don't give up the ship.' He died from the effects of his wound at Halifax, July 5, 1813.

LEADVILLE, a city of Lake Co., Col. It is the trade center of one of the richest mining regions, and produces one-third of the lead used in this country. Silver is also mined in large quantities. Pop. 15,000.

LEA, ISAAC, LL.D., an American geologist and scientific writer, born of Quaker parents, at Wilmington, Del., March 4, 1792. He was a merchant during his early life, but found time for study. He directed his attention particularly to geology, and made large collections of fossil shells and minerals found about Philadelphia, Pa. He made discoveries of great importance, and his works are full of interest to students of Natural History. The following are his principal works: *Contributions to Geology* (1833), and *Fossil Footmarks in the Red Sandstones of Pottsville* (1853). A complete edition of his works, in 13 volumes, has been published.

LEAVITT, JOSHUA, D.D., an American clergyman and editor, born at Heath, Mass., Sept. 8, 1794. He graduated from Yale College at the age of 20, and practiced law from 1819 to 1825. In the latter year he entered the Congregational ministry and became pastor of a church at Stratford, Conn. From 1828 until the close of his life, he was engaged in literary and editorial work. He edited the *Sailor's Magazine*, the *New York Evangelist*, and *Emancipator*. The last was devoted to the cause of abolition, of which Dr. Leavitt was an earnest advocate. In 1848 he became one of the staff of the *Independent*, which position he held at the time of his death in Brooklyn, Jan. 16, 1873.

LEBANON SPRINGS, a village and summer resort of Columbia Co., N. Y. It has a fine mineral spring, large hotels, and is near to several Shaker settlements. The adjacent scenery is noted for its wild beauty.

LEBANON, in Lebanon Co., Pa. It has five railroads, and contains a number of large iron works. Pop. 10,000.

LEBLANC', NICOLAS, a French chemist, was born at Issondun (Indre) in 1753. He studied medicine, and in 1780 became surgeon to the house of the Duc d'Orleans, but occupied himself chiefly with chemical researches. In 1786 the Academy of Sciences offered a premium for the invention of a new process for the manufacture of carbonate of soda. L. turned his attention to the subject, and in 1789 discovered the process now in use, by which the carbonate is prepared from common salt. The importance of this discovery in the development of chemistry is incalculable, but L. himself reaped no benefit from his labors. He was forced to explain his method to the Government, who published it; and after a long series of unsuccessful endeavors to obtain an indemnity, L. died by his own hand, January 16, 1806.

LEBRI'JA, a town of Spain, province of Seville, on a branch of the Guadalquivir, 40 miles N.N.E. of Cadiz by rail. It has a large Arabesque church, and its industries are chiefly weaving and brickmaking. There is a considerable trade in the fine oil and fruits of the vicinity. Pop. 10,338.

LECK'Y, WILLIAM EDWARD HARTPOLE, was born near Dublin, March 26, 1838, educated at Trinity College, and graduated B.A. (1859). In 1861 appeared his *Leaders of Public Opinion in Ireland* (new ed. 1871–72). Four years later his *History of the Rise and Influence of the Spirit of Rationalism in Europe* (2 vols. 5th ed. 1872), gained for him the respectful attention of the philosophical world. In 1869 the *History of European Morals from Augustus to Charlemagne* established his reputation for brilliant and scholarly generalization. His three works have been translated into German by Dr. H. Jolowicz.

LE CONTE, JOHN EATON, an American civil engineer and scientist, born in New Jersey, Feb. 22, 1784, and entered the engineer corps of the U. S. army in 1813. In 1831 he retired from the army with the rank of major, and devoted the remainder of his life to scientific pursuits. He published numerous articles of interest and permanent value. Died at Philadelphia, Pa., Nov. 21, 1860.

LEE, ALFRED, D.D., born at Cambridge, Mass., Sept. 9, 1807, and graduated from Harvard College in 1827. At first a lawyer, he subsequently entered the ministry of the Protestant Episcopal Church; and, after serving as rector of a church in Rockdale, Del., was, in 1841, made Bishop of Delaware.

LEE, NATHANIEL, an English dramatist, was born in 1650. Upon leaving Cambridge he took to the stage, but proved a bad actor, though a good reader. At the age of twenty-five he produced his first play, *Nero*. The best known of his productions are *The Rival Queens, or Alexander the Great* (1677); *Theodosius, or The Force of Love* (1680); *The Princess of Cleve* (1689); and *The Massacre of Paris* (1690). L. also joined Dryden in writing *Œdipus* (1679) and *The Duke of Guise* (1685). In these are to be found passages marked by wonderful delicacy of fancy and intense dramatic passion, but the style frequently degenerates into mere bombast. L., who was subject to fits of insanity and dissipation, died in 1692.

LEE, ROBERT, D.D., a leader of the liberal section of the Church of Scotland, was born at Tweedmouth, in Northumberland, 11th November 1804. He studied at St. Andrew's University, was ordained in 1832, was called to Arbroath in 1833, to Campsie in 1836, and, on the Disruption (1843) was made minister of Grey Friars', Edinburgh. In 1846 he became Regius Professor of Biblical Criticism in the University of Edinburgh, and the valuable results of his study of the Bible text appeared in *The Holy Bible, with about* 60,000 *Marginal References and Various Readings* (1854). His *Prayers for Public Worship* appeared in 1857, and for their use in Grey Friars' he was arraigned before the Presbytery of Edinburgh (1859), and later before the General Assembly, when he won a favorable verdict by a singularly eloquent defence. His *Reform of the Church of Scotland in Worship, Government, and Doctrine* (1860) discussed the liturgy, postures in worship, instrumental music, festivals and feasts, &c., with the view of bringing the Church into greater harmony with the age, and the opinions it contained were reported favorably on by the General Assembly in 1864. The first organ used in the service of the national church was introduced into Grey Friars' in April 1865. The General Assembly subsequently reversed the decision of 1864, and Dr. L. was preparing a case for the civil courts when he died at Torquay 12th March 1868. See the *Life of Dr. R. L.* by the Rev. R. H. Story (2 vols. 1870).

LEER, a town of Prussia, province of Hanover, on the Leda, near its junction with the Ems, and 16 miles S.E. of Emden by rail. It has considerable shipping, and manufactures sugar, chicory, tobacco, beer, and brandy. Pop. (1875) 9339.

LEEUWIN, CAPE, the S.W. extremity of Australia, is situated in 34° 19′ S. lat., 115° 8′ E. long. It consists of a bluff of granite, against which the sea beats with tremendous force.

LEGNA'NO, a town of N. Italy, province of Verona, 25 miles S.S.E. of Verona by rail. It lies in a swampy rice district, is of some strategic importance, and has leather and straw-hat industries. Pop. (1874) 13,355.—Another Italian town of the same name, 17 miles N.W. of Milan, has several interesting churches, containing rare pictures. It was the scene of a great victory won by the Milanese over Friedrich Barbarossa, 29th May 1176. Pop. (1874) 6685.

LEIGHTON, ALEXANDER, born in Edinburgh, Scotland, in 1568, studied at Leyden, where he obtained a medical diploma, and at Edinburgh, where he became Professor of Moral Philosophy (1603), removed to London (1613), and having failed to obtain the license of the College of Physicians to practice as a doctor, accepted the lectureship of a Calvinist meeting-house. In 1629 he had printed in Holland *An Appeal to the Parliament*, or *Zion's Plea against the Prelacie*, in which the prelates were denounced as men of blood, episcopacy as anti-christ, and the queen as a daughter of Heth. For this he was arrested, February 29, 1630, brought to trial June 4, and sentenced to be degraded from the ministry, whipped, pilloried, and branded with a double S. S. ('sower of sedition'), to have his ears cut off, and his nose slit, to pay a fine of £10,000, and to be imprisoned for life. He escaped, but was recaptured, and, after undergoing this barbarous punishment, lay in the Fleet Prison until released by the Long Parliament (1640), which also voted, but never paid him, £6000, and made him keeper (1642) of Land's palace at Lambeth, at that time a State prison. He is said to have died insane, either in 1644 or 1649.

LEITZMERITZ, a town of Bohemia, on the right bank of the Elbe, which is here spanned by an iron bridge 597 yards long, 35 miles N.N.W. of Prag, has a fine cathedral (founded 1045), six churches, five educational institutions, &c. Brewing, salmon fishing, straw plaiting, and agriculture are the principal industries, and large quantities of fruit are annually exported to Berlin and St. Petersburg. Pop. 10,023.

LEL'AND, CHARLES GODFREY, a versatile American writer, born at Philadelphia, August 15, 1824, graduated at Princeton College (1846), traveled in Europe, and studied at Heidelberg, Munich, and Paris, and returning to America in 1848, was called to the bar (1851). Relinquishing law for literature, he wrote for periodicals, and was editor of several American magazines, but shortly after the close of the Civil War, in which he saw some service, settled in England. L.'s fame rests chiefly on his *Hans Breitmann's Ballads* (5 parts, 1867–70; complete ed. 1872), written in the broken English of a Pennsylvanian German; somewhat similar to which is his *Pidgin English Sing-Song* (1876). He is also author of two works on the English gypsies, various translations from the German, the *Egyptian Sketch-Book* (1873); *Johnny-kin and the Goblins* (1876), &c.

LEMAI'TRE, FREDERIC, one of the greatest of French actors, was born at Havre, in July 1798, and studied for two years under Lafon at the *Conservatoire*. He played at the 'Odeon,' and 'Comédie,' but found his proper sphere at the 'Porte-Saint-Martin,' where his brilliant versatile powers gained him the name of the *Talma du Boulevard*. The ease with which he passed from the tragic through the airiest comedy to all the phases of the eccentric and grotesque, made him the great actor of the new romantic school of art and poetry. He embodied the finest conceptions of Dumas and Victor Hugo, and among his many leading parts were 'Ruy Blas,' 'Lucrèce Borgia,' 'Kean,' and 'Robert Macaire.' L. died 1st February 1876.

LE MOYNE, a distinguished French-Canadian Family.—I. CHARLES LE M. was born in Normandy, France, in 1626, and in 1641 removed to Canada. He was the father of eleven sons, nearly all of whom distinguished themselves in various ways.—II CHARLES, Baron de Longueil, born at Montreal, Dec. 10, 1656, played an important part in the settlement of Canada, participated gallantly in the wars against the English, was wounded at Quebec in 1690, became governor of Montreal in 1700, and died at Montreal, June 8, 1729.—III. JACQUES, born at Montreal in 1659, took an active part in the wars with the English, and in 1690 was mortally wounded at Quebec, in which engagement he was in command of the batteries which repulsed the English squadron.—IV. PAUL, born at Montreal, in 1663, participated in the above wars, went with Frontenac's expedition against the Iroquois Indians; and in 1704 he and 40 others were burned to death by these indians in a stockade.—V. JOSEPH, born at Montreal in 1668, served in the French army, took part in the settlement of Louisiana, captured Pensacola from the Spaniards (1719), was made captain (1720) and rear-admiral (1723), and died in 1734.—VI. ANTOINE, born at Montreal in 1683, entered the French army, participated in the settlement of Louisiana, defeated the English forces under Pepperell, at Louisburg, and died in France, in 1747.

LEN'CLOS, NINON DE, the French Aspasia of the 17th c., was born of good family at Paris, 13th May 1616. Her mother endeavored to train her piously; but her father cultivated with more success her taste for pleasure. She was singularly beautiful, spoke several languages with ease, excelled in other accomplishments, and enjoyed a yearly income of $50,000. When seventeen she left the maternal roof, some say under the protection of Richelieu, others, under that of the Duc de Coligny. It matters not which was first; her intrigues continued for fifty years, and with more than fifty lovers. In one instance, indeed, she remained with an amorous gentleman in the country for three entire years; but such a breach of her own rules was not to be tolerated, and her mob of admirers recalled her to Paris. In the case of one family—the Sevignés—she was mistress successively to father, son, and grandson. She closed her list of successful adorers with Chateauneuf at seventy, but was considered beautiful when nearly ninety. Of her two sons, one, ignorant of his parentage, made love to her, and shot himself on learning the truth. Despite her character, the best of society visited her; authors and authoresses were proud to correspond with her; and anxious mothers brought their children to her home to study society—for manners then took the place of morals. Ninon was no worse than many ladies

of her time—only more beautiful and more distinguished in her connections. She died in 1705. There are some genuine letters of hers in the works of St. Evremond, but those under her name addressed to the Marquis de Sevigné are spurious. See Sardière's *Vie de N. de L.;* Bret's *Mémoire sur N. de L.;* and Voltaire's *Lettre sur Mlle. de L.*

LENNOX, JAMES, founder of the Lennox Library in New York City, born in N. Y., in 1800. Inheriting a fortune, he was noted for his philanthropic liberality, extending throughout his entire life. Died at New York, in 1880.

LENT'HALL, WILLIAM. Speaker of the Long Parliament, was born at Henley-on-Thames, Oxfordshire, England, in June 1591; educated at Thame School and St. Alban Hall, Oxford, and called to the bar at Lincoln's Inn in 1616. Elected M.P. for Woodstock, he was chosen Speaker of the House of Commons (1640), and as such was desired by Charles I. to point out to him the five members whom he had come down to arrest, January 4, 1642. 'May it please your Majesty,' said L., falling on his knees, 'I have neither eyes to see, nor tongue to speak, but as the House directs me.' He was rewarded for his conduct on this occasion by the posts of Master of the Rolls, Commissioner of the Great Seal, and Chancellor of Lancaster, but shared in the expulsion of the Rump, and retired from public life until 1654, when he sat for Oxfordshire, as again in 1656. At the Restoration his name was exempted from the act of Indemnity, but he obtained a pardon, and retired to Burford Priory, Oxfordshire, where he died, September 3, 1662, having on his deathbed recanted his 'puritanical errors' to the Bishop of Chichester.

LEOMINSTER, a town of Worcester Co., Mass., on the Fitchburg and Old Colony railroads, 40 miles from Boston. It is engaged in manufacturing horn combs, jewelry, buttons, pianos, and paper. Pop. 5776.

LER'DO DE TEJA'DA, SEBASTIAN, a Mexican statesman, born at Jalapa, April 25, 1825, and was admitted to the bar in 1851. He became eminent as a lawyer, and soon gained prominence as a politician. He became a member of Congress in 1861, and was appointed minister of foreign affairs in 1863. He was a firm supporter of the national party during its struggle with the Emperor Maximilian, supported by French troops. Upon the success of that party in 1867, Lerdo was made president of the supreme court of justice, and in 1872 was elected president of the Republic.

LESLIE, FRANK, born in England, in 1821, and came to America in 1848. He took up his residence in New York City, where he became the successful publisher of numerous illustrated papers and magazines. Died in 1880.

LES'SEPS, DE, FERDINAND, VISCOUNT, a distinguished French engineer, born at Versailles, Nov. 19, 1805. He projected and executed the Suez Canal (1859–69), one of the most gigantic engineering enterprises of the world.

LESTER, CHARLES EDWARDS, an American author, born at Griswold, Conn., July 15, 1815. He was first a lawyer and then a Presbyterian minister, but devoted most of his life to literary work. Among his published works are *The Glory and Shame of England* (1841), *Condition and Fate of England* (1842), *Life of Vespucius* (1846), *The Napoleon Dynasty* (1852), *Life of Charles Sumner* (1874), and *Our First Hundred Years* (1874–75).

L'ESTRANGE, SIR ROGER, an English author, was born at Hunstanton Hall, Norfolk, England, 17th December, 1616. An ardent royalist by education and sympathy, he was imprisoned from 1644 to 1648, when he escaped to the Continent. He returned to England in 1653, and on the Restoration became censor of plays. He started the *Public Intelligencer* in 1663, and the *Observator* in 1679, journals in which he championed High Toryism with an able but virulent and vindictive pen. He was knighted by James II. His mind failed latterly. He died in London 11th September 1704. L. published many political pamphlets and classical translations.

LEUTZE, EMMANUEL, a distinguished painter, born in Württemberg, May 24, 1816, and in early life came to America. In 1841 he visited Europe for the purpose of study, and in 1859 returned to America. His best known works are *Western Emigration* (in the Capitol at Washington), *Washington Crossing the Delaware, Cromwell and his Daughter*, and *The Iconoclast*. There is wide difference of opinion as to Lentze's merits as an artist. Died at Washington, D. C., 1868.

LEWIS, DIO, M.D., an American reformer, born at Auburn, N. Y., March 3, 1823, and educated at the Harvard Medical School. He practiced medicine for a time, but has devoted most of his life to teaching and writing. He has published, among other works, *The New Gymnastics* (1862), *Weak Lungs, and How to Make them Strong* (1863), *Talks about People's Stomachs* (1870), *Our Girls* (1871), and *Chats with Young Women* (1874). His writings are of a high moral tone, and are full of common sense.

LEWIS, MATTHEW GREGORY (MONK LEWIS), was born in London, 9th July 1775. While in Germany he composed *The Monk*, his best known book, vigorously but coarsely written, full of murders, ghosts, and impurities. The *Bravo of Venice* (1804) was his second-best novel, and the *Castle Spectre* (1797) his only successful play. One or two stirring ballads of his still live, and his *W. Indian Journal* is a good book of travels. He died returning from a visit to his estates in the W. Indies, 14th May 1818. L.'s *Life and Correspondence* was published in 1839.

LEWIS, TAYLOR, LL.D., L.H.D., an eminent American linguist, born at Northumberland, N. Y., March 27, 1802, graduated from Union College in 1820, and began the practice of law at Fort Miller, N. Y., but soon after relinquished it, in order to devote his entire time to classical studies. He was professor of Greek in the University of New York (1838), and in Union College (1849). Among his published works are *The Six Days of Creation* (1855), *The Bible and Science* (1856), and *The Divine Human in the Scriptures* (1860). Died at Schenectady, N. Y., in 1877.

L'HOSPITAL, MICHEL DE, a great French statesman, born in 1505 at Aigueperse in Auvergne, studied law at Toulouse and Padua, was auditor of the Rota at Rome, came in 1534 to Paris, where he practised as an advocate and counselor for the Parliament, was appointed by Marguerite of Valois her chancellor, and in 1554 became superintendent of finance. On the accession of François II. (1559) he entered the Council of State, and in 1560 was made chancellor of the kingdom by Catherine de' Medicis. A good man, a genuine patriot, and a prudent councilor, he labored to restore order and smooth party differences, but his moderation was taken for secret heresy, and led to his losing the seals, 24th May 1568. He died at Bellebat, near Étampes, 13th March 1573, during the Civil War, against which he had constantly remonstrated. See his *Œuvres Complètes*, by Dufey (5 vols. Par. 1824), and the biographies by Villemain and Lévesque de Pouilly.

LICK, JAMES, an American philanthropist, born at Fredericksburg, Pa., Aug. 25, 1876. After following the business of pianomaking in New York and at various places in South America, he removed, in 1847, to San Francisco, Cal., where he amassed a large fortune. At his death, in 1876, he bequeathed over $1,700,000 to charitable and educational institutions, $700.000 of which was given to the University of California for the erection of an observatory and the construction of a telescope, the latter to be more powerful than any ever before made.

LIDD'ON, REV. HENRY PARRY, D.D., D.C.L., the greatest living preacher in the English Church, born in 1830, studied at Christ Church, Oxford, and graduated in 1850, became Johnson's theological student (1851), and having taken orders, was Vice-Principal of Cuddesdon Theological College (1854–59). He was made a canon of Salisbury in 1864, and as Bampton lecturer (1866) delivered a masterly course of sermons, *The Divinity of our Lord* (Oxf. 1867). In 1870 he was advanced to a prebend of St. Paul's Cathedral, and the same year became Ireland Professor of Exegesis in the University of Oxford. As a leader of the Anglo-Catholic party, L. has attended several of the Bonn conferences of the 'Old Catholics,' and in 1876 expressed his sympathy with the Greek Church by a visit to the revolted provinces of Turkey. He is the author of *Lenten Sermons, Some Words for God, Sermons Preached before the University of Oxford*, and *Some Elements of Religion*.

LILL'O, GEORGE, a London jeweler with a turn for writing plays, was born 4th February, 1693. The only one of his plays which kept the stage was *George Barnwell*, a tragedy played at Drury Lane for twenty consecutive nights in 1731, and a great favorite with Queen Caroline. *Fatal Curiosity* was his next best performance. Lillo wrote simply, with tenderness and good feeling, but no genius. He died 3d September, 1739. See the biographical memoir prefixed to Davies' edition of L.'s *Dramatic Works* (2 vols. Lond. 1770).

LILY-TREE, a name given to the *Dracæna Draco* or Dragon-tree of Teneriffe, as being a liliaceous plant, with a branching tree-like stem. Each branch is surmounted by a crowded head of lanceolate leaves, from amid which the flower-stalk rises forth. The common name is derived from the tree being one of the sources of Dragon's-blood. The colossal and historic specimen at Orotiva was by Humboldt's measurements 70 feet high and 48 feet in girth. Unfortunately it was totally destroyed during a hurricane in 1867, after a supposed existence co-eqnal with the Egyptian pyramids.

LIMA, a town of Allen Co., O., on the Ottawa River. It has direct communication with Cincinnati and Fort Wayne, by railroad; and is engaged in manufacturing and trade. Pop. 7569.

LIN'ACRE, THOMAS, a physician and scholar of the 'New Learning,' was born at Canterbury, England, about 1460, and became a Fellow of All Souls' College, Oxford, in 1484. Sent with De Selling on an embassy to the Pope, he studied Greek at Flor-

ence under Chalcondylas, and medicine under Hermolaus Barbarus at Rome, where he formed friendships with Grocyn and William Latymer, and translated several of Galen's treatises into Latin. On his return to Oxford, he lectured on Greek and physic, became tutor to Prince Arthur, and having taking orders (1507), held successively the livings of Mersham, Hawkhurst, Holsworthy, and Wigan, and prebends of Wells, York, and Westminster. He was also physician to Henry VII. and Henry VIII., and founder of the Royal College of Physicians (1518), of which he became first president. His death took place at London, Oct. 20, 1524. L.'s learning, styled by his pupil Erasmus 'deep, searching, and refined,' is enshrined in his nine Latin translations of Galen, Proclus, and Paulus Ægineta, in a Latin Grammar for the use of the Princess Mary, and in the treatise, *De Emendata Structura Latini Sermonis Libri Sex* (Lond. 1524).

LINCOLN, a town of Logan Co., Ill., on Salt Creek, 28 miles from Springfield. It has three railroads, is in the midst of a fine agricultural region, and is the largest grain shipping point between Chicago and St. Louis. Pop. 5500.

LINCOLN, BENJAMIN, a general of the American revolution, born at Hingham, Mass., Feb. 3, 1733. He served under Washington before Boston and in New Jersey; was with Gates in Northern New York, at the time of Burgoyne's surrender, and was wounded at Bemus Heights. He was in command of Charleston, at the time of its surrender, in 1780, and was again under Washington, at the time of Cornwallis's surrender at Yorktown. After the termination of the war, he held several political positions in his native state. Died at Hingham, May 9, 1810.

LINCOLN, the State Capital of Nebraska, on Salt Creek, 69 miles S.W. of Omaha. The Union Pacific and other railroads pass through it. It contains the State Penitentiary and Insane Asylum, and is the seat of several educational institutions, including the State University. There is considerable manufacturing and a large wholesale and jobbing trade is carried on. Pop. 18,000.

LINGUAGROSS'A, a town of Sicily, province of Catania, near the N.E. base of Etna, 9 miles W. of the railway station at Taormina. It has several good churches, and in the vicinity is some beautiful scenery. Pop. (1874) 8822.

LIN'LEY, THOMAS, an English musician and composer, born at Bath about 1725, studied under Paradies, a Venetian composer, and became conductor of concerts and oratorios in his native town. The marriage of his daughter to Sheridan led to his subsequently embarking in theatrical speculations. L. died in London, 19th November 1795. Along with his son, L. wrote the songs in Sheridan's *Duenna*, composed the accompaniments to the original airs in the *Beggar's Opera*, and published some exquisitely sweet and tender ballads.

LIPPINCOTT, SARAH JANE (*née* CLARKE), better known by her *nom-de-plume* of 'Grace Greenwood,' born at Pompey, N. Y., Sept. 28, 1823. She was married to Leander K. Lippincott, in 1853. She has written extensively for the press, and has published numerous books of stories for children. Her writings have been noted for their pure sentiment, and have had wide circulation.

LIR'IA, a town of Spain, province of Valencia, 15 miles N.W. of the town of Valencia, has considerable trade. Pop. (1870) 8500.

LISLE, CLAUDE CHRISTOPHE ROUGET DE, a French poet who by a single song, the *Marseillaise*, has won immortality. Born 10th May 1760, L. was an officer of artillery at the time of the Revolution. The song—both words and music—was composed at Strassburg in a single night, about the beginning of 1792. The author called it *Chant de Guerre de l'Armée du Rhin*. Everywhere it soon sent a fiery rapture through the volunteers of the Republic. When Barbaroux the Girondist leader, and deputy for Marseille, first introduced it to the Parisians, they being ignorant of its real authorship called it *Hymne des Marseillais*, by which name it has ever since been known. L. died near Paris, 26th June, 1836. The *Hymne* is now the 'National Anthem' of France.

LIS'TON, JOHN, an English actor, born in London, England, in 1776. Originally a master in Archbishop Tennison's school, Leicester Square, he was expelled for acting with the boys. He then took to the stage, and displayed the happiest comic talent. In 1806 he obtained an engagement at the Haymarket Theater. *Mawworm*, *Tony Lumpkin*, and *Bombastes Furioso* were among his best impersonations, but the greatest of all was his *Paul Pry*, first performed in 1825, the memory of which is ever green. He retired in 1837, and died March 22, 1846. His wife (*née* Tyres) was a popular singer and actress.

LITCHFIELD, a town of Montgomery Co., Ill., 43 miles from St. Louis. It has three railroads, and manufactures railway cars, machinery, and flour, coal and lubricating oil are found in the vicinity. Pop. 5000.

LIT'TLEJOHN, ABRAM NEWKIRK, D.D., a clergyman and bishop of the Episcopal Church in America, born in Montgomery Co., N. Y., Dec. 13, 1824, and graduated from Union College in 1845. He was ordained priest in 1850, was rector of churches in New Haven, Conn., and in Brooklyn, N. Y., and in 1868 became bishop of Long Island. He has published numerous sermons and addresses.

LITTLE ROCK, the capital of Arkansas, on the Arkansas River, 300 miles from its mouth. It is the terminus of several railroads, and is connected by steamboat with the various points on the Arkansas and Mississippi rivers. Besides its public buildings, it is an important cotton market, and has extensive cotton seed oil mills. Pop. 13,185.

LITTORI'NA, a genus of *Gasteropodous* mollusca, including the Periwinkle (*L. littoralis*), and a nearly allied species (*L. rudis*), &c. The genus L. forms the type of a special family, *Littorinidæ*, in which the mouth of the shell is entire (*holostomatous*). The shell itself is spiral, of depressed shape, and the *operculum*, or plate developed on the foot, is of horny nature.

LIVERMORE, GEORGE, an American writer, born at Cambridge, Mass., July 10, 1809. Although engaged in mercantile pursuits, he devoted much time to historical and literary pursuits, and wrote largely for the press. He was an earnest supporter of the Union during the civil war. Died at Cambridge, Mass., Aug. 30, 1865.

LIVERMORE, MARY ASHTON (*née* RICE), born at Boston, Mass., Dec. 19, 1821. She is best known to the public as a lecturer upon social themes, and an advocate of woman's suffrage.

LIVINGSTON, PHILIP, an American merchant and patriot, born at Albany, N. Y., Jan. 15, 1716, and graduated from Yale College in 1737. He was successful as a merchant in New York, was a member of the Continental Congress 1774–78, and was one of the signers of the Declaration of Independence. Died at York, Pa., June 12, 1778.

LOBOS ISLANDS (Span. *lobo*, 'a seal'), three islets in the Pacific Ocean, 12 miles off the coast of Peru, to which country they belong. They abound with seals, and contain valuable deposits of guano.

LOCAL PREACHERS, a class of preachers peculiar to the M. E. Church, established by Wesley early in the history of that denomination. While pursuing the ordinary secular callings of life, they are licensed to preach the gospel. There are in the U. S. about 22,000 local preachers, many of whom rank high for ability and scholarship.

LOCKE, DAVID ROSS, an American editor and humorist, born at Vestal, N. Y., Sept. 20, 1833. He has edited several papers in Ohio, and last of these the *Toledo Blade*. He is best known to the public by his 'Nasby' letters, a series of caustic satires on the Democratic party, written under the *nom-de-plume* of 'Petroleum V. Nasby.' He has also published numerous political pamphlets.

LOCK HAVEN, in Clinton Co., Pa., on the W. branch of the Susquehanna River and the Pennsylvania Canal. Its principal interests are the lumber trade and manufacturing. Pop. 5847.

LO'CRI, a people of ancient Hellas, divided into the three tribes of the L. Ozolæ, dwelling to the N. of the Gulf of Corinth, and the L. Epicnemidii and L. Opuntii, on the shores of the Euboean Sea. The two last claimed to be Autochthons, and are mentioned by Homer (*Il.* ii. 527–535); the L. Ozolæ first appear in history during the Peloponnesian War, but are believed to have founded L. Epizephyrii (683 B.C.), a town of Magna Græcia, on the S.E. coast of the Bruttian peninsula, 13 miles N. of the promontory of Zephyrium (*Capodi Bruzzano*), and 4 miles from the modern Gerace. This city, famous as possessing the first written code of laws in that of Zaleucus (*circa* 660 B.C.), after a long alliance with Syracuse against Rhegium, submitted to Rome in the early part of the 3d c. B.C., but revolting to Hannibal (215) was not recovered by the Romans until 205. It existed as a *civitas* as late as the reign of Valentinian II. (A.D. 375–392), and was probably destroyed by the Vandals in the 5th c.

LO'DI, the name of the Mohammedan dynasty that preceded the Moguls at Delhi. It was of Afghan origin, and had previously established itself at Lahore in the Punjaub. In 1450, Belol L. drove the last of the Sayyids from Delhi; his brother conquered Behar; but his son, Ibrahim, was completely defeated and killed at the first battle of Paniput, in 1526, by Baber, the founder of the Mogul Empire.

LOGAN, JOHN A., an American soldier and statesman, born in Jackson Co., Ill., Feb. 9, 1826. His early education was limited. At the outbreak of the Mexican war, he entered the army as a private, served gallantly until its close, and was promoted lieutenant. At the close of the war he studied law, and was admitted

to the bar in 1851. He rapidly attained success in his profession, and was elected to Congress by the Democratic party in 1858, and again in 1860. But in the latter year he resigned his seat in Congress that he might enter the Union army. He raised the 31st Illinois regiment in 1861, and in September of that year took the field with McClernand's brigade. He was wounded in the assault upon Fort Donelson, and, as major-general of volunteers, commanded the third division, 17th army corps, under McPherson, in the movement against Vicksburg, in 1863. In Nov. 1863, he succeeded Gen. Sherman in command of the 15th army corps. At the battle of Atlanta, he succeeded Gen. McPherson, on the latter's fall, and rallied the Union forces. After the war, he was elected to the 40th and 41st congresses, and to the U. S. Senate in 1871. In 1884 he was nominated for Vice-President by the Republican National Convention, held at Chicago, Ill., upon the same ticket with James G. Blaine, for President, but was defeated.

LOGAN, JOHN, was born at Soutra, Midlothian, in 1748. After studying at Edinburgh University, he became for a time tutor in the family of the Sinclairs of Ulbster. In 1770 he edited the poems of his friend Michael Bruce, then three years dead, adding to these several original compositions. One of the poems in the volume was the well-known *Ode to the Cuckoo*, claimed by L., but by not a few ascribed to Bruce. In 1774 L. was appointed minister of South Leith church. This charge he labored in for many years with much success, preaching sermons whose effect, when ultimately edited and published by Blair (2 vols. 1790; 5th ed. 1807), was astonishing. In 1781 he produced his *Poems* and *Elements of the Philosophy of History*, and three years later a tragedy entitled *Runnimede*, which failed on the boards of the Edinburgh theater. In London, whither he had gone to carry on literary work, he died, 28th Dec. 1788. L. was a graceful and natural poet, and the finest sermon writer among the Scottish clergy of the 18th c.

LOGAN, SIR WILLIAM EDMOND, a celebrated Canadian geologist, was born at Montreal, 23d April, 1798. He graduated at Edinburgh, and in 1818 went to London, where he entered the bank of his uncle. In 1829 he became director of copper-smelting works at Swansea, Glamorganshire, where he soon began to direct his study to geology. His researches among the coalfields attracted the attention of De la Beche, at that time the director of the English Geological Survey. In 1841 L. returned to Canada, and upon the formation of the Canadian Geological Survey was nominated its director. He began operations in 1843, and by his subsequent researches, especially among the ancient Laurentian deposits, established a world-wide reputation as a geologist. At the Paris Exhibition of 1855 he was presented with a gold medal, and the succeeding year was made a knight. L. died at Castle Malgwyn in Pembrokeshire, June 22, 1875.

LOGOMANIA, or Disease of the Faculty of Language. It frequently happens, in connection with cerebral lesions, that although the ideas are clear and distinct, and the faculty of speech but slightly impaired, it is impossible to represent the ideas in words by their appropriate symbols. Cases of true L. are extremely rare, and they depend more frequently on functional disorder than on organic disease.

LOMBARD LEAGUE, a league of the cities of N. Italy, formed in 1167 to oppose the ambition of the Emperor Friedrich. Verona and its neighbors were the first that banded together. Milan, Cremona, &c., soon joined them, and in 1176 they won a great victory at Legnano. By a second peace, that of Constanz in 1183, the L. cities were allowed to administer their own laws, and to make peace and war on their own account. Thus they became virtually independent, and soon showed great intellectual and commercial vitality, but at the same time an unfortunate disregard for each other's welfare, which in the long run made them the prey of petty despots.

LONG BRANCH, a sea-side summer-resort of Monmouth Co., N. J., on the Atlantic coast, within easy access of New York and Philadelphia. On a high bluff, fronting the sea, are numerous hotels and elegant cottages. The bathing is unsurpassed and the drives are fine. The summer population sometimes exceeds 30,000; that of the winter is about 6000.

LONG ISLAND CITY, in Queens Co., N. Y., an important suburb of New York City, on the East River, immediately N. of Brooklyn. It is the terminus of the various branches of the Long Island Railroad, and is extensively engaged in manufacturing. Pop. 24,000.

LONGSTREET, JAMES, a distinguished Confederate general, born in S. C., in 1820, and graduated from West Point in 1842. He served with gallantry during the Mexican war, was severely wounded at the assault upon Chapultepec, was brevetted captain for bravery at Contreras and Cherubusco, and major for bravery at Molino del Rey. In 1861 he resigned from the army, entered the Confederate service, and in 1862 was made major-general. He participatad under Lee in all the principal battles with the Army of the Potomac, and gained for himself high reputation as a gallant and skillful commander. Since the war he has lived at New Orleans and in Georgia. In 1880 he was sent, as U. S. minister, to Turkey.

LOPHOR'NIS, a genus of Humming-birds, of which the *L. ornatus*, or tufted coquette of N. Brazil, is a familiar example. The spangled coquette is another species, known scientifically as the *L. Reginæ;* others are the *L. Gouldii* and the *L. Helenæ*. These birds have a most brilliant plumage.

LORIMER, GEORGE CLAUD, D.D., an American divine, born in 1837. He was at first an actor, but in 1859 entered the ministry of the Baptist Church. After filling pastorates in Paducah, Ky.; Louisville, Ky.; Albany, N. Y.; and Boston, Mass., he was, in 1879, called to the First Baptist Church of Chicago, where he still remains (1885).

LORING, WILLIAM W., a Confederate officer, born in North Carolina in 1815, entered the U. S. army, took part in the Mexican war, was made lieutenant-colonel for bravery at Contreras and Cherubusco, and colonel for bravery at Chapultepec, and lost an arm at the Belen gate of Mexico. At the outbreak of the civil war, he resigned his commission and entered the Confederate service, where he served with distinction. At the termination of the war, he went to Egypt and organized the army of the Khedive.

LOTZE, RUDOLF HERMANN, a German philosopher and physiologist, born 21st May 1817, at Bautzen, studied medicine and metaphysics at Leipsic, where he was appointed extraordinary Professor of Philosophy in 1842. In 1844 he became Professor of Philosophy at Göttingen. Though of the school of Herbart, L. has an independent place, and in the struggle between transcendentalism and materialism he has distinguished himself as a powerful opponent of the latter. His works are *Gedichte* (1840); *Metaphysik* (1841); *Allgemeine Pathologie und Therapie* (1842); *Logik* (1843); *Ueber den Begriff der Schönheit* (1845); *Ueber Bedingungen der Kunstschönheit* (1847); *Allgemeine Physiologie* (1851); *Medicinische Physiologie* (1852); *Mikrokosmus* (1856–64); *Streitschriften* (vol. i. 1857); *Geschichte der Æsthetik in Deutschland* (1868).

LOUISBURG, a French fortress, built upon the Eastern coast of Cape Breton Island, and named from Louis XIV. In 1745, Massachusetts, assisted by Connecticut and New Hampshire, sent an expedition against it, consisting of about 4000 men. After a seige of nearly two months' duration, the French garrison was compelled to surrender. But the treaty of Aix-la-Chapelle gave Louisburg back to the French. In 1758 the fortress was attacked by a British force of 14,000 men and 38 vessels, under Gen. Amherst; and after a fierce bombardment, it was compelled to surrender. Near the ruins there is now a small village of fishermen.

LOULE, a town of Portugal, province of Algarve, 10 miles N.W. of Faro, is surrounded by a Moorish wall, has a ruined Moorish castle, and manufactures baskets of aloe thread. Pop. 12,000.

LOVEJOY, ELIJAH PARISH, an American anti-slavery agitator, born at Albion, Me., Nov. 9, 1802, and graduated from Waterville College in 1826. He entered the Presbyterian ministry in 1833, edited the *Observer* in St. Louis until compelled to leave that city by mob violence, and then removed to Alton, Ill. Here his printing press was twice destroyed by a pro-slavery mob, and he himself murdered by a mob, Nov. 7, 1837.

LOVEJOY, OWEN, a brother of Elijah P., and like him an anti-slavery agitator, born at Albion, Me., Jan. 6, 1811, and educated at Bowdoin College. He served several years in the Congregational ministry, and was in Congress 1856–64. Died in Brooklyn, N. Y., March 25, 1864.

LOW ARCHIPELAGO, or PAUMO'TAS, an archipelago of seventy-eight small coral islands in the S. Pacific, the center of the group being in 19° S. lat., 141° E. long. Their total area is 4125 sq. miles, and the pop. only 8000. The islands were discovered by De Quiros in 1606, and France established a protectorate over them in 1846. An active pearl shell fishery is carried on around them.

LOY'ALTY ISLANDS, a group of five thickly-wooded coral islands in the S. Pacific, to the E. of New Caledonia, lying between 20°–22° S. lat., and 167°–169° E. long. The largest island, Lifu, measures 37 miles by 15, and the area of the whole group is 1354 sq. miles. The inhabitants are Melanesians, and many of them have been converted to Christianity by the Roman Catholic missionaries, who have long labored among them. The L. I. belong to France.

LUBBOCK, SIR JOHN, BART., M.P., F.R.S., &c., was born in London, April 30, 1834. By profession a banker, and for several years Hon. Secretary to the London Bankers. In 1865 and 1868 he contested West Kent unsuccessfully in the Liberal interest, but in 1870 was returned for Maidstone. Though he has taken a leading part in certain financial and educational measures, it is chiefly

as a man of science that he is generally known. He has been President of the Ethnological and Entomological Societies, of the Anthropological Institute, and of the Royal and Linnæan Societies. As an author, he is widely known through his *Prehistoric Times, as Illustrated by Ancient Remains, and the Manners and Customs of Modern Savages* (3d ed. 1870). *The Origin of Civilization, and the Primitive Condition of Man* (1870), *The Origin and Metamorphosis of Insects* (1874), and *On British Wild Flowers considered in Relation to Insects* (1874), besides his *Monograph of the Thysanura and Collembola*.

LUDINGTON, a town of Mason Co., Mich., on the east shore of Lake Michigan, 96 miles from Milwaukee. It is engaged in the lumber trade; has iron works, and is also a fruit center. Pop. 6500.

LUDLOW, EDMUND, born at Maiden Bradley in Wiltshire, England, about 1620, studied at Trinity College, Oxford, and entered the Temple, but having joined the lifeguards of the Earl of Essex as a volunteer, fought at Edgehill (1642), and was taken prisoner at Wardour Castle in 1644. Soon exchanged, he was present at the second battle of Newbury, became high sheriff and member for Wiltshire (1645), actively promoted 'Pride's Purge,' was one of the king's judges, and voted for the abolition of the House of Lords. 'Firm as brass or oak timber,' he made himself obnoxious to Cromwell, who sent him to Ireland (1650) as lieutenant-general of the horse. Thence he retired to Essex (1655), and, having refused to take the oaths to Richard Crowwell, he joined the Wallingford House party, and held a brief tenure of supreme power in Ireland, but on the Restoration fled to Vevey in Switzerland, where he died in 1693, his reappearance in London (1689) having been met by a proclamation of arrest. His *Memoirs* (3 vols. Vevey, 1698–99) appear in Guizot's *Collection des Mémoires relatifs à la Révolution d'Angleterre* (Par. 1823).

LUDLOW, FITZHUGH, an American author, born at Poughkeepsie, N. Y., in 1837, and in 1855 began to write for the press, in which work he rapidly gained prominence. Among his published works are *The Hashish Eater*, *The Heart of the Continent*, and *The Opium Habit*. To the first and last of these peculiar interest attaches from the fact that Ludlow based them upon his personal experience in the use of these drugs. Died in Switzerland, Sept. 13, 1870.

LU'GOS, a market-town of Hungary, comitat of Krassó, 34 miles E.S.E. of Temesvár, has a gymnasium, a Minorite monastery, and fine barracks, is the seat of a Greek bishop, and carries on a lively trade in wine, silk, and leather. Pop. (1869) 11,654. L. was the last rallying point of the insurgent Hungarian government and army in 1849.

LUNDY, BENJAMIN, one of the leaders of the abolition agitation in America, born at Hardwich, N. J., Jan. 4, 1789, of Quaker parents. His early education was very limited, and he learned the saddler's trade in Wheeling, Va. He subsequently removed to St. Clairsville, O., where he practiced his trade. Becoming deeply impressed with the wrongs of slavery, he organized the humane society, and made a stirring appeal to the people of the U. S. on the subject. From this time forward he was unceasing in his efforts for the anti-slavery cause, conducting several papers at various times in its advocacy, delivering many addresses, and writing continually upon the subject. His life was repeatedly threatened, and he was assaulted and nearly killed near Baltimore by an enraged slave-trader. Died in 1839.

LUNDY'S LANE, BATTLE OF, fought July 25, 1814, between British forces, commanded by Gen. Drummond, and a U. S. force under the command of Gen. Brown. The struggle was fierce, but terminated slightly in favor of the Americans, who, however, were unable to follow up their advantage. During the battle, both Gen.'s Brown and Drummond were severely wounded.

LÜTT'RINGHAUSEN, a town of Rhenish Prussia, 20 miles S.E. of Düsseldorf, has manufactures of woollens, linens, cottons, cutlery, &c. Pop. (1875) 9493.

LYD'GATE, JOHN, an English poet, was a native of Suffolk, England, and was born not later than 1370. He studied at Oxford, Paris, and Padua, became a priest of the Benedictine monastery of Bury St. Edmunds in 1397, and established there a school of rhetoric or literature, which acquired a wide renown in his lifetime. He died in the reign of Henry VI. 'L.,' says Morley, 'was well read in ancient lore, mathematician also and astronomer, as well as orator and poet; a bright, pleasant, and earnest man, who wrote clear, fluent verse in any style then reputable, but who was most apt at the telling of such moral stories as his public liked.' His three chief works are *Troy Book*, *The Storie of Thebes*, and *Falls of Princes*. The first is a metrical adaptation from the French, the second a 'Canterbury Tale' in imitation of Chaucer, and the third is founded on Boccaccio's Latin work, *De Casibus Mustrium Virorum*. His *London Lickpenny* is a satire not yet forgotten.

LYNE'DOCH, THOMAS GRAHAM LORD, the ablest of Wellington's lieutenants, was born at Balgowan, in Perthshire, Scotland, in 1750. He lived quietly as a country gentleman till the age of forty-four, when the death of his wife affected him so deeply that he resolved to travel, in the hope of finding some solace for his grief. After serving as a volunteer under Lord Hood in the S. of France, he returned to Scotland, raised the first battalion of the 90th regiment, of which he was made colonel in 1794. He conducted the blockade of Malta, which the French were forced to surrender in 1801, served under Moore in Spain, and afterwards under Wellington with signal distinction. At Barossa, Vittoria, San Sebastian, and the passage of the Bidassoa, his brilliant and resolute genius proved irresistible. In 1814 L. was appointed commander of the forces in Holland, and raised to the peerage with a pension of £2000 a year. He died 18th December 1843. See Murray Graham's *Memoir of Lord L.* (1868; 2d ed., 1877).

LYON, NATHANIEL, an American general, born at Ashford, Conn., July 14, 1819, graduated from West Point, and entered the army in 1841. He participated in the Mexican war, was wounded at the capture of the City of Mexico, and for gallantry in this action was made brevet captain. In May, 1861, he was made brigadier-general U. S. volunteers. While leading a regiment, whose colonel had been killed, at the battle of Wilson's Creek, he was shot, and almost instantly killed, Aug. 10, 1861.

M.

MACINTYRE, DUNCAN BAN, commonly called by his countrymen Donacha Ban ('fair-haired Duncan'), one of the best Gaelic poets of modern times, was born in Glenorchy, Argyleshire, Scotland, 20th March 1724, became forester first to the Earl of Breadalbane, afterwards to the Duke of Argyll, and entered late in life the city guard of Edinburgh, where he died, October 1812. His poems were first published at Edinburgh in 1768, under the title, *Orain Ghaidhealach, le Donacha Mac-an-t-soir* ('Gaelic Songs, by Duncan Macintyre'). They were reprinted in 1790, and again in 1804. In the opinion of Celtic critics, M. is a master of all kinds of lyric composition, serious and humorous. His diction is pure, and versification harmonious. A monument has been erected to his memory on a hill near Dalinally, commanding a fine view of Loch Awe.

MACOMB, ALEXANDER, an American general, born in Michigan, in 1782, and in 1799 entered the army. He served with distinction during the war of 1812, defending Plattsburg against an English army, under Prevost, for which congress voted him a gold medal, and promoted him to the rank of major-general. Died in 1841.

MADEIRA WINES. The qualities and varieties of M. W. are numerous, and differ very widely in commercial value. The kinds chiefly known and appreciated in European markets are Malmsey, Tinto, Sercial, Bual, and Palhetinho, and the highest qualities are produced only on the S. side of the islands. M. W. are naturally rich in alcohol, but those sent to the English and American markets are, like most alcohol wines, artificially branded. They are generally fine keeping wines, improving greatly in bouquet by age, and a good Madeira can never be too long kept. Their mellowness and flavor are developed by heat and shaking, on which account the wines are frequently sent on voyages to the East or West Indies, and an East Indian Madeira is regarded as a great luxury.

MADISON UNIVERSITY, an educational institution, controlled by the Baptists, and located at Hamilton, N. Y. There are three departments: an academy, a college, and a theological

seminary. It has valuable buildings and an increasing endowment.

MAGEE', WILLIAM, D.D., born in county Fermanagh, Ireland, March 18, 1766, graduated at Dublin University (1785), was elected fellow (1788), ordained (1790), and after serving for some years as assistant professor of Oriental languages, was raised to the chair of mathematics (1806). In 1811 he published his *Discourses on the Atonement* (7th ed. 1841), and the year after, accepting the livings of Kappagh and Killyleagh, became Dean of Cork (1814), Bishop of Raphoe (1819), and Archbishop of Dublin (1822), where he died August 18, 1831. A complete edition of his works appeared in 1842.

MAGINN', WILLIAM, LL.D., son of a classical teacher, was born at Cork, Ireland, 11th November 1794, entered Trinity College, Dublin, at the early age of ten, and took the degree of LL.D. in 1816. During 1818–20 he was a frequent contributor to *Blackwood*, settled in London in 1823, and rapidly came to the front as a brilliant and versatile penman. In 1828 he joined the staff of the *Standard*, and was editor of *Fraser's Magazine*, when its pages were constantly irradiated with the flashes of youthful genius. He died at Walton-on-Thames, 21st August 1842. His *Homeric Ballads, Shakspeare Papers*, and critical essays have been edited by Dr. R. S. Mackenzie (5 vols. New York, 1855–57). M. was one of the gayest, brightest, and wittiest of those reckless litterateurs who half a century ago worshiped with equal devotion at the shrines of Apollo and Bacchus.

MAG'NUS or MAG'NI, JOHANNES, a Swedish historian, born at Linköping, 19th March 1488, studied at Louvain and Köln, and in 1523 was appointed Archbishop of Upsala, with the consent of Gustaf Vasa. His opposition to the Reformation led to his imprisonment for a short time in 1526, after which he visited Prussia, Poland, Germany, and afterwards Italy, where he died at Rome, 22d March 1544. During his exile he wrote a *Historia metropolitanæ Ecclesiæ Upsalensis* (Rome, 1557–60) and *Historia de omnibus Gothorum Sueonumque Regibus* (1554).—OLAUS M., brother of the above, born 1490, after holding various posts in the Swedish diplomatic service, accompanied his brother into exile as his secretary, and was after his death appointed titular Archbishop of Upsala, yet remained at Rome, where he died in 1558. He edited his brother's works, and himself wrote a comprehensive *Historia de Gentibus septentrionalibus earumque diversis Statibus* (Rome, 1555; Eng. trans. Lond. 1658), which was long the main source of knowledge of Sweden and the Swedes available to other nations.

MAGRUDER, JOHN BANKHEAD, a Confederate general, born in Virginia in 1810, and graduated from West Point in 1830. He served during the Mexican war, and was wounded at Chapultepec. At the beginning of the civil war he entered the Confederate service, and after participating in the Chickahominy campaign, was made major-general, and placed in command of the western department. Died at Houston, Tex., Feb. 19, 1871.

MAHABALIPURAM, or the Seven Pagodas, a ruined city on the Coromandel or E. coast of S. India, 33 miles S. from Madras. It is celebrated for its highly ornamented pagodas, and for carvings on the rocks. The city itself is said to be covered by the sea. See Fergusson's *History of Indian Architecture* (Lond. 1876).

MAHAN, ASA, D.D., an American theologian, born at Vernon, N. Y., in 1799, graduated from Hamilton College in 1824, and from Andover Seminary in 1827. He then entered the ministry of the Presbyterian Church, and in 1835 became President of Oberlin College, Ohio. He was afterwards President of Cleveland University and of Adrian College. Among his published works are the following: *Scripture Doctrine of Christian Perfection, The Science of Intellectual Philosophy, The Doctrine of the Will, The Science of Moral Philosophy, The Science of Logic*, and *A Critical History of Philosophy*.

MAHAN, DENNIS HART, LL.D., an American military engineer, born in New York, April 2, 1802, and graduated from West Point in 1824. He published numerous works on fortifications and military engineering. Was drowned in the Hudson River near Stony Point, Sept. 16, 1871.

MAHANOY CITY, in Schuylkill Co., Pa., on Mahanoy Creek, 13 miles N.E. of Pottsville. It is a mining and manufacturing town. Pop. 7181.

MAHÉ, a French settlement on the Malabar or W. coast of S. India, at the mouth of a small estuary, 7 miles S. from Tellicherry, and 636 from Bombay. Area about 2 sq. miles; pop. about 2000. It was finally restored to the French in 1815. The coasting trade in 1872–73 showed an export of $13,500, and an import of $12,175.

MAH'MUD THE GHIZNEVIDE, born at Ghuzni, 12th December 967, succeeded his father in the emirship of Khorasan and Bokhara (997), and having conquered the neighboring provinces of Persia, made Ghuzni his capital, and renounced his allegiance to the califs. He next turned his arms against India, which he invaded fourteen times (1001–28), ravaging Kanoge and Mathura, and carrying off the gates of the famous temple of Somnath. The first of the Mussulman invaders, to him is due the spread of Islam in India. Among a host of men of letters attracted by the splendor of his court, the poet Firdusi stands forth pre-eminent. M. died at Ghuzni, April 30, 1030. See Hammer-Purgstall, *Gemäldesaal Moslemischer Herrscher* (Darm. 1837).

MAHONE, WILLIAM, an American statesman, born in Virginia, in 1827. He became a civil engineer, and served in the Confederate army during the civil war, rising to the rank of major-general. He was made U. S. senator, in 1880, and became prominent as the leader of the 'readjusters,' a political party which sought certain modifications of the public debt of Virginia.

MAHO'NY, FRANCIS, better known by his *nom-de-plume* of FATHER PROUT, was born at Cork, Ireland, in 1805, educated for the Romish Church, and became incumbent of Watergrass Hill. His opinions were of the most cosmopolitan kind, and during the best days of *Fraser's Magazine* he was a constant contributor to its columns. His scholarship was wide, but was utilized by him chiefly for quaint and humorous reference. 'Modest distrust of his own power to please deterred Prout from obtruding much of his personal musings. He preferred chewing the end of classic fancies or otherwise approved and substantial stuff, delighting to invest with new and varied forms what had long gained universal recognition.' For many years he acted as Paris correspondent for the *Globe* newspaper, and for some years as Roman correspondent of the *Daily News*. Some of his lyrics are of a high order, *The Bells of Shandon* having attained a national reputation. He died at Paris, 18th May 1866. M.'s *Reliques*, collected from *Fraser* in 1836 (new ed. 1860), are the most characteristic of his writings in prose and verse. His later writings were edited by Blanchard Jerrold as *Final Reliques* in 1874.

MA'JOR or MAIR, JOHN, was born at Cleghornie, near North Berwick, in 1469, and educated, it is believed, partly at Oxford and Cambridge, and partly at the university of Paris. In 1506 he became a doctor of the Sorbonne, and in 1519 accepted a professorship at St. Andrews, but the political discord sent him back to Paris, where he devoted himself to teaching. In 1533 he was appointed provost of St. Salvator's College, University of St. Andrew's, an office which he retained till 1549. His opinions concerning ecclesiastical and secular government were of a bold and liberal order, and both upon Knox and Buchanan exercised considerable influence, though the latter speaks disparagingly of him—*solo cognomine, Major*. The *In quatuor Sententiarum lib. Commentarius* (published at Paris, 1516) won him a European reputation as a commentator, and his *De Historia Gentis Scotorum, seu Historia Majoris Britanniæ* published at Paris, 1521 (reprint, Edinb. 1740), began to tone down the fabulous element which held so large a place in Scotch annals. He died at St. Andrews about 1550.

MALL'ARD (*Anas boschas*), a well-known species of *Anatidæ* or ducks, popularly known also as the wild duck. The male is brilliant or metallic green on the head and neck, the lower part of the neck being encircled with a collar of white. The back is a chestnut-brown, and the remaining tints include a grey below various black markings. The female is of a sombre brown hue. The average length is two feet. The nest is made of grass, and is lined with soft down. It is placed close to the water's edge, and the eggs are large and white, tinted with green.

MALL'ET, originally MALL'OCH, DAVID, a Scottish *littérateur*, born at Crieff, Perthshire, about 1700, was for some time tutor in the family of the Duke of Montrose, and after traveling over the continent of Europe, settled in London, where he died 21st April 1765. He wrote several plays, *Eurydice, Mustapha*, the masque of *Alfred* (in conjunction with Thomson), a *Life of Lord Bacon*, &c., but is now only remembered, and that faintly, for his ballad of *William and Margaret*, in which some natural pathos finds expression through the conventional diction of the time. M. was an unscrupulous pamphleteer.

MALMESBURY, JAMES HARRIS, FIRST EARL OF, an English diplomatist, son of James Harris the philologist, was born at Salisbury, 9th April 1746, and educated at Oxford and Leyden. He was Secretary to the Embassy at Madrid in 1768, Ambassador at Berlin, 1772–76, at St. Petersburg, 1777–82, at the Hague, 1784–88, and again at Berlin, 1793–97. At the last named capital he negotiated a treaty of subsidies, and the marriage of the Prince of Wales (afterwards George IV.) with Princess Caroline of Brunswick. In 1796–97 he was sent on an unsuccessful mission to France to treat for peace. In 1798 he was created Baron, and in 1800 Earl of M. From his retirement from the diplomatic service till his death he was much consulted by statesmen on foreign affairs. He died November 21, 1820. His *Diary and Correspondence*, in 4 vols., a most valuable work for historians, was published by his grandson, the third earl, in 1845.

MAL'ORY, Sir Thomas. the compiler of *The Most Ancient and Famous History of the Renowned Prince Arthur*, of whom we only know that he was a knight, and that he completed his work in the ninth year of the reign of Edward IV. (1469–70). Of this quaint volume, based on the great prose romances of Merlin, Lancelot, Tristram, the Queste du St. Graal, and the Mort Artus, seven black-letter editions are known to exist—Caxton's (July 1485), of which the only complete copy is in the Earl of Jersey's library at Osterley Park, Middlesex; two by Wynkyn de Worde (1498 and 1529); Copland's (1557); two by Thomas East, one folio, the other 4to, both undated; and William Stansby's (1634), which last edition has been reprinted in *Walker's British Classics* (2 vols. 1816), by Joseph Haslewood (3 vols. 1816), and by Thomas Wright (3 vols. 1866). Of Caxton's original edition a reprint appeared in 1817, edited by Robert Southey.

MALVERN HILL, Battle of, an engagement of the civil war, July 1, 1862, between the army of the Potomac, commanded by Gen. McClellan, and a Confederate force under Gen. Lee. A desperate assault was made upon the Union force, while strongly posted upon M. H., about 11 miles from Richmond, which was repulsed. The Confederate loss was over 4000, that of Union army, about 2000. McClellan, however, continued the retreat, then in progress towards Harrison's landing.

MANAYUNK, in Philadelphia Co., Pa., on the Schuylkill River, 6 miles from Philadelphia proper. It has been called the Lowell of Pennsylvania, and it has 45 mills engaged in the manufacture of woollen and cotton goods, besides other industries. Pop. 20,000.

MANDHA'TA, an island in the Nerbudda, district of Nemur, Central Provinces, British India, nearly a square mile in area, whose banks rise precipitously 400 feet from the river. Here are two of the twelve original 'lingas' or emblems of Siva; and the whole island and the neighboring banks of the river are covered with ruined temples of the Sivaite, Vishnuvite, and Jain sects of Hindus. Not a single sculpture has been left unmutilated by Mohammedan fanaticism.

MANDU, the former capital of the Mohammedan kingdom of Malwa, now in the petty state of Dhar, 15 miles N. of the Nerbudda River, and 26 S.W. of Mhow. It was founded in the 4th c., and was the capital of Malwa from 1387 to 1570, when it was captured by Akbar. The circuit of the ramparts is said to be as much as 37 sq. miles; but inside all is deserted, overgrown with jungle, and the haunt of tigers. A Jumma Musjid, or great mosque, and the mausoleum of a king in white marble, are still well preserved.

MANDVI, the chief seaport and most populous town of the native state of Kutch, in political connection with the government of Bombay, India, on the N. shore of the Gulf of Kutch. Pop. (1872) 35,988. Ships of considerable burden anchor in the roads.

MANISTEE, in Manistee Co., on Lake Michigan, at the mouth of the Manistee River, about 100 miles from Grand Haven. Milling and salt and lumber manufacturing are carried on. It is the largest shingle manufacturing city in the world, producing about two million shingles per day. It has two large salt-producing works, and is surrounded by the great fruit-growing belt of Michigan. Pop. 11,000.

MANITOU, an Indian term, meaning any object of religious reverence, either good or bad. *Gitche Manitou* is the name applied to the Supreme Being by many tribes of the Indians of North America.

MANITOWOC, in Manitowoc Co., Wis., on Lake Michigan, at the mouth of the Manitowoc River, 77 miles from Milwaukee. It has a good harbor, is engaged in shipbuilding, and has foundries, machine shops, furniture factories, &c. Pop. 6367.

MANKATO, a town of Blue Earth Co., Minn., at the junction of the Minnesota and Blue Earth rivers, and the Chicago & N. W., and other railroads. About it is a fine agricultural district; and it has four large flouring mills and other manufacturing interests. Pop. 7000.

MANRE'SA, a town of Spain, province of Barcelona, on the river Llobregat, 30 miles N.W. of the city of Barcelona. It has cotton and silk manufactures. Pop. 9000.

MANSFIELD, in Richland Co., O., 176 miles from Pittsburgh and 180 from Cincinnati, at the junction of four railroads. It has large manufacturing interests, considerable wholesale trade, and is surrounded by an agricultural community. Pop. 9859.

MANT, Richard, D.D., born at Southampton, England, February 12, 1776, passed from Winchester School to Trinity College, Oxford, and was elected a fellow of Oriel (1798), taking his M.A. in 1800, and D.D. in 1815. Ordained in 1802, he was successively vicar of Great Coggeshall, Essex (1810); Bampton Lecturer (1812); chaplain to Archbishop Manners Sutton (1813); rector of St. Botolph's Bishopsgate (1815); and of East Horsley, Surrey (1818); bishop of Killaloe and Kilfenora (1820), and of Down and Connor (1823). He died at Ballymoney Rectory in the county of Antrim, November 2, 1848. M.'s best known work, prepared in conjunction with the Rev. George D'Oyly, D.D., is his edition of the Bible, with notes selected from the Anglican divines (3 vols. Lond. 1817; New York reprint, with additional notes by Bishop Hobart, 2 vols. 1818–20). He also published an annotated *Book of Common Prayer* (1820), a *History of the Church of Ireland* (2 vols. 1839–40), *Ancient Hymns from the Roman Breviary* (new ed. Oxf. 1873), &c. See his *Life*, by Archdeacon Berens (1849), and a complete list of his works in vol. xxxi. new series, of the *Gentleman's Magazine*.

MANTEGN'A, Andrea, a famous Italian painter and engraver on copper, was born at Padua in 1431, studied under Squarcione, married a daughter of Giacomo Bellini, and opened a school in Mantua which acquired a wide celebrity. He died in 1509. M.'s best works are the frescoes in the Church of the Eremitani (Padua), and in the Castello di Corte (Mantua), the altar-piece of St. Zeno (Verona), the 'Dead Body of Christ' (Berlin), and the cartoons of 'Cæsar's Triumph' (Hampton Court). M. is considered the head of the 'Paduan School,' which is distinguished by its close but servile study of the antique, and its comparative neglect of nature. His coloring is almost always dry. The most notable of his pupils was Correggio. M. had three sons, all of whom were painters.

MAN'WYNE, a town in the Chinese province of Yunnan, bordering on Independent Burmah, the scene of the treacherous murder of Mr. Margary, an enterprising British diplomatic officer, on 22d February, 1875. See *Journey of A. R. Margary from Shanghae to Bhamo, and back to M.* (Lond. 1876).

MA'RAH (Heb. 'bitterness'), the name of a place in the wilderness of Shur, three days' journey from the point where the Israelites crossed the Red Sea. The waters were so bitter that it was impossible to drink them, but they were sweetened by Moses casting in a tree which 'the Lord showed him' (Exod. xv. 23–25).

MAR'BLING is the art of imparting variegated patterns to sheets of paper or book edges. The colors, previously mixed up with wax and ox-gall, are superimposed on each other on the surface of a solution of gum contained in a shallow trough, and the particular pattern required is arranged by drawing a rod or comb through them. A sheet of paper is then laid flat on the colors and removed without disturbing their arrangement; the marbled paper is afterwards calendered. Book edges are dipped into the trough, and when dry are burnished with agate. Germany exports much marbled paper.

MARCY, William Learned, an American lawyer and statesman, born at Southbridge, Mass., Dec. 12, 1786, and graduated from Brown University in 1808. He was for several years a teacher, and then began to practice law in Troy, N. Y. He was a judge of the Supreme Court of New York, was twice elected governor, and U. S. senator. He was secretary of war under Polk, and secretary of state under Pierce. In the latter position he won high reputation for statesmanship. Died at Ballston, N. Y., July 4, 1857.

MAR'GARY, Augustus Raymond, a young Englishman, educated at Brighton College, who was appointed to a student interpretership in China at the age of twenty-one, and devoted himself to the study of the Chinese character and language. In 1874 he was selected for the important task of traversing S.W. China to the Burmese frontier, to meet and escort the mission sent by the Indian government from that quarter. This duty he successfully accomplished with admirable energy and tact; but in February 1875, while proceeding in advance of the Burmese party, he was treacherously killed at the Chinese town of Manwyne, in Yunnan, where he had just before been hospitably entertained. It was more than twelve months before retribution for this murder was exacted by diplomacy from the Chinese authorities. See *The Journey of A. R. M. from Shanghae to Bhamo and back to Manwyne* (Lond. 1876).

MARIETTA, a town of Washington Co., O., on the Muskingum River, at its entrance into the Ohio River. It has direct railroad connections with the principal points in the state. The Muskingum River is navigable from here to Zanesville, a distance of 80 miles. It is interested in manufacturing, river commerce, and trade; and is surrounded by the coal oil regions of Ohio. Pop. 6000.

MARIETTA COLLEGE, an educational institution located at Marietta, O. It was founded in 1835. It has a good library and is fairly equipped for collegiate work.

MARION, Francis, an American soldier and patriot, born in South Carolina in 1732. At the outbreak of the Revolution, he entered the Continental service, under Moultrie, with the rank of captain. He participated in the contests with the British in and about Charleston, and just prior to the capture of that city in 1780,

by the enemy, was sent into the country on account of a broken leg, the result of an accident. Here he raised a band of men, poorly equipped and rudely armed, with whom he waged a desultory strife against the British, much to their annoyance. His adventurous spirit and stragetic skill gained for him the title of 'the Swamp Fox.' The number of his troops having rapidly increased, he joined the army of Gen. Greene, and served under him until the evacuation of Charleston by the British, in 1782. Died near Eutaw, Feb. 29, 1795.

MAR'IVAUX, Pierre Carlet de Chamblain de, was born at Paris, 4th February, 1688, received but a poor education, and always affected a contempt for classical writers. In 1716, appeared his *L'Homère Travesti*, a foolish satire upon the *Iliad*. He was a voluminous writer for the stage, his comedy *Le Jeu de l'Amour et du Hasard*, which appeared in 1730, having firmly established his reputation among his contemporaries as an analyst of the eccentricities of the passion of love. His dialogue is invariably brilliant, but his discrimination of character weak. In the romance of *Marianne* (1731–36), he reached higher ground, being freed from the laws of the drama, under which his power of developing plot and character was hampered. It is still looked into by French readers. M. died at Paris, 12th February, 1763. His *Œuvres Complètes* were published at Paris in 12 vols. 1781. A more careful but less complete edition is that of Duviquet (10 vols. Par. 1827–30). See Sainte-Beuve's *Causeries du Lundi*, vol. ix.

MARLBORO, in Middlesex Co., Mass., on the Old Colony and Fitchburg railroads, 32 miles from Boston. It is principally engaged in manufacturing boots and shoes.

MAROT, Jean, a French poet, was born at Mathieu, near Caen, in 1463, and died at Cahors in 1523 as valet-de-chambre to François I. His works were first collected by Constelier (Par. 1723). —His son, Clement M., born at Cahors in 1495, served as page to the Seigneur de Villeroi, and having by his verses won the patronage of Marguerite de Valois, succeeded his father as valet to her brother, François I., with whom he was taken prisoner at Pavia (1525). A charge of heresy cast him, on his return, into prison, whence in his *Enfer* he launched a bitter satire against his persecutors, and in 1535 he was forced to seek a refuge at the court of Navarre. But even there his translations of the Psalms brought him once more into difficulties with the clergy. He withdrew to Geneva (1543), and thence—the sour Calvinism of the place ill assorting with his gay Bohemian spirit—to Turin, where he died, September, 1544, leaving a son, Michel, who was also a poet. The best edition of Clément's works is Gniffrey's (Lyon, 1869). See Colletet, *Notices Biographiques sur les Trois Marots* (Par. 1871); and H. Morley, *Clement M., and other Sketches* (Lond. 1871).

MARQUETTE, in Marquette Co., Mich., on Lake Superior, 200 miles N. of Green Bay. It has iron mines, blast furnaces, rolling mills, and other manufacturing interests. Pop. 6800.

MARSH, Othniel Charles, an American scientist, born at Lockport, N. Y., in 1831, and graduated from Yale College in 1860. He further pursued his studies in Germany, and, upon his return to America, was made professor of paleontology at Yale. He has conducted extensive explorations in the Rocky Mountains, of great scientific value.

MARSHALL, Humphrey, an American lawyer, born at Frankfort, Ky., Jan. 13, 1812, and graduated from West Point in 1832. In 1833 he resigned from the army, and having studied law, began its practice in his native place. He served in the army during the Mexican war, and was present at the battle of Buena Vista. He was several times elected to Congress, and served for a short time in the Confederate army with the rank of brigadier-general. At the close of the war he resumed the practice of law, in which he was very successful. Died at Louisville, Ky., March 28, 1872.

MARSHALL, John, LL.D., a distinguished American jurist, born at Germantown, Va., Sept. 24, 1755. In 1781 he began to practice law, and soon attained distinction by his legal abilities. After having served his state and country in many important positions, he was in 1801, made Chief-justice of the U. S. Here he soon displayed highest abilities, and won for himself a place among the greatest jurists of the world. He published a *Life of Washington* and a *History of the Colonies*. Died at Philadelphia, Pa., July 6, 1835.

MARSHALLTOWN, in Marshall Co., Ia., 70 miles W. of Cedar Rapids. It carries on a thriving trade with the adjacent country, and is also interested in manufacturing. Pop. 10,000.

MARSH'MAN, Joshua, an English missionary, born at Westbury Leigh, Wiltshire, 20th April 1768, was sent in 1799 by the Baptist Missionary Society to Serampore, India, where he labored for many years along with Carey, Ward, and others of the 'Serampore Brethren.' He mastered several Oriental languages, and translated a great portion of the Scriptures into Chinese. He published the *Works of Confucius* (the original text with a translation) in 1811, a Chinese grammar in 1814, and jointly with Carey a Sanskrit grammar in 1815, and a Bengali-English dictionary in 1825 (abridged 1827). He printed a discussion with Rammohun Roy on *The Deity and Atonement of Christ* in 1822. Rightly or wrongly, M. was held mainly responsible for the separation of the brethren from the parent Baptist Missionary Society in 1827. He died at Serampore, December 5, 1837. See Cox's *History of the Baptist Missionary Society*.—John Clark M., C.S.I., a leading man of letters in India, the eldest son of the preceding, was born at Serampore in 1794. He founded the first Bengali newspaper, the *Sumachar Darpan*, and also the first English weekly newspaper: the influential *Friend of India*, which has recently passed out of existence. In conjunction with his father's friend, Dr. Carey, he brought out the first complete *Bengali Dictionary;* and his popular *History of India from the Earliest Times to the End of the Eighteenth Century* is perhaps the most widely read of all books on the country which was his adopted home. He also wrote Lives of Carey, Marshman, and Ward, and memoirs of Sir Henry Havelock, who was his own brother-in-law. While in England he had been called to the bar, and in the department of Indian law he wrote many useful works. For ten years he filled the appropriate office of Translator to the Government of Bengal, and finally returned home in 1852. M. died 8th July 1877.

MARSTON MOOR, in the W. Riding of Yorkshire, England, 5 miles N.E. of Tadcaster, the scene of the second great defeat of the Royalists by the Parliamentarians (July 1, 1644). The former were commanded by Prince Rupert, the Marquis of Newcastle, and Sir Charles Lucas; the latter, by Fairfax, the Earl of Manchester, Cromwell, and Sir David Leslie; the forces on each side amounting to some 25,000. On one flank the king's horse broke through the Scotch, but on the other Cromwell's 'Ironsides' turned the fortune of the day. The Royalists lost 3000 killed and wounded, and 1500 prisoners, and the remnant of their forces, who threw themselves into York, were forced to capitulate after a few days' siege.

MAR'TYN, Henry, the martyr missionary of the East, was the son of a miner, and was born near Truro in Cornwall, in 1781. Educated in classical studies at the Truro Grammar School, he went up to St. John's College, Cambridge, in 1797. There he read mathematics, and graduated as Senior Wrangler in 1801. There also he came under the influence of the Rev. Charles Simeon, whose curate he presently became. In 1805 he went out to India as a military chaplain; in 1811 he betook himself to Persia, and died 16th Oct. 1812, at Tokat in Asia Minor, while traveling alone back to Europe. His career is rendered yet more interesting from the feeble health with which he had always to contend, and by the melancholy story of his persistent and unrequited love. He lived long enough to translate the New Testament into Hindostani and Persian, and to leave behind a heroic example of self-sacrifice. See memoirs of H. M. by Sargent, Wilberforce, and Sir J. Kaye.

MARX, Karl, born 1818 at Köln, studied law and philosophy at Berlin. From 1841 till its suppression he edited the *Rheinische Zeitung* at Köln, but went to Paris in 1844, where he joined the republican and socialist leaders; with Ruge, H. Heine, and Börnstein publishing *Deutsch-französische Jahrbücher*, and a newspaper, *Vorwärts*, but was forced to flee to Brussels, where he put himself at the head of the 'central committee' of the Socialists in 1848. The same year he returned to Köln, where he started the *Neue Rheinische Zeitung*, but removed to London in 1849, where in 1864 he established the 'International' of which he has since been the most prominent leader. In 1872 a disruption of the Society took place, and M., who headed the extreme section, withdrew to New York. His chief work is *Das Capital, Kritik der politischen Oekonomie* (1867).

MASSAY'A, a town of Central America, in Nicaragua, near a lake and volcano of the same name, 245 miles S.E. of the town of San Salvador. Palm-hats and wooden wares are manufactured. The surrounding district is fertile and well-tilled. Pop. 15,000 (mostly Indians).

MAS'CARA, an old town of Algeria, on the N. slope of the Atlas Mountains, 50 miles S.E. of Oran. It has considerable trade, and some industry in making burnus. Formerly a residence of Turkish beys, it was nearly destroyed by Marshal Clauzel, 6th December 1835. Pop. (1872) 9240.

MASON, Erskine, D.D., a distinguished American preacher, born in New York, in 1805. He was educated at Dickinson College, Pa., and pursued his theological studies at Princeton. He was pastor of Presbyterian churches in Schenectady, N. Y., and New York City, and attained great fame as a pulpit orator. He was subsequently professor of church history in Union Theological Seminary, New York, and died in 1851.

MA'SON, William, an English poet, born at Hull, England, in 1725, entered St. John's College, Cambridge (1742), graduated

B.A. (1745), was elected a fellow of Pembroke (1747), and published *Iris*, a satire on Oxford Jacobitism (1748), which was followed by four bombastic *Odes* (1756), and by two tragedies, *Elfrida* (1753) and *Caractacus* (1759), both acted and condemned at Drury Lane. Having taken orders, M. received a royal chaplaincy, with the living of Aston in Yorkshire (1754), and a canonry and precentorship in the cathedral of York (1762), where he died, April 7, 1797. Besides other poems—among them *The English Garden* (1772–82)—M. published works on painting and church music, but he is best remembered as the compiler of the *Memoir and Letters* of his friend the poet Gray (1775), the basis, it may be said, of all succeeding biographies.

MASON CITY, a town of Cerro Gordo Co., Ia., 115 miles N. of Des Moines. It has direct railroad communication with Chicago and Milwaukee, and is surrounded by a farming community. Pop. 5000.

MASSASOIT, a chief of the Wampanoag Indians, who showed great friendship to the settlers at Plymouth, Mass.; and who gave shelter to Roger Williams when banished from the colony of Massachusetts, on account of Baptist principles. Died in 1661.

MASSILLON, a flourishing city of Ohio, situated on the Tuscarawas River. It has large manufacturing interests, and is surrounded by valuable coal-fields. Population, 6837.

MAS'ULAH BOATS, a peculiar kind of craft used for the conveyance of passengers through the perpetually raging surf of the Coromandel or E. coast of the Indian peninsula, especially at Madras city. The materials are taken from any grove of mango and cocoanut. Mango planks are saturated with oil, bent into shape over a fire, and seamed and sown together with coir and straw. Such is their elasticity and toughness, that it has been proved by experiment that English-built lifeboats are less capable of resisting the tremendous strain caused by beating over the surf and the sandy beach. They have no keel, but a smooth and rounded bottom.

MATAMORAS, MARIANO, a Mexican general and revolutionist, born in Mexico in 1770. For some time he was a priest, but afterwards joined his countrymen in arms against the Spaniards. He soon gained himself a reputation as a military leader. At the battle of Puruaran, he was captured by the enemy, and was shot, Feb. 13, 1814, at Valladolid.

MAT'SYS, MET'SYS, or MESS'IS, QUENTIN, a Flemish painter, born at Louvain in 1466, is said to have been a blacksmith until his twentieth year—whence his nickname, the 'Farrier of Antwerp'—and to have exchanged the sledge-hammer for the brush from love of a maiden who would wed none but a painter. Genuine works by him are rare, the best known being the 'Descent from the Cross' in the Antwerp Museum, 'Mary Magdalen' in Lord Methuen's gallery at Corsham House, and a 'Madonna' at Berlin, while other specimens occur in the collections at Vienna, Munich, Frankfurt, and Dresden. The 'Two Misers' at Windsor has been of late years ascribed to his son Johann. M. died at Antwerp in 1531. See Van Even's *Recherches sur Quentin Messis* (Louvain, 1864).

MATTOON, in Coles Co., Ill., 173 miles from Chicago. It is a railroad center and a corn-growing and shipping point. Coal is found in the vicinity. Pop. 6300.

MAUCH CHUNK, a small town of Carbon Co., Pa., in the center of the Lehigh coal country. It is remarkable for the beauty and picturesqueness of the surrounding scenery, and is becoming a famous resort for summer travelers. Population, 3752.

MAY, SAMUEL JOSEPH, born at Boston, Mass., in 1797, and educated at Harvard College. He entered the ministry of the Unitarian church, and was pastor of churches in Brooklyn, Connecticut, and Syracuse, N. Y. He was one of the most outspoken and eloquent advocates of the abolition of slavery. Died in 1871.

MAYAG'UEZ, a town of Porto Rico, 66 miles S.W. of San Juan, is situated 1 mile inland, being connected with its port by a tramway. There is safe anchorage, and the town, well supplied with gas and water, is the most advanced place in the island. Estimated pop. (1875) 20,000.

MAY, THOMAS, a poet and historian, was born at Mayfield, Sussex, England, in 1594, and proceeded from Sidney College Cambridge, to Gray's Inn; but embracing the profession of letters, he became a favorite of Charles I., and during his residence at court produced five plays, two poems on the reigns of Henry II. (1633) and Edward III. (1635), and translations of Virgil's *Georgics* (1622) and Lucan's *Pharsalia* (1627), the latter with a supplement in seven books, which he afterwards rendered into Latin (1640). On the outbreak of the civil war, M. sided with the Commons, and, appointed secretary and historiographer to the parliament, wrote a *History of the Parliament of England which began Nov. 3, 1640* (Lat. vers. 1647; Eng. 1650; Fr. trans. 1823), and a *Breviary of the History of the Parliament* (1650). He died, choked by his nightcap strings, November 13, 1650.

MAZ'AMET, a town in the S. of France, department of Tarn, at the foot of the Montagnes Noires, and on the Annette, 33 miles S.S.E. of Albi by rail. It has considerable manufactures of woollens, which, with linens and hydraulic limestone, it produces annually to the value of $3.600,000. Pop. (1872) 10,600.

M'CARTHY, JUSTIN, novelist and journalist, was born in Cork, Ireland, November 22, 1830. He was on the staff of the Cork *Examiner* from 1846 to 1853, when he joined that of the *Northern Times*, Liverpool. In 1860 he became parliamentary reporter for the *Morning Star*, in 1861 foreign editor of the paper, and chief editor, 1864–68. During 1868–71, M. made a complete tour of the United States. Although a vigorous and accomplished contributor to political literature M. has won a wider fame in fiction. His novels are—*Paul Massie* (1866); *The Waterdale Neighbors* (1867); *My Enemy's Daughter* (1869); *Lady Judith* (1871); *A Fair Saxon* (1873); *Linley Rochford* (1874); *Dear Lady Disdain* (1875); and *Miss Misanthrope* (1877). These works are skillfully constructed, abound in incident, and are written in exquisitely beautiful English. Everywhere we can notice the play of a keen, incisive, and graceful intellect, of warm, tender sensibilities, and of a singularly pure and healthy spirit. M. has also written essays and papers on many subjects; *Con Amore* (a collection of essays, 1868); *Critical Notice of George Sand* (1870); *Prohibitory Legislation in the United States* (1872); *Modern Leaders* (biographical sketches, New York, 1872), &c. As a lecturer M. has few equals. The easy yet ornate elegance of his unwritten composition exerts a peculiar and unwonted charm.

MCCALL, GEORGE ARCHIBALD, an American officer, born in Philadelphia, Pa., March 16, 1802, graduated from West Point, and entered the army in 1822. He was engaged in the war against the Seminoles, and participated with gallantry in the Mexican war. He was promoted for bravery at the battles of Palo Alto and Resaca de la Palma. He participated in the civil war with the rank of brigadier-general of volunteers, and was engaged at Mechanicsville, Gaine's Mill, and Frazier's Farm. At the last battle he was taken prisoner. In 1863 ill health compelled him to retire from the army. Died at West Chester, Pa., Feb. 25, 1868.

MCCLERNAND, JOHN A., an American officer and politician, born in Kentucky, May 30, 1812, removed to Illinois when young, and began the practice of law in 1832. He was elected to Congress in 1843 and in 1851, and again in 1859. At the outbreak of the civil war he resigned from Congress, raised a brigade and entered the Union service with the rank of brigadier-general U. S. volunteers. He was present at Fort Donelson, Shiloh, and the capture of Vicksburg, and was in command of the expedition which captured Arkansas post. He resigned his commission in Nov. 1864.

MCCLINTOCH, JOHN, D.D., LL.D., an American scholar and theologian, born at Philadelphia, Pa., Oct. 27, 1814, graduated from the University of Pennsylvania in 1835, and in the latter year entered the ministry of the Methodist Church, where he soon became distinguished for eloquence and scholarship. Upon the founding of Drew Theological Seminary, through the munificence of Daniel Drew, in 1866, he was chosen its president, which position he filled up to the time of his death. Besides many sermons and essays, he published *Analysis of Watson's Theological Institutes* (1850), *Sketches of Eminent Methodist Ministers* (1863), and a translation of Bungener's *History of the Council of Trent* (1855). With Dr. Strong he edited the *Cyclopædia of Biblical, Theological, and Ecclesiastical Literature*. Died at Madison, N. J., March 4, 1870.

MCCLOSKEY, JOHN, D.D., an American cardinal, born at Brooklyn, N. Y., March 20, 1810, graduated from Mount St. Mary's College, Md., and entered the priesthood in 1834. He was pastor of a church in New York, and in 1841 was made president of St. John's College, Fordham, N. Y. In 1847 he became first bishop of the diocese of Albany, and on the death of Archbishop Hughes in 1864, was appointed his successor. In 1875 he was made cardinal.

MCCOOK, ALEXANDER MCDOWELL, an American general, born in Ohio, April 22, 1831, and graduated from West Point in 1852. At the beginning of the civil war, he was appointed colonel in the volunteer service, and in Sept. 1861 was made brigadier-general of volunteers. He was present at Shiloh, the siege of Corinth, and Perryville. He commanded the 20th corps at Stone River and Chickamauga with the rank of major-general.

MCCOSH, JAMES, D.D., LL.D., a distinguished metaphysician and philosopher, born in Ayrshire, Scotland, in 1811, and educated at the Universities of Glasgow and Edinburgh. In 1835 he became a minister of the Church of Scotland, and in 1868, having been called to the presidency of the College of New Jersey at Princeton, he came to America where he has since remained. His published writings are numerous, and he is universally recognized as a profound Christian scholar.

McDONOUGH. THOMAS, an American naval officer, born in Delaware, Dec. 23, 1783, and entered the navy in 1800. He took part in the war against Tripoli; and on Sept. 11, 1814, defeated a large and superior British squadron on Lake Champlain. For this brilliant victory Congress awarded him a gold medal, and Vermont voted him an estate. Died at sea, Nov. 16, 1825.

McDOWELL, IRWIN, an American general, born at Columbus, O., Oct. 15, 1818, and graduated from West Point in 1838. He served during the Mexican war, and was brevetted captain for gallantry at Buena Vista. At the outbreak of the civil war he was made brigadier-general, and placed in command of the army of the Potomac, which he commanded at the first battle of Bull Run, where he sustained a disastrous defeat at the hands of the enemy. In 1862 he was superceded by Gen. McClellan, and placed in command of a division under him. He commanded the 3d army corps at Cedar Mountain, Rhappahannock Station, and second Bull Run. In 1872 he was promoted to be major-general. Died at San Francisco, Cal., May 5, 1885.

McILVANE, CHARLES PETTIT, D.D., LL.D., D.C.L., a Bishop of the American Protestant Episcopal Church, born in New Jersey, in 1798; educated at Princeton College; and entered the ministry. After filling various minor positions, he was, in 1832, made Bishop of Ohio. He published *Lectures on the Evidences of Christianity*, *Family and Parish Sermons*, &c. Died in 1873.

McKEESPORT, in Allegheny Co., Pa., on the Monongahela and Youghiogheny rivers, and the Baltimore & Ohio and other railroads, 15 miles from Pittsburgh. It carries on a large trade in coal, lumber, and wrought-iron pipe. Pop. 9500.

M'CLURE', SIR ROBERT JOHN LE MESURIER, the discoverer of the N.W. Passage, was born at Wexford, Ireland, January 28, 1807. Educated at Eton and Sandhurst, he entered the Navy, served in the Arctic Expedition of 1836, on the Canadian lakes, and on the American and W. Indian coasts till 1846, gradually rose to the rank of first-lieutenant (1838), joined Sir James Ross in the search for Franklin (1848), and on his return was made commander. In 1850 he was nominated to the *Investigator*, and again dispatched in search of Franklin. The expedition, entering Behring Strait, reached 117° 10′ W. long. and 73° 10′ N. lat., 30 miles from Melville Strait (16th September 1851), but was there fixed in the ice. A sledge party sighted the N.W. Passage on the 22d October. After a vain attempt to press forward, the *Investigator* sailed round the S. end of Banks' Land for 30 miles, and was again checked by ice. In an inlet which they called Mercy Bay, the party were imprisoned till April 1854, when they were relieved by Captain Kellett, who conveyed them to England. M. was made post-captain, and received a knighthood, while the officers and crew were rewarded by a grant of £10.000. Subsequently M. served in the E. Indies and China, and died at Portsmouth, October 18, 1873.

McPHERSON, JAMES BIRDSEYE, an American general, born in Sandusky Co., O., Nov. 14, 1828, and graduated from West Point in 1853. During the year 1862 he was rapidly promoted for meritorious conduct, and in the latter part of that year was made major-general. He distinguished himself for bravery at Forts Henry and Donelson, Shiloh, Vicksburg, the siege of Corinth, Port Gibson, and Champion Hill, winning highest praise from Gen. U. S. Grant. He was with Sherman on his famous Atlanta campaign, and took a prominent part in all its battles. On July 22, 1864, he was shot before Atlanta, and was instantly killed.

MEADE, GEORGE GORDON, an American general, born at Cadiz, Spain, where his father was U. S. consul, and graduated from West Point in 1831. He served during the Mexican war under both Taylor and Scott, and was present at the battles of Palo Alto, Resaca de la Palma, and Monterey. For gallantry at the last, he was brevetted first-lieutenant. In 1861 he was made brigadier-general of volunteers, and assigned to a command in the army of the Potomac. He took part in the battles of Mechanicsville, Gaines's Mill, and Glendale; and at the last of these was severely wounded. He distinguished himself by his gallantry at South Mountain, Antietam, Fredericksburg, and Chancellorsville. On June 28, 1863, President Lincoln placed him in command of the army of the Potomac, and on July 1st, 2d, and 3d, he defeated the army of Gen. Lee in the battle of Gettysburg. Died at Philadelphia, Pa., Nov. 6, 1872.

MEADVILLE, a town of Crawford Co., Pa. It has some manufacturing interests, and is in the midst of the leading dairy section of Pennsylvania. Pop. 8860.

MEAGHER, THOMAS FRANCIS, an American general, born at Waterford, Ireland, Aug. 3, 1823, and in early life became an agitator against English supremacy. He was sentenced to death for sedition, but the sentence was commuted to transportation for life. In 1852 he escaped from Tasmania, and came to New York. During the civil war, he commanded an Irish brigade in the Union army, and won distinction by his gallantry. He was drowned in the Missouri River, at Fort Benton, Montana Territory, July 1, 1867.

MECHANICSVILLE, BATTLE OF, an engagement of the civil war, near the village of the same name, in Virginia, 7 miles from Richmond, June 26, 1862. The Union force was under the command of Gen. Fitz John Porter, while the Confederates were commanded by Gens. Longstreet and Hill. Crossing the Chickahominy, the Confederates made a desperate assault upon the Union lines, but were repulsed. Their loss was over 3000, while that of the Union force was but slight.

MEDFORD, a town of Middlesex Co., Mass., on the Mystic River, and the Boston & Maine, and the Boston & Lowell railroads, 5 miles from Boston. Manufacturing is carried on to a considerable extent. Pop. 7573.

MEGA'CEROS (Gr. 'large-horned'), or IRISH ELK, the name given to a large genus of extinct deer, the *M. Hibernicus* or *Cervus Megaceros* of palæontologists. The remains of this genus occur in Pliocene deposits in Ireland, England, and on the Continent; and it is doubtful if the M. existed in the Post-tertiary or Recent period. The antlers were large and spreading, sometimes measuring 10 feet from tip to tip. The M. was a true deer, allied to the fallow-deer and the reindeer.

MEGAL'ODON (Gr. 'large-toothed'), a genus of fossil *Lamellibranchiate* mollusca, belonging to the family *Cyprinidæ*. The shells of M. were very massive, and had large 'beaks.' They are characteristic fossils of the Devonian or Old Red Sandstone system.

MEGILP, a vehicle, generally formed of equal parts of linseed oil and mastic with a little sugar of lead, used by oil painters. It flows freely from the pencil, and on drying assumes a clear gelatinous consistency.

MEHEDPORE', a town of Central India, in the outlying dominions of the Rajah of Indore, on the right bank of the Seepra, a tributary of the Chumbul, 300 miles S.W. from Agra. In the neighborhood occurred the battle of M., in December 1817, when the Mahrattas under Holkar, and the Pindarees, were decisively defeated by General Hislop and Sir John Malcomb. The result was the pacification of Central India.

MEHEMET ALI PASHA, a distinguished Turkish general, is the son of a German musician, and was born in Magdeburg, Prussia, in 1829, his real name being Jules Detroit. When aged fifteen he sailed from Hamburg as a cabin boy, but on account of cruel treatment deserted from his ship at Constantinople. Here he secured the favor of Ali Pasha, then Foreign Minister, and subsequently Grand-Vizier, who sent him to the military college. He obtained a lieutenancy in 1853, and was on Omar Pasha's staff during the Crimean War. He served as general officer in the Servian campaign of 1876. In the early summer of 1877 he commanded a division of the army in Montenegro with such success that he obtained the rank of Mushir, and on Abdul Kerim's dismissal succeeded that officer in the supreme command of the Turkish armies in Europe. In September 1877 with the Turkish right he tried to drive in the Russian left on the river Lom, but after some apparent successes, he fell back to his original positions, and was deprived of the chief command in the beginning of October.

MEIGS, MONTGOMERY CUNNINGHAM, an American general, born at Augusta, Ga., May 3, 1816, and graduated from West Point in 1836. He was assigned to the engineer corps, and rapidly gained distinction. He supervised the reconstruction of several of the more important of our sea-board fortifications. During the civil war he was quartermaster-general U. S. A., and in that position rendered invaluable services to the cause of the Union.

MEKNAS, MEKINES, or MEKNASA, a well-built town in Marocco, N. W. Africa, 200 miles N.E. of the town of Marocco, in a fertile valley watered by the Bet, covered with olive groves, and surrounded by well-cultivated hills. M. has a splendid marble palace, the summer residence of the Sultan. It has considerable trade, and manufactures of leather and earthenware. Pop. 15.000 (in summer 55,000).

MEL'FI, a town of southern Italy, in the province of Potenza, on the N.E. slope of the volcanic Monte Vulture. Its chief buildings are a modern cathedral on the site of an older structure (1155), almost totally destroyed in the earthquake of August 14, 1851; the château of Prince Doria, formerly the castle of Robert Guiscard; a town-hall, bishop's palace, &c. There is a lively trade in wine, oil, cheese, and cattle. Pop. (1874) 11,640.

MELROSE, a town of Middlesex Co., Mass., on the Boston & Maine Railroad, 7 miles from Boston. Large shoe factory and rubber works are here located. Pop. 5071.

MELVILLE, SIR JAMES, was born at Halhill, Fifeshire, in 1530, and was page to Queen Mary of Scotland. In 1564 he was sent to the English court with friendly messages to Elizabeth concerning the approaching marriage with Darnley. Two years later

he acted as interim secretary to the Scotch Queen, and was an unwilling confident of Darnley, who remarked to him about the murderers of Rizzio, 'As they have brewed so let them drink.' The same year he was sent to announce the birth of James VI. of Scotland to the court of England. In 1567 he remonstrated with Mary in connection with her marriage with Bothwell, and received the answer that 'matters were not that far agaitwart.' He was afterwards carried with her a captive to Dunbar, and negotiated the surrender of Edinburgh Castle. M. was asked to undertake a mission to Denmark (1595) in connection with the proposed marriage of James VI. to the younger daughter of the King, but he escaped from the duty. 'He was,' says Burton, 'a man of a character and temper rare for that age—very pacific, yet no coward; a dealer with all parties, yet never, as it would seem, suspected of selling one party to another.' He received the last instructions of Queen Mary on the scaffold. His *Memoirs of Affairs of State*, one of the most valuable of historical references, was printed for the Bannatyne Club in 1827. He died 1st November 1607. See Burton's *History of Scotland*, vols. iv., v.

MENTA'NA, a small Italian village, 13 miles N.E. of Rome, noted for a battle fought November 3, 1867, in which Garibaldi was defeated by the combined French and Papal troops. On his retreat he was taken prisoner by the Italian regulars of Victor Emmanuel. In honor of the victory the pope instituted the M. medal.

MEPHISTOPH'ELES, in the Faust legend, is the *famulus* of that famous magician. Old German chapbooks and puppet-plays give three spellings of his name, M., Mephistophiles, and Mephistophilis, the last being also the form adopted by Marlowe, whilst Shakspeare (*Merry Wives of Windsor*, act i., sc. 7) has a fourth variant, Mephistophilus. The etymology again of the name is doubtful, whether it is a barbarous Greek compound, *me-phostophiles*, 'not loving the light;' a derivative of the Lat. *mephitis* and Gr. *philos;* or, as is most probable, from two Hebrew words, *mephir*, 'destroyer,' and *tophel*, 'liar.' The wholly human, mirthful, sneering M. of the medieval legend, invested by Marlowe with 'an awful melancholy,' stands forth in Goethe's drama as the spirit that denies, 'the devil,' as Carlyle says, 'not of superstition but of knowledge.'

MERCURY, the nearest known planet to the sun. Its greatest and least distances are 42,669,000 and 28,115,000 miles respectively, giving an eccentricity of ·2056. The mean sidereal year is 87·9693 days; but the period of rotation assigned (24h. 5m. 28s.) cannot be regarded as established, on account of the difficulty of getting a proper view of the surface. At its greatest elongation it appears only as a half disc, and its proximity to the sun renders it a very unfavorable object for observation. The orbit is inclined 7° 0′ 8″·2 to the ecliptic; but the inclination of the equator is not known. Its diameter is estimated at 3050 miles; its volume $\frac{1}{17}$ that of the earth; and its density $\frac{1}{10}$ greater than the earth's. Transits of M. across the sun's disc are frequent, and are important to the astronomer as affording him opportunities of observing the peculiarities of such phenomena, which are of so great value in the case of Venus. The orbital motions of M. show irregularities which, according to Leverrier, indicate the existence of intramercurial planets, whose combined mass is comparable to that of M.

MERIDIAN, a town of Lauderdale Co., Miss., on the Mobile & Ohio Railroad, 135 miles from Mobile. It has a large trade and is growing rapidly. Pop. 5500.

MET'CALFE, Sir Charles (afterwards Lord), a distinguished Indian civilian, was the son of a successful Bengal officer, and was born at Calcutta, 30th Jan. 1785. He was educated at Eton, and arrived in India as a writer at the age of fifteen. He was early selected for the political (or diplomatic) department, and in 1808 was sent on the first British embassy to Runjeet Singh, the Sikh Rajah. M. was afterwards Resident at Delhi and Hyderabad, and Member of Council at Calcutta. In 1835–36 he acted as Governor-General of India, and signalized himself by removing all restrictions on the press of that country. He was the first Lieutenant-Governor of the newly-formed N.W. Provinces. On his return to England, M. was appointed Governor of Jamaica (1839–41), and subsequently Governor-General of Canada (1843–45). In both colonies he acted with great moderation in troublous times. He was raised to the peerage in 1845, and died at Malshanger, near Basingstoke, 12th Sept. See Sir J. W. Kaye's *Lives of Indian Officers* (Lond. 1867).

METEORIC IRON, the metal of which the great mass of aërolites are composed, is an alloy of iron with nickel and cobalt. The iron meteorites often contain nodules of iron, phosphoret of iron, and nickel and graphite. When polished, the surface is very brilliant, but it usually rusts quickly from the presence of chlorine.

M'GEE', Thomas D'Arcy, a Canadian politician, was born at Carlingford, Ireland, 13th April 1825, went to Boston in 1842, where he became editor of the *Pilot*, returned to promote the 'Young Ireland' movement of 1848, escaped to New York, where he was editor of the *Nation*, 1848–50, and later of the *American Celt*. Displeased with the 'Know-Nothing' movement (1854–56) he removed to Montreal, Canada, advocated ardent royalism in the *New Era*, entered the Canadian Parliament in 1857, and was made President of the Executive Council in 1864, and Minister of Agriculture in 1867. He denounced the Fenian Society, and was assassinated by one of the body at Ottawa, 7th April 1868. M.'s chief works are *O'Connell and his Friends* (1845); *Irish Writers of the 17th Century* (1846); *Irish Settlers in N. America* (1852); *Canadian Ballads* (1858); *Popular History of Ireland* (2 vols. 1863); and *Speeches* (1865).

MIAMI UNIVERSITY, an educational institution, founded at Oxford, O., in 1824. It has suitable buildings, and its affairs are regulated by a board of 18 trustees, appointed by the governor of the state.

MI'CHAEL, St. (Heb. 'who is like unto God'), the 'first of the chief princes,' or archangels (Dan. x. 13), 'which standeth for the children of thy people' (xii. 1), he who 'disputed with the devil about the body of Moses' (Jude ix.; *cf.* 2 Peter ii. 11), and 'fought with his angels against the dragon' (Rev. xii. 7). In Rabbinical tradition he was regarded as the tutelar saint of the Jewish nation, as now he is the patron of the Church militant, and guardian of redeemed souls. He is usually represented in art as clad in armor, a sword in one hand, and in the other a pair of scales with which he weighs the souls of men. Michaelmas, or the Feast of St. M. and All Angels, falls on September 29.

MICHIGAN CITY, in La Porte Co., Ind., on Lake Michigan. It was three railroads, and is the only harbor in the state. It is extensively engaged in manufacturing, lake commerce, and the lumber trade. It ranks next to Chicago as a lumber market on the chain of lakes. Pop. 10,000.

MICHIGAN UNIVERSITY, one of the largest and leading educational institutions of the West, located at Ann Arbor, Michigan, and first opened for students in 1842. It has fine buildings, large libraries, several departments, and is managed by eight regents, chosen by the people of the state.

MICK'LE, William Julius, born at Langholm, Dumfriesshire, September 29, 1734, received two years' schooling at the Edinburgh High School, and having failed in business as a brewer, went to London in May 1763 to seek a livelihood by his pen. He gained the patronage of Lord Lyttelton, but was glad to accept the post of corrector in the Clarendon Press, Oxford (1765), and here it was that he wrote the *Concubine* (1767), a Spenserian poem, republished as *Syr Martyn* (1778); a translation of Camoen's *Lusiad* (1775; a new and revised edition appeared in 1877); his ballad of *Cumnor Hall*, and other poems. As secretary to Commodore Johnstone (1779) he visited Lisbon, where he was admitted a member of the Portuguese Academy, and in 1780 he became an agent of prizes. He died at Forest Hill, in Oxfordshire, October 28, 1788. There is a collected edition of his poems (3 vols. 1806), with a memoir by the Rev. J. Sim. The exquisite song, *There's nae Luck about the House*, probably written by M. prior to 1760, has been also attributed to Jean Adam, who died in the Glasgow Workhouse in 1765. See the *Athenæum*, January 27, 1877.

MIDDLEBURY COLLEGE, an American educational institution at Middlebury, Vt. It has a valuable property, and is controlled by the Congregational church.

MIDDLETOWN, a town of Orange Co., N. Y., on the N. Y., Lake Erie & Western and other railroads, 67 miles from New York. It is surrounded by a fine dairy and farming section, with which it carries on a considerable trade. Pop. 9500.

MIDHAT' PASHA', a Turkish statesman, was born in Constantinople in 1822. He entered the public service when very young, and held in succession various civil appointments. During the Crimean War he was sent to put down brigandage in Roumelia. He subsequently spent a few years in Paris, London, and other European capitals, where he imbibed a love of liberal institutions. In his first important office, governor of the vilayet of the Danube, to which he was appointed in 1864, he displayed ability and resolution, and encouraged improvements of all kinds. He afterwards became the leader of the Young Turkey party, and was appointed President of the Council of Justice. As a member of the cabinet of Mehemet Rushid he took a leading part in the deposition of the Sultans Abdul-Assiz and Murad. Early in 1876 he published a scheme of administrative reform, and on 19th December was created Grand Vizier, when he promulgated the new Turkish constitution. While advocating radical internal improvement, he was, however, vehemently opposed to foreign dictation, and was the soul of the Turkish resistance to the demands of the Constantinople Conference. M. was suddenly dismissed from his office and banished, February 5, 1877.

MIFFLIN, THOMAS, born at Philadelphia, Pa., in 1744. He served with distinction in the war of the Revolution, and rose to the rank of major-general. After its conclusion he held several positions of public trust. Died in 1800.

MILAN' IV. OBREN'OVITCH, Prince of Servia, born at Jassy, 22d August 1854, is the grand-nephew of Milosch Obrenovitch, founder of the reigning dynasty. His father, only son of Prince Ephraim, was married to a Moldavian lady. Adopted by the childless Michael III., the young M. was sent for education to Paris in 1864, but was recalled by the Skuptchina to occupy the throne in 1868 on the assassination of Michael. M. was crowned at Belgrade on attaining his majority in 1872, and married Natalie Keskho in 1875. In June of the latter year Servia joined Bosnia and Herzegovina in the revolt against the Porte, but in a brief campaign the Servians, in spite of the help rendered by an organized force of Russian volunteers, were repeatedly beaten by the Turkish troops, till finally the storming of Alexinatz, on the 1st September, opened the way to Belgrade, and thus placing Servia at the mercy of her opponent, compelled M. to sue for peace. The settlement of the terms of peace directly involved the interference of Russia, and led eventually to the Conference at Constantinople.

MILES, NELSON A., an American general, born in Massachusetts, in 1839. He followed mercantile pursuits, until the outbreak of the civil war, when he entered the Union army. He served with distinction, rising to the rank of major-general, and was three times wounded, at Fair Oaks, Malvern Hill, and Chancellorsville. After the civil war, he served upon the frontier, against the Indians.

MILLER, SAMUEL, D.D., an American clergyman of the Presbyterian Church, born in Delaware, in 1769. He was educated at Dickinson College, Pa.; was pastor of churches in the city of New York; and was one of the founders of the theological seminary at Princeton, N. J. Died in 1850. Among his works are the following: *Letters on Unitarianism; On the Eternal Sonship of Christ; On the Office of Ruling Elder;* and *On Baptism.*

MILLVILLE, a town of Cumberland Co., N. J., on the Maurice River and a branch of the West Jersey Railroad, 40 miles from Philadelphia. It is engaged in the manufacture of cotton, iron, and glass. Pop. 7660.

MILOSCH' OBREN'OVITCH, Prince of Servia, was born in 1784 in the village of Dobrinja, in the Servian circle of Uschica. He was the son of a day-laborer, and along with his half-brother Milan joined Czerny Georg in his struggle with the Turks. Milan died in 1810, but M. soon came to the front as one of the bravest and most successful warriors of the Servians. In 1813 his splendid defence of the village of Rawanj threw into the shade even the achievements of Czerny Georg himself. On the great uprising of the Servians, on the Palm Sunday of 1815, he placed himself at their head, and after long and chequered fighting finally secured the freedom of his country. At the peace of 1816 he was recognized by the Sultan as Woiwode of Servia, and in 1817 he was chosen by the nobles and clergy hereditary Prince of Servia. He ruled not without skill, but very despotically till 1839, when he was compelled to resign his authority and was banished. He was succeeded by his son, MILAN M. O., who died twelve days after he had assumed the government, and in turn was succeeded by M.'s second son MICHAEL (born 16th September 1823), who in 1842 was forced to make way for Karadgordgevitch, son of Czerny Georg. On the fall of the latter in 1858, the Servian Skuptschina recalled the gray-haired exile M., who died 26th September 1860.

MILTON COLLEGE, an educational institution at Milton, Wis., controlled by the Seventh-Day Baptists, and chartered as a college in 1867.

MINER, ALONZO AMES, D.D., an American minister of the Universalist church, born in New Hampshire, in 1814. In 1839 he entered the ministry, and has since acted as pastor of churches in Lowell, Mass., and Boston, Mass. He was for a time president of Tuft's College, but, in 1874, returned to his Boston pastorate. M. has attained high rank as a thinker and public speaker.

MINNEAP'OLIS, a city of Minnesota, on both sides of the Mississippi, at the Falls of St. Anthony, 8 miles N.-W. of St. Paul by rail, and 3 from the celebrated Falls of Minnehaha ('laughing water'). In 1877 it had 54 churches, 2 universities, 10 public schools, 21 flour-mills (producing 1,306,000 barrels yearly), 20 sawmills (turning out 200,000,000 feet of lumber), besides shingle and lath mills, machine shops, foundries, woollen, oil, and paper mills, &c. The total yearly product of its manufactories is about $17,000,000. The two halves of the city were connected (1877) by a suspension bridge, 111 feet high and with a span of 675 feet, erected at a cost of $200,000. Pop. 100,000.

MINNEHAHA, a beautiful waterfall in Minnesota, where the river of the same name plunges down a precipice, 60 feet high. The word Minnehaha, in the language of the Dakota Indians, means 'laughing water.'

MINNESOTA, UNIVERSITY OF, an educational institution at Minneapolis, Minn. Co-education of the sexes is practiced, and tuition in all departments is free. It has a large endowment of public lands and a growing library.

MIRAMICHI', a river in the province of New Brunswick, Dominion of Canada, flows in a N.E. direction, and, after a course of 200 miles, discharges itself by a wide estuary into the Gulf of St. Lawrence. It is navigable for large ships to Newcastle, and has a large export trade in timber. The salmon and cod fisheries at its mouth are valuable.

MIR'AMON, MIGUEL, born in the city of Mexico, September 29, 1832, entered the military academy of Chapultepec (1846), and received his commission (1852). He opposed the revolution of 1855, defeated Juarez at Salamanca (1858), and was appointed president *ad interim* in the room of Zuloaga (1859). He failed in an attack on Vera Cruz, and, execrated for his share in the 'massacre of Tacubaya,' was forced (1860) to take refuge in Europe, where he visited the French, Spanish, and Italian courts. On the accession of Maximilian to the throne of Mexico, M. was made grand-marshal (1863) and ambassador to Berlin (1864); but in 1866, on the withdrawal of the French troops, he hastened back to Mexico, and undertook the defence of Queretaro, which was captured May 15, 1867. Along with Maximilian and Tomas Mejia, M. was tried by court-martial, sentenced, and shot on the Cerro de las Campanas, June 19, 1867.

MISSOURI COMPROMISE, an enactment of Congress, which sought to compromise the difficulties then existing between the slave-holding and free states. When, in 1818–19, an effort was made to secure the admission of Missouri into the Union as a free state, the measure was violently opposed by the members from the southern states. These differences were, however, finally settled by the Missouri Compromise, which was passed largely through the influence of Henry Clay. By it Missouri was admitted to the Union as a slave state, and it was also enacted (Feb. 28, 1821), that slavery should be forever excluded from all that territory west of Missouri and north of the parallel of 36° 30'. This compact, however, was violated by the Kansas and Nebraska bills in 1854, and its violation led to the organization of the Republican party, and paved the way to the civil war.

MITCHEL, ORMSBY MCKNIGHT, LL.D., an American scientist and soldier, born in Kentucky, Aug. 28, 1810, and graduated from West Point in 1829. He taught for some time at West Point, practiced law in Cincinnati, and in 1834 was made professor of Natural Philosophy and Astronomy in Cincinnati College. Shortly after this he excited interest by a remarkable and interesting series of public lectures on astronomy, upon which subject he lectured extensively in the U. S. At the beginning of the civil war he entered the Union army with the rank of brigadier-general, and in 1862 was made major-general. He died from yellow fever at Beaufort, S. C., Oct. 30, 1862. He published *The Planetary and Stellar Worlds* and *The Orbs of Heaven.*

MITCHELL, DONALD GRANT, a graceful and polished American writer, born in Connecticut, in 1814. He was educated at Yale College, and became a lawyer, but has devoted his energies principally to literary work. He has written under the *nom-de-plume* of 'Ik Marvel.' The following are his best known works: *Fresh Gleanings; The Battle Summer; The Lorgnette; Reveries of a Bachelor; Dream Life, a Fable of the Seasons; My Farm of Edgewood; Rural Studies;* and *Doctor Johns.* He was U. S. Consul at Venice, 1853–55, and upon his return home took up his residence at Edgewood, near New Haven, Conn.

MIT'FORD, JOHN, an elegant English scholar, was born at Richmond, Surrey, England, 13th August 1781. After leaving Oriel College, Oxford, he obtained the living of Benhall, Suffolk, in 1810. In 1815 he was presented to the rectory of Weston St. Peter's, and in 1817 to that of Stratford St. Andrew, also in Suffolk. M. edited the *Gentleman's Magazine* from 1834 to 1850, and with fine critical acumen and ripe scholarship annotated many of the English poets in the Aldine edition. He died at Benhall, 27th April 1856.

MITTWEI'DA, an industrial town in the kingdom of Saxony, near the Zschopau, 35 miles S.E. of Leipsic by rail. It has large engineering works, cotton mills, dye-works, bleach-fields, and a trade in peat and building stones. Pop. (1875) 9093.

MODERA'TO, a musical term signifying that the time is to be taken at a moderate pace.

MODOCS, a tribe of North American Indians, noted for their treachery and murderous assaults upon white settlers. In 1864 these Indians were placed upon the Klamath reservation in Oregon. In 1872 a party of Modocs, who had fled under a chief called Captain Jack, refused to return to their reservation, fired upon the troops sent against them, and thus inaugurated what is

known as the Modoc war. During this war Gen. Canby and Peace-Commissioner Thomas were treacherously killed, while attending a conference with Modoc chiefs. Eventually the hostiles were captured, and Captain Jack, with three others, was hung.

MOIR, DAVID MACBETH, a minor poet, was born January 5, 1798, at Musselburgh, near Edinburgh, Scotland, and practised there as a surgeon. He early published *The Bombardment of Algiers*, and other poems, and became a contributor to *Blackwood's Magazine* under the *nom de plume* of Delta. *The Legend of Genevieve* (1824), *Domestic Verses* (1843), and *The Autobiography of Mansie Waugh* (1828) first appeared in the magazine. The last of these is an admirable picture of the small, vulgar, shrewd, conceited, yet kindly Scot. It displays something of the racy humor of Galt with more tenderness and poetry, and constitutes M.'s best claim to remembrance. In 1851 he published *The Poetical Literature of the Past Half Century*, and *The Lament of Selim*. He died at Dumfries, July 6, 1851. Aird edited his works in one vol. (1857).

MOLINE, in Rock Island Co., Ill., on the Mississippi River. It has railroad connections with Chicago from which it is distant 180 miles. It has fine water power and growing manufacturing interests. Pop. 10,000.

MOLINO DEL REY, BATTLE OF, an engagement of the Mexican war, near the City of Mexico, Sept. 8, 1847. The Mexican army was commanded by Santa Anna, and that of the United States, by Gen. Scott. By a desperate and fiercely resisted assault, M. D. R. was captured by Scott's army. Santa Anna's army numbered 19,000 men, that of his opponent, 10,000.

MOLOCH LIZARD (*Moloch horridus*), a species of lizard found in Australia, and presenting a singular appearance from its being covered with strong plates and spines, while the head bears two prominent processes. A protuberance armed with two spines occurs in the back of the neck.

MOMBAZ', a town of E. Africa, in the territory of the Sultan of Zanzibar, and on a coral islet at the mouth of two rivers. The harbor is good, but the town, inhabited by half-caste Arabs, is ruinous and filthy. It was visited by Vasco da Gama in 1497, and from 1529 to 1720 it was held by the Portuguese, who erected a strong rock-fort, the walls of which are still standing. M. was occupied by the English in 1824, but abandoned two years later. Pop. 10,000.

MONFERRA'TO, a former marquisate of Italy, bounded N. by the seigniory of Vercelli, E. by Milan and Genoa, S. by the Apennines, and W. by Piedmont. It had an area of 1300 sq. miles, and was divided by the Tanaro, an affluent of the Po, into upper and lower M. Casale was the capital. Aleran, the founder of the House of M., was created a marquis by Otho II. in 995. His successors played a prominent part in the Crusades, one of them, Konrad, being chosen King of Jerusalem (1192), and another, Guglielmo VII., marrying his daughter Yolande to the Byzantine emperor Andronicus Palæolus (1284). Theodoro, the second son of this marriage, succeeded to the marquisate, which remained vested in his descendants, until, on the death of the last of the line (1533), it passed to the House of Gonzaga. Since 1703 it has been incorporated with Savoy, and now forms part of the province of Turin.

MONGO'LIA, the land of the Mongols, and part of the Chinese empire, is a vast plateau 2000 feet above the sea, extending between Siberia on the N. and China Proper and Thibet on the S., and between Turkestan on the W. and Mantchuria on the E. Area estimated at 1,304,000 sq. miles; pop. 600,000. M. is in great part occupied by the Desert of Gobi, is girt by high mountain ranges (the Altai, Khin-ghan, &c.), and contains the head waters of the Amoor, Yenisei, and Angara. The climate is one of great extremes. Apart from the desert region the soil is mainly baked clay, affording root only to stunted bushes and tufts of saline grass. Yet in the more favored spots the Mongol manages to rear herds of camels, horses, and sheep, which he exchanges for Chinese tea, corn, and manufactured goods. The chief centers of population are Urga and Karakorum, and in the N.W. are the trading stations Uliassutai and Kohdo. See *M., the Tangut Country, and the Solitudes of Northern Thibet*, by Lieut.-Col. N. Prejevalsky (Eng. trans. with notes by Col. Yule, Lond. 1876).

MONK-BIRD (*Tropidorhynchus corniculatus*), a species of Insessores, belonging to the Tenuirostral section of the order. It receives its name from its bare head resembling the shaven crown of a monk. The M.-B. is a native of S. Australia, where it is also named the 'Friar Bird,' 'Leatherhead,' and 'Poor Soldier.' The bill is elevated at the base, and the fourth and fifth quills are longest. The tail is long and rounded. The feet and claws are very strong. The bird feeds on the nectar of flowers, and also on insects. Its voice is powerful but somewhat harsh. The wings are short, and the flight proportionally weak. The general color is a greyish-brown, the tip of the tail being white. Long white feathers decorate the breast, and the under parts are light brown.

MONMOUTH, BATTLE OF, fought between British forces, commanded by Sir Henry Clinton, and an American force, commanded by Washington, at Monmouth Court-house, N. J., June 28, 1778. The results of the fighting were slightly in favor of the Americans, and on the succeeding night Clinton retired from the scene of action.

MONMOUTH, a town of Warren Co., Ill., on the Chicago, Burlington & Quincy and the Central Iowa railroads. It is surrounded by a rich agricultural district, is engaged in manufacturing, and is the seat of Monmouth College. Pop. 5012.

MONSTRELET, ENGUERRAND DE, a French chronicler, was born about 1390, is supposed upon his own authority to have belonged to a noble family, was connected in 1430 with the court of Jean de Luxembourg, under whom he held some office until 1440. At Compiègne he saw Jeanne Darc, and witnessed the interview of the Duke of Burgundy with her. In 1444 he took the oath as Provost of Cambray, and died 20th July 1453. M.'s fame rests upon his *Chronique*, a work composed of three books, two only of which are his. The first extends from 1400 to 1422, and the second carries on the narrative to 1444. The work, compared with the vivacious pages of Froissart, is inexpressibly dull, but its value as an accurate record of facts is quite as great. The best edition is that of M. D'Ouët D'Arcq (2 vols. Par. 1857–58).

MONTBRISON, a town of France, in the department of Loire, on the Vizezy, 22 miles N.W. of St. Etienne by rail. Its chief buildings are the church of Notre-Dame-d'Espérance, the Mairie and Palais-de-Justice (both ancient convents), and a public library of 15,080 volumes. M. has tanneries, breweries, and a spinning-mill, and in the neighborhood are three mineral springs. Pop. (1872) 5386.

MONTCALM DE SAINT VÉRAN, LOUIS JOSEPH, MARQUIS DE, a celebrated French general, born at the Château de Candiac, near Nîmes, February 28, 1712, entered the army at the age of nine, obtained his captaincy (1729), and commanded the Auxerrois regiment in the battles of Plaisance and Exiles. Created a field-marshal (1756), he was immediately despatched to Canada, which was then threatened by an English invasion, and opened the campaign by the capture of Forts Oswego and Georges. Though to 60,000 English he could only oppose 3000 regulars, as many militiamen, and 1800 undisciplined Indians, M. inflicted a severe defeat on Lord Abercromby, under the wall of Ticonderoga (July 18, 1758). But in the following year three simultaneous attacks were made on Canada. Wolfe, advancing on Quebec (June 27), was at first repulsed, but scaling the Heights of Abraham (September 13), he appeared in M.'s rear. In the great English victory that followed, both generals fell, M. surviving his rival only by a day. A monument raised in Quebec by Lord Dalhousie (1827) bears the following inscription: *Mortem virtus communem, famam historia, monumentum posteritas dedit.*

MONTCLAIR, a town of Essex Co., N. J., on the Morris & Essex and the Greenwood Lake railroads, 14 miles from New York City. It is a beautiful town and contains the residences of many New York business men. Pop. 5146.

MONT-DE-MARSAN, a town of France, capital of the department of Landes, 61 miles N.W. of Tarbes by rail, on the Midouze, a navigable affluent of the Adour, formed by the confluence here of the Midou and Douze. The buildings, wholly modern, include a lyceum, theater, and public library of 12,000 volumes. M. has ironworks, distilleries, and crushing-mills for linseed and colza oils, and carries on a busy transit trade with Bayonne in Armagnac wines and brandies. Pop. (1872) 6964.

MONTEFIO'RE, SIR MOSES, a Jewish philanthropist, the descendant of a wealthy family of bankers, was born in London, October 24, 1784. He was knighted in 1837, when he held the office of Sheriff of London, and was created a baronet in 1846. Since 1840 he has undertaken various missions to the East on behalf of his co-religionists, and his earnest, unwearied, and successful services in procuring kindlier laws and greater freedom for them in many states, notably in Poland, Morocco, and Turkey, has made his name revered throughout the world-wide Hebrew community. His philanthropy has also been exerted in favor of oppressed Christian subjects in Mohammedan countries. He endowed a Jewish college at Ramsgate in 1867 in memory of his wife Judith (author of *Notes of a Visit to Egypt and Palestine*, 1844). On more than one occasion he has received the thanks of the Corporation of London for his humane efforts, and in 1873 he was presented with the freedom of the City. In June 1875, when over 90 years of age, he undertook a mission of investigation into the condition of the Jews at Jerusalem, and a special thanksgiving service for his safe return was held in the following September at the Great Synagogue, London. See Picciotto's *Anglo-Jewish History* (Lond. 1876). The centennial of his birth was celebrated in 1884.

MONTELEO'NE (the *Hipponium* of the Greeks, and *Vibo Valentia* of the Romans), a town of Southern Italy, in the province of

Cantazaro, 48½ miles S.S.W. of Cosenza, and 3 miles distant from the Gulf of St. Eufemia. It has manufactures of silk, and a trade in fruits and wine; played an important part in the Neapolitan wars of the Middle Ages; and suffered greatly from the earthquake of 1783, in which its castle, erected by Friedrich II., was almost totally destroyed. Pop. (1874) 11,840.

MONTEMAY'OR, JORGE DE, a famous Spanish poet, born about 1515 at Montemayor, near Coimbra in Portugal, served for some time in the army, but afterwards went to Castile, and became a singer in the royal chapel. He accompanied Philip II. on his visit to Germany, Italy, and the Low Countries. Later, the Queen of Portugal, Philip's aunt, invited him to her court. M. fell, it is supposed, in a duel in Italy about 1562. By his brilliant though unfinished *Diana Enamorada* (1st ed. 1545; mod. ed., Madrid, 1802), he became the founder of the Spanish pastoral romance, which exercised a wide influence in Western Europe. The *Diana* comprises seven books, partly in prose and partly in verse, and is distinguished by its inexhaustible fund of tender sentiments, and by the dignity and harmony of its versification. He also wrote a number of poems, first published at Antwerp in 1554, under the title of *Obras*, but in subsequent editions the collection was termed *Cancionero*. See Ticknor's *History of Spanish Literature*.

MONTEREY, BATTLE OF, an engagement of the Mexican war, Sept. 21–22, 1846. It consisted in the attack and capture of the strongly fortified city of Monterey, defended by 10,000 Mexicans, by an American army of 6,500 men, commanded by Gen. Zachary Taylor.

MON'TESPAN, FRANÇOISE, ATHENAIS, MARQUISE DE, daughter of Rochechouart Duc de Mortmart, was born in 1641, and in her youth bore the name of Mlle. de Tonnay-Charente. In 1661 she was married to the Marquis de M., who brought her to the Court of Louis XIV., where her beauty and vivacity soon attracted the notice of the monarch. She superseded the soft La Vallière in the royal regards, and after 1667 received his exclusive devotion. The Marquis de M. did not accept the situation with the grace of a courtier, and was, in consequence, successively imprisoned in the Bastille, banished to Cayenne, and finally divorced. But M. was doomed to be superseded in turn. She required a governess for the children whom she had borne to the king, and the lady whose services she obtained (Madame Maintenon) robbed her of his affections. In 1686 Louis finally broke off his relations with M., who in 1691 was ordered to leave Paris. She entered the order of the Daughters of St. James, and died 27th May 1707. By her intercourse with Louis she had three sons, the Duc de Maine, the Comte de Vexin, and the Comte de Toulouse, and three daughters, Mlle. de Nantes, married to the Duc de Bourbon; Mlle. de Tours (died 1681), and Mlle. de Blois, married to the Duc d'Orleans; besides other children who died young. M. was ambitious and haughty, and enjoyed the splendor of her shame. See *Memoires de Madame la Marquise de M.* (2 vols. Par. 1829).

MONTEVER'DE, CLAUDIO, an Italian composer, born at Cremona in 1568, and died at Venice in 1649. He produced many pieces of sacred music, several operas, including *Orfeo* and *Ariana*, and five books of motets and madrigals.

MON'TEZ, LOLA, was born about 1820. Her birthplace is variously given as Seville, Limerick, and Montrose in Scotland. After an adventurous life in London, Paris, and Brussels, she came to Münich in 1846, won the favor of King Ludwig I. of Bavaria, who made her Countess of Landsfeld. She moulded in some degree the policy of the Bavarian Court, and was opposed to the Ultramontanes. In consequence of public disturbances caused by her own rashness and pride, she was expelled from the country in February 1848, returned to England, thence came to America in 1852, where she excited a great *furore* as an actress, and latterly became a lecturer on social and moral questions. She published an *Autobiography*, and died at New York, 30th June 1861.

MONTFAUCON, BERNARD DE, a French antiquary, born Jan. 13, 1655, at the château of Soulage in Languedoc, served under Turenne, but in 1676 entered the Benedictine monastery of St. Maur, where he applied himself to the study of philosophy, theology, history, literature, and the dead and living languages. He received the post of keeper of the collection of medals at St. Germain des Prés (1694), made an antiquarian tour in Italy (1698—1701), was admitted member of the Academy of Inscriptions (1719), and died at Paris, in the Abbey of St. Germain des Prés, Dec. 21, 1741. In folio alone, M. published forty-four different works, among them *Diarium Italicum* (Par. 1702; Eng. trans. 1725), *L'Antiquité appliquée et representée en Figures* (15 vols. Par. 1719–24), and editions of Athanasius (1693), the Greek Fathers (1706), Chrysostom (1718), *Bibliotheca Bibliothecarum Manuscriptarum Nova* (2 vols. 1739), &c.

MONTGOMERY, ALEXANDER, a Scottish poet of James VI.'s time, born at Hazelhead Castle, Ayrshire, seems to have been an officer in the guard of the Regent Morton. What services he rendered the king cannot be ascertained; but from 1582 he enjoyed a pension of five hundred marks per annum. In 1586 he got royal license to travel for five years on the Continent; and it is certain he was confined for a time in some foreign prison. The dates of his compositions are unknown. Three short poems are quoted in Bannatyne's MS. (1568). His most famous poem, *The Cherrie and the Slae*, a long love allegory—virtue represented by the cherry, vice by the sloe—was first printed by Waldegrave in 1597. For the whole of his compositions see the edition prepared by Laing, with memoirs by Irving (ed. 1821). It is probable that M. survived at least till 1605, when his *Mindes Melodie* was printed by Charteris.

MONTGOMERY, WILLIAM READING, an American general, born in New Jersey, July 10, 1801, and graduated from West Point in 1825. He participated in the Mexican war, and was brevetted major for gallantry at Palo Alto and Resaca de la Palma, and lieutenant-colonel for gallantry at Molino del Rey. He took part in the first battle of Bull Run, and was shortly afterwards made brigadier-general. In 1864 he resigned from the army, owing to ill-health, and died at Bristol, Pa., May 31, 1871.

MOOD'Y, DWIGHT LYMAN, born at Northfield, Massachusetts, February 5, 1837, worked as a farm laborer till he was seventeen, and in 1856 went to Chicago. Here he opened a Sunday School for 1000 children, and became pastor of a Congregational Church, and here, in 1871, he was joined by IRA DAVID SANKEY, who, born at Edinburgh, Pennsylvania, August 28, 1840, had been in business at New Castle since 1855. Visiting Great Britain in 1873, the two held a series of gigantic revival meetings at Edinburgh, Glasgow, Dublin, London, and other cities, M. preaching, and S. singing the well-known hymns that go by his name. Their first audience at the Agricultural Hall, Islington, was estimated at upwards of 21,000, and the total expenses of the mission amounted to £28,396, of which a deficit of £138 was left by public contributions. Since their return to America (1875) they have continued their evangelistic work at Chicago, New York, and other places.

MOON-BLINDNESS, or Nocturnal Amaurosis, is a disease which, though rare in this country, is by no means uncommon in warm climates, and more especially among seamen. The first attack generally excites great alarm, being unaccompanied with any premonitory or constitutional symptons. M.-B. probably depends on come peculiar state of the retina, rendering the eye insensible except to light of a certain degree of intensity. The disease is generally curable.

MOOSEHEAD LAKE lies in the northern part of Maine, is about 36 miles long, and from 3 to 10 miles wide, and is much frequented by sportsmen for its gunning and fishing.

MOP'LAHS, a tribe of Mohammedans on the Malabar or W. coast of S. India, numbering about 600,000. They are an Arab race, recruited by converts from Hinduism during the persecution of Hyder Ali and Tippu. Hardworking cultivators and enterprising traders, they are liable to serious outbreaks of religious fanaticism. In 1855 the collector of Medura was murdered, and again in 1873 nine fanatics rushed upon the bayonets of a detachment of European troops who are always stationed in the district.

MORAN, THOMAS, a distinguished painter, born at Bolton, England, Jan. 12, 1837. In 1871 he came to America and went with Hayden's expedition to the Yellowstone. His best known works are *The Grand Cañon of the Yellowstone* and *The Chasm of the Colorado*. These two were purchased by the government for $20,000.

MORE, HENRY, born at Grantham, Lincolnshire, England, October 12, 1614, was educated at Eton, afterwards studying at Christ's College, Cambridge, where he obtained a fellowship. Early abandoning the Calvinism in which he had been reared, he gave himself up to mysticism, studying in particular the writings of the Neoplatonists. In 1642 he published *Psychodia Platonica, or a Platonical Song of the Soul*, containing much subtle thought clothed in poetry never better than Bunyan's. He likewise published *The Threefold Cabbala*, an explanation of the first chapters of Genesis, *The Mystery of Godliness*, *The Mystery of Iniquity*, *A Discourse on the Immortality of the Soul*, *Medela Mundi, or Cure of the World*, and other books of less importance. He was the last of those in England who embraced the Renaissance Platonism of Italy. His philosophy attempted to make matter contingent, metaphysics being with him the science of incorporeal existence. His ethics, like those of all Platonists, were high toned; practically, he was benevolent to a fault, and although displaying an amusing amount of naïve egotism, his writings imbue the reader with sincere admiration and respect for their author. He translated his works into Latin in 1679. Refusing tempting offers of church and university preferment, he lived the life of a recluse,

and died 1st September 1687. See his *Life* by Ward (Lond. 4th ed. 1712), and Vaughan's *Hours with the Mystics* (Lond. 1856).

MORE'LIA, capital of the State of Michoacan, Mexico, delightfully situated among the mountains, 6350 feet above the sea, and 130 miles N.W. of Mexico, was founded by the Spaniards in 1541, and called Valladolid till 1828, when it was renamed from the revolutionary chief Morelos, who as well as Iturbide was born here. It is the seat of an archbishop (since 1863), and has a beautiful cathedral (built 1745), a college, a splendid arched aqueduct for the supply of water, and a large cotton factory (since 1868), with 2500 spindles and 78 looms. Pop. 30,000.

MORGAN, JOHN H., a Confederate general, born at Huntsville, Ala., June 1, 1826, and served during the Mexican war in the cavalry. In 1861 he entered the Confederate service, and in 1862–63, conducted a series of daring raids through Kentucky. In 1863 he entered Ohio, but was captured and sent to the penitentiary. He escaped, and during another raid, was surprised and killed, near Greenville, Tenn., Sept. 4, 1864.

MOR'LAND, GEORGE, an English painter, born in London, 26th June 1763, sold his drawings at the age of six, and at sixteen was a finished artist and a sad blackguard—thanks to the education of a greedy father. He painted with great freedom and inimitable humor. His subjects were usually animals, occasionally rural landscapes and interiors. The two he especially affected were a litter of pigs and a pothouse parlor. He died a palsied drunkard in a sponging-house in Eyre Street, 29th October 1804.

MOR'LEY, HENRY, born in London, 1822, educated at Neuwied and King's College, London, and practised as surgeon at Madeley in Shropshire (1844–48); was a schoolmaster for two years at Liscard, Liverpool, and in 1851 settled in London as a journalist, writing for *Household Words* and the *Examiner*. Of the latter he became editor. In 1865 he was appointed Professor of English Language and Literature at University College, and in 1870 was appointed Examiner in English Language, Literature, and History to the University of London. M. has a richly cultivated mind, fine sympathies, a clear perception of literary beauty, and a vigorous critical faculty. Among his numerous writings may be noted *How to Make Home Unhealthy* (1850); *A Defence of Ignorance* (1851); *Life of Palissy the Potter* (1852); *Life of Jerome Cardan* (1854); *Life of Cornelius Agrippa* (1856); *Memoirs of Bartholomew Fair* (1859; new ed. 1874); *Fairy Tales* (1859–60; new ed. 1877); *Journal of a London Playgoer* (1866); *Tables of English Literature* (1870); *Clement Marot and other Essays* (2 vols. 1871); *English Writers* and *Illustrations of English Religion* (1877).

MORPHY, PAUL CHARLES, a distinguished chess player, born at New Orleans, La., June 22, 1837, and when a mere child developed wonderful skill at this game. He was admitted to the bar in 1857. In the same year he became the chess champion of the U. S. He afterwards visited Europe, and met and vanquished the best players of the continent. He also developed remarkable skill in conducting several games at once while blindfolded. Died July 10, 1884.

MORRIS, GEORGE P., an American poet, born in Pennsylvania, and in early life removed to New York and became engaged in journalistic work. He is chiefly known as a song-writer. He wrote *Woodman, Spare that Tree; We were Boys Together; My Mother's Bible;* and *The Deserted Bride*. Died in 1864.

MORRIS, GOUVERNEUR, an American financier, born at Morrisania, N. Y., Jan. 31, 1752, and graduated from King's College New York in 1768. He held important positions in his own state, and was in Congress 1777–80. He was a member of the committee that drew up the Federal Constitution in 1787, and was subsequently U. S. minister to France and U. S. Senator. Died at Morrisania, N. Y., Nov. 6, 1816. Mr. Morris was noted for his public-spiritedness and hospitality.

MORRIS, ROBERT, an American patriot, born in England, but came to America when a mere child. During his early life he followed mercantile pursuits in Philadelphia, Pa. He was a member of the first Continental Congress and one of the signers of the Declaration of Independence. During the Revolution he greatly aided the government financially, at times pledging his personal credit to large amounts. He was U. S. Senator from 1786 to 1795. During the latter years of his life he lost his fortune, and spent his closing years in prison for debt. Died at Philadelphia, Pa., May 8, 1806.

MORTON, HENRY, born at New York, December 11, 1836, graduated at the University of Pennsylvania (1857), and was successively appointed Professor of Chemistry at the Philadelphia Dental College (1863), secretary of the Pennsylvanian Franklin Institute (1864), Professor of Chemistry in the University of Pennsylvania (1869) and President of the Stevens' Institute of Technology at Hoboken, New Jersey (1870). Besides sixteen *Lectures on Light* (1867), which excited considerable attention in the learned world, M. is author of numerous able papers in the *Chemical News*, *Philosophical Magazine*, and other scientific journals.

MORTON, JOHN, was probably born at Milborne St. Andrew, in Dorsetshire, England, about 1420, and proceeded from Cerne Abbey to Balliol College, Oxford, where he graduated LL.D., and became principal of Peckwater Inn (1453). Introduced by Cardinal Bourchier to Henry VI., he had been made a privy councilor, rector of Bloxworth, chancellor of Cornwall, and subdean of Lincoln (1450). He was present on the Lancastrian side at the battles of Towton and Barnet, but after the defeat of Tewkesbury (1471) gave in his adhesion to Edward IV., and by him was appointed Master of the Rolls (1472), and Bishop of Ely (1479), with a host of minor preferments. Edward's death, however, was followed (June 13, 1483) by the famous 'strawberry scene' of Shakspeare's *Richard III.*, and by M.'s imprisonment in Brecknock Castle. Escaping to Ely, he passed over to Flanders, and there received the news of the victory of Bosworth (1485). On his return to England his attainder was reversed, and he was created lord chancellor and archbishop of Canterbury (1486), a cardinal (1493), and chancellor of Oxford (1494). He died at Knowle, in his native county, October 12, 1500. An eminent lawyer, with a prodigious memory, full of energy, but of polished manners, cursed with a besetting sin of avarice, yet princely in bestowing—such is the character that may be gathered from his life, and from the first book of the *Utopia* of Sir Thomas More, who was page in his household (1494–97). See vol. v. of Hooke's *Lives of the Archbishops of Canterbury* (Lond. 1867).

MORTON, OLIVER P., an American statesman, born in Indiana, Aug. 4, 1823, educated at Miami University, and began the practice of law in 1847. From 1861 to 1865 he was governor of Indiana, and in that position rendered most efficient aid to the Union cause. He was an ardent and eloquent supporter of the war, since which he has been elected several times to the U. S. Senate. Died Nov. 1, 1877, at Indianapolis, Ind.

MOSCH'ELES, IGNAZ, pianist and composer, was born of Jewish parents at Prague, 30th May 1794. He was a precocious child, and at the age of eleven was the best pianist in his native city. In Vienna he studied under Albrechtsberger and Salieri. After a professional tour over all Europe he took up his residence in London in 1820, where he was for more than twenty years professor in the Royal Academy of Music and conductor of the Philharmonic Concerts. He translated Schindler's *Life of Beethoven* into English 1841. At Mendelssohn's suggestion he accepted the musical professorship in the Conservatoire at Leipsic in 1846. He died 10th March 1870. M. published many beautiful concertos, sonatas, fantasias, and studies. He was unrivalled as a pianist in his own pure classic style. See *Aus Moscheles' Leben*, by his widow, 2 vols. (1872–73), translated into English by A. D. Coleridge (Lond. 1873).

MOTT, LUCRETIA COFFIN, born at Nantucket, Mass., Jan. 3, 1793, and removed to Boston (1804) and to Philadelphia (1809). She became a preacher in the Society of Friends, helped to organize the American Anti-Slavery Society, and advocated woman's suffrage. Died in the month of November, 1880.

MOTT, VALENTINE, M.D., LL.D., a distinguished American surgeon, born at Glen Cove, Long Island, Aug. 20, 1785. During his life he held professorships in several of the leading medical institutions of America, and acquired highest reputation by the success with which he performed the most difficult operations. He was not surpassed by any of the surgeons of his day, either at home or abroad. In addition to this he was a brilliant lecturer, and published many valuable articles on medical and surgical themes. Died in New York, April 26, 1865.

MOULTRIE, WILLIAM, an American patriot, born in South Carolina in 1731. From the beginning of the difficulties between the British Crown and the colonies, he strongly supported the cause of the latter. In 1776 he gallantly defended a rude fort on Sullivan's Island in Charleston harbor, against an attack of the British fleet, under Sir Peter Parker, whom, after ten hours' hard fighting, he compelled to retire. This fortress has since been known as Fort Moultrie. He was made brigadier-general, and took part in several struggles with the British. In 1782 he was made major-general, and after the close of the war, was twice elected governor of his state. He published *Memoirs of the Revolution*. Died at Charleston, S. C., Sept. 27, 1805.

MOUND BIRD. See TALLEGALLA in Chambers' En.

MOUNT VERNON, a town of Westchester Co., N. Y., on the New York & Harlem and the New York & New Haven railroads, 13 miles from New York. It is the home of many persons who do business in New York City. Pop. 6000.

MUALITCH, a town of Asiatic Turkey, 16 miles S. of the sea of Marmora, and 42 W. of the town of Brussa. It has considerable trade with Constantinople in wool, silk, and fruit. Pop. about 16,000.

MU'DIE, ROBERT, was the son of a weaver, and was born in the neighborhood of Dundee, Scotland, 28th June 1777. After holding the appointment of drawing master in the Inverness Acad-

emy and Dundee High School, he removed to London in 1820, and became a reporter on the *Morning Chronicle*. Worn out by a life of incessant literary toil, M. died 29th April 1842. In the course of twenty years he produced more than eighty volumes, only one of which still possesses any vital interest. The *Feathered Tribes of Great Britain* (2 vols. 1833), though desultory and incomplete, ranks as a British classic in natural history.

MUHLENBERG, WILLIAM AUGUSTUS, D.D., an American philanthropist and hymn-writer, born at Philadelphia, Pa., Sept. 16, 1796, graduated from the University of Pennsylvania in 1814, and entered the ministry of the Episcopal Church in 1817. After serving several churches, he came to New York in 1846, as rector of the Church of the Holy Communion. Here he was instrumental in founding St. Luke's Hospital. He has written many hymns, the best known of which is 'I would not live alway.' Died in New York City, April 1877.

MUKH'TAR, GHAZI AHMED, PASHA, a Turkish general, was born about 1836. He received command of the main Turkish army operating in Montenegro in 1876, when his campaign was unsuccessful. He was appointed commander at Erzeroum in February 1877, and on the outbreak of the war with Russia obtained the supreme command in Asia. He checked the Russian invasion at Zewin in June 1877, and by an active movement thereafter relieved Kars. On 25th August he won an important victory at Kezil-Tepe. He received the title of Ghazi or Victorious from his grateful Sultan, September 1877. Near the Russian frontier in the beginning of October he withstood a furious onslaught by the Russians, which lasted several days, and cost the assailants (according to M.), 15,000 men; but on the 14th, 15th, and 16th of October, in a succession of fierce battles, M., attacked in front and flank by an overwhelming force of Russians, was disastrously defeated, his position captured, his army cut in two —one portion surrendering and the other retiring on Erzeroum. The siege of Kars was in consequence vigorously renewed, and on the 18th of November, after a desperate resistance on the part of the Turks, the town was stormed by the Russians, the whole of the garrison not slain in the struggle were made prisoners, and 364 cannon captured.

MULBERRY JUICE, or MORI SUCCUS, the deep purple juice of the ripe fruit of the *Morus Nigra*, is used in medicine as a coloring matter for draughts, an agreeable addition to a gargle for sore throat, and as a refreshing drink, slightly laxative, in febrile cases. The only officinal preparation is the *syrup*, which may be given in doses of from 1 to 2 drachms.

MÜLLER, JULIUS, a German theologian, born at Brieg, Silesia, April 10, 1801. He was a profound thinker, and is best known to Americans by his work entitled *The Christian Doctrine of Sin*. Died Sept. 27, 1878.

MÜLLER, WILHELM, one of the most charming lyric poets of Germany, was born at Dessau, 7th Oct. 1794, studied philology and history under F. A. Wolf at Berlin (1812), acted as a volunteer in the German War of Liberation (1813), took part in the battles of Lützen, Bautzen, Hainau, and Kulm, and on the conclusion of peace resumed his studies at Berlin, devoting himself especially to the Old German language and literature. In 1817 he visited Italy, and some time after his return was appointed ducal librarian at Dessau, where he died, 1st Oct. 1827. M. had a certain nobility of character and love of comprehensive culture which reappear in his illustrious son; but it is as a poet he will be remembered by his countrymen. The first work that distinctly evinced his poetic power was *Gedichte aus den hinterlassenen Papieren eines reisenden Waldhornisten* (2 vols. 1821–24). His *Lieder der Griechen* (5 parts, 1821–24), simultaneously issued, show still finer work. But he is seen at his best in his *Lyrische Spaziergänge* (1827). They are marked by an inward truth and feeling, a fresh and vivid power of description, a noble ardor for the rights of the people, and a singular melody of language. A collection of his *Gedichte* was published at Leipsic in two vols. in 1837 (latest edition 1869). Schwab published M.'s *Vermischte Schriften* (5 vols. 1830), with a biographical memoir.

MU'LOCK, DINAH MARIA (Mrs. Craik), a popular English novelist, is the daughter of a clergyman, and was born at Stoke-upon-Trent, England, in 1826. Her earlier novels, *The Ogilvies* (1849), *Olive* (1850), *The Head of the Family* (1851), *Agatha's Husband* (1852), &c., led the way to her great success with *John Halifax, Gentleman* (1857), an admirable novel both in conception and tone. The reputation she had by this time achieved as an earnest and thoughtful writer, and accurate portrayer of middle-class life, has since been well maintained by *Mistress and Maid* (1863), *A Noble Life* (1866), *Hannah* (1871), *The Laurel Bush* (1876), and other novels. She has also written *Fugitive Poems* (1860), *Sermons out of Church* (1875), besides many short tales and sketches, and books for the young. She received a pension in 1864, and married Mr. George Lillie Craik in 1865.

MUNCIE, a town of Delaware Co., Ind., on the White River. It is connected by railway with the principal cities of the state, and is engaged in milling, pork-packing, and trade in agricultural produce. Pop. 6500.

MUNGOOSE, or MONGOOSE (*Herpestes griseus*), a species of Carnivorous quadrupeds, belonging to the family of the Ichneumons, and sometimes named the Indian Ichneumon. It attains the size of a cat, and is of grey color. Another species, named the banded M. (*Mungus fasciatus*), inhabits Africa. The Indian species is famous as a destroyer of that most deadly of snakes, the Cobra (*Naja tripudians*), and combats between it and the reptile almost invariably result in the death of the latter. Some observers think that the fur of the M. protects it; others that the M. may be bitten, but that, by eating some herb, it counteracts the effects of the poison; while a more likely theory is that the agility of the animal enables it to keep out of harm's way, and that it seizes and despatches the snake before the latter has time to bite.

MUNKACS', a town of Hungary, capital of the comitat of Bereg, on the Latorcza, 67 miles N.E. of Debreczin by rail. It has manufactures of cloth, furs, and hosiery; and iron, alum, and rock-crystals ('Hungarian diamonds') are found in the neighborhood. On an isolated rock (310 feet high) 2 miles E. of the town, stands the strong fortress of M. (1359), now converted into a state prison. Pop. (1869) 8602.

MU'RAL CIR'CLE is an astronomical instrument of large size, consisting of a telescope attached to a graduated circle which is firmly fastened to a solid wall of masonry. It is fixed in the meridian plane, and is intended for measuring angular distances in the meridian. Originally the telescope was used simply with a graduated arc or quadrant, but the circles constructed by Troughton in the beginning of the present century showed the many advantages which a complete circle has over an arc. The instrument cannot be used for accurately determining right ascensions; and consequently it is now giving place to the more complete structure known as the Transit Instrument.

MURDAN' (*Mardan*), a town in the district of Peshawur, Punjaub, British India, 33 miles N.E. from Peshawur. It is the permanent headquarters of the celebrated Guides Corps, more than 1000 strong, including horse and foot. In 1857 the Guides marched to the siege of Delhi, covering 580 miles in twenty-two days. M. has been the scene of the assassination of more than one British officer by Mohammedan fanatics. See Sir J. W. Kaye's *History of the Sepoy Mutiny* (vol. ii. Lond. 1860).

MURFREESBORO, a village of Tennessee, situated in a fertile plain 32 miles S.E. of Nashville. Pop. 3502. It is historically interesting as the scene of a prolonged contest, known also as the Battle of Stone River, between the Confederates and Federals, which resulted in the final retreat of the former, after the loss of 10,000 out of an army originally 35,000 strong. The fighting lasted from December 31, 1862, to January 4, 1863.

MURGER, HENRI, a French novelist, born at Paris, March 24, 1822; after receiving a meagre education, served as clerk to a notary (1836–38), and next secretary to a Russian nobleman, Count Tolstoi. He wrote poems, but could find no publisher for them, and plunged presently into that life of misery and adventure which he dubbed la vie Bohemienne, and has described in his first and ablest production *Scènes de la vie de Boheme* (Par. 1845). This M. frequently copied, but never equalled, in his *Pays Latin* (1851), *Scènes de Campagne* (1854), *Sabot Rouge* (1860), &c. He also published *Ballades et Fantasies* (1854) and *Nuits d'Hiver* (1861), besides several comedies, as *Bonhomme Judis* (1852), and *La Sermant d'Horace* (1860). M. died at Paris, January 28, 1861. A complete edition of his works has been issued in 10 vols.

MURRI (*Marri*), a hill station and sanitarium established in 1851 among the spurs of the Himalayas, 7330 feet above the sea, in the district of Rawul Pindi, Punjaub, British India, 39 miles N.E. of Rawul Pindi. Pop. (1868) 2346. The census was taken in midwinter; during the summer season the number of visitors may amount to 12,000. The scenery is very beautiful, and the climate healthy, though there have been disastrous outbreaks of cholera. There are 5 hotels and a thriving brewery. In September 1857, during the mutiny, M. was attacked unsuccessfully by the insurgent hill tribes. One of the Lawrence Memorial Asylums for the children of European soldiers is situated here, and is occupied by 70 boys and 56 girls.

MURRUMBID'GEE, a large river in the S. of New South Wales. It rises in the Snowy Range, an offshoot of the Australian Alps, and for the greater part of its course of 1300 miles flows W. until it unites with the Murray in 34° 35′ S. lat., 143° 20′ E. long. The country on its banks is for the most part well adapted for pastoral purposes, except near its junction with the Lachlan, where there is a vast morass. The M. is navigable by light-draught steamers for 500 miles.

MU'SICAL BOX, a case fitted with a mechanical contrivance for playing tunes. Such boxes first came into fashion about the beginning of the 18th c., when it was common to attach small ones as pendants to watch-chains. The mechanism consists of a steel board with tongues of different sizes called a comb, a cylinder fitted with small steel points, and a fly or regulator. The notes are produced by the revolving action of the cylinder on the comb; the shorter the tongues the quicker being the vibrations, and consequently the higher the pitch. Some boxes plays as many as 100 tunes. The most famous manufactories of these articles are at Geneva and St. Croix, Switzerland, at Prague, and at St. Susanne, France. Musical clocks are extensively manufactured in the Black Forest. The insertion of reeds, pipes, bells, castanets, &c., produce different kinds of boxes, such as the mandoline, organocleide, &c.

MUSICAL GLASSES, an instrument composed of glass goblets filled more or less with water, to be struck gently and rapidly with the end of a damped finger. A complete scale is formed by gradnating the quantity of water, the less the quantity, the lower being the pitch of the sound produced.

MUSKEGON, a city of Muskegon Co., Mich., near the mouth of the Muskegon River, 6 miles from Lake Michigan and 100 from Chicago. It has forty immense saw mills, and is the largest lumber-manufacturing city of the West. It produces annually about 600,000,000 feet of lumber. There are also other extensive manufacturing industries. Pop. 15,000.

MUTT'ON (Fr. *mouton*, 'a sheep') is the flesh of full-grown sheep. The best M. is obtained from animals from four to five years of age, but it is seldom sheep are kept more than from two to three years. The flesh of Southdown and of blackfaced sheep is esteemed the sweetest. M. contains considerably more fat and much less nitrogenous matter than beef, but next to beef it is the most valuable and extensively used flesh-food.

MUTT'RA, (*Mathurá*), the chief town of the district of the same name, N.W. Provinces, British India, on the right bank of the Jumna, 35 miles N.W. of Agra, and 97 S.E. of Delhi. Pop. (1872) 59,281. It is an ancient city, mentioned by Arrian and Pliny, and it is known to have been a religious center in the Buddhist period. But it is most famous as the scene of the birth and adventures of Krishna, and as such it is crowded by Vishnuvite pilgrims, for whose guidance there are 1400 families of Chowbays, a sect of Brahmins. The river is lined with *ghauts* or bathing-places, built from the neighboring quarries of sandstone. M. has twice been sacked by the Mohammedans: by Mahmud of Ghuzni in 1017, who carried off untold wealth from the golden and bejeweled idols, and again by the Afghans in 1757. It was acquired by the British in 1803 from the French adventurer Perron, who had received it as a fief from Scindiah. Its trade is now very great, and its merchants are reckoned extremely wealthy. The chief buildings are the Jumna Musjid of Aurungzebe, the Observatory of the Rajput Prince, Jey Singh, now both in a ruinous state; and the residence and Jain temple of Paruekji, the former treasurer of Scindiah, reputed to be the richest banker in India.—The *district* of M., which is crossed by the Jumna river, and watered by the newly-opened Agra Canal, has an area of 1612 sq. miles, and a pop. (1872) of 887,689. The crops are wheat, barley, millets, pulses, and sugar-cane. It contains the hills of Goverdhun, among which lies Brindabun, the scene of the amorous youth of Krishna. See *Travels of a Hindoo*, by Baboo Bholanauth Chunder (Lond. 1869).

MYER, ALBRT J., an American general, born in N. Y., in 1828, and graduated from Hobart College, in 1847. He studied medicine, and entered the U. S. army as Surgeon. He is chiefly renowned for his invention of a signal system, and his connection with the meteorological department of the signal service, which he himself organized. He rose to the rank of brigadier-general, U.S.A. Died in 1880.

MYO'PIA is the term used in ophthalmic medicine to denote short-sightedness or near-sightedness. It is the opposite condition of *Presbyopia*, or long-sightedness.

N.

NABATHÆ'ANS. In Scripture history Nebajoth was the first-born of Ishmael (Gen. xxv. 13; 1 Chron. i. 29), and father of a tribe in Western Arabia beside the tribe of Kedar (Isaiah lx. 7). This tribe is by Josephus (*Ant.* i. 12, 4) and Jerome (Gen. *in loc.*) identified with the N. or Nabatæans, who, according to these writers, gave their name to all the region from the Euphrates to the Red Sea, and who in the time of the Maccabees (about B.C. 160) occupied the same region (1 Macc. v. 25, ix. 33–37; Jos. *Ant.* xii. 8, 3). During the height of their power the country of the N. embraced the whole of Edom, from which they drove the Edomites, and the plain of Arabia between the northern half of the Red Sea and the Mountains of Nejd, being bounded on the west and north by Palestine and Bashan. Besides being rich in flocks and herds, nearly the whole commerce of Western Asia was in their hands. From their capital of Petra, the ruins of whose rock-hewn buildings yet testify to their great wealth and civilization, caravan tracks radiated in all directions: to Palestine, Phœnicia, Damascus, Palmyra, Mesopotamia, to the ports on the Persian Gulf and the Red Sea, and to Egypt. The first mention of a king of the N. is about 166 B.C. (2 Macc. v. 8). All their kings bore the title of Aretas or Obodas, and the country was called Arabia Petræa or simply the kingdom of Arabia. Herod Antipas married a daughter of the Aretas of the time (Jos. *Ant.* xviii. 5, 1), probably the same who captured Damascus and governed it by an Ethnarch (2 Cor. xi. 32). The first blow to their prosperity was received when a new route between the east and west was opened through Egypt. The kingdom was annexed to the Roman Empire in A.D. 105, and the cities ruined by the Mohammedan conquest.

NACHIMOV, PAUL STEPANOVITCH, a Russian admiral, born in 1803, in the government of Smolensk, circumnavigated the globe under Sasarev (1822–25), was present at the battle of Navarino (1827), and commanded a corvette in the blockade of the Dardanelles (1830). Appointed, on the outbreak of the Crimean War, to the command of the Russian fleet in the Black Sea, he annihilated a Turkish squadron off Sinope (November 30, 1853), and having played a gallant part in the defence of Sevastopol, was raised to the rank of Admiral (April, 1855). On the 10th July of the same year he was struck by a bullet, and died the following day.

NA'GA'S, a wild race of Aborigines, bordering on Assam, in the N.E. frontier of British India. They are divided into many tribes, some of whom are inoffensive and trade freely with British subjects. Their exports are cotton, caoutchouc, timber, and beeswax. Other tribes are very warlike, and are notorious for their practice of carrying off as trophies the heads of their enemies. Since 1866 a British officer has been stationed in political charge of the N. tribes between the State of Munnipur and Assam, who exercises a general control but no direct government. The area of the tract held by the N. is 4900 sq. miles; the pop. (1872) 68,918. In 1875, and again in 1876, officers were murdered who were engaged beyond the frontier on survey duties, but the prestige of the British name has now been restored.

NAHANT, a summer resort, in Essex Co., Mass., on Massachusetts Bay, 14 miles from Boston. It is famous for its fine beach; has many beautiful cottages; and is much frequented by Bostonians.

NAIRNE, CAROLINE OLIPHANT, BARONESS, a Scottish poetess of rare genius, was the third daughter of Laurence Oliphant of Gask, and was born at the mansion-house of Gask, in Perthshire, 16th July 1766. Her beauty was such that she was called the 'Flower of Strathearn.' In June 1806 she married William Murray Nairne, then an officer in the British army, who in 1824 succeeded to the title of Baron Nairne, which had been attainted since the Rebellion of the Forty-five. The Baroness survived her husband fifteen years, dying at Gask, 27th October 1845. During the last years of her life she evinced a deep interest in religion, and was particulary attached to the Free Church movement, though her charities, which were numerous and varied, took no sectarian shape. Except to a very few friends, she never divulged the secret of her authorship; and while all Scotland was ringing with the *Laird o' Cockpen*, *The Land o' the Leal*, *Bonnie Charlie's now awa'*, *the Auld House*, *There grows a Bonnie Brier Bush*, *The Hundred Pipers*, &c., she remained absolutely unknown to her

countrymen. There is an exquisite womanliness in her lyrics. Everything, whether humorous or serious, is tenderly, delicately, graciously touched; and everywhere there is stainless purity in word and sentiment. In 1850 Paterson & Sons, Edinburgh, published the first edition of the Baroness N.'s *Lays from Strathearn*, with pianoforte accompaniments by Finlay Dun. The seventh edition of this most beautiful collection appeared in 1876. See Charles Rogers' *Memoirs and Complete Lyrical Compositions of the Baroness N.* (Lond. 1869).

NAIRS, the dominant Hindu tribe on the Malabar or W. coast of S. India, to whom the Zamorin of Calicut belonged. They are a warrior caste, claiming to be second only to the Brahmins. In old times they never went abroad without a knife or crooked sword, which they were ready to draw on all inferiors. They do not recognize the marriage tie; and consequently all descent and inheritance to property is traced through the female line—a custom which still governs the succession to the throne in the native states of Travancore and Cochin on the Malabar coast.

NANUK', the founder of the Sikh religion, was born near Lahore in 1469, of the Rotri or trading caste. He traveled widely as a religious devotee, and studied the religious books both of Hindus and Mohammedans. 'Several Korans and Puranas had he read, but one God had he not found.' Finally he abandoned the garb of an ascetic, returned to his family, and passed the remainder of a long life in teaching men to worship the One Almighty Invisible God, to live virtuously, and to be tolerant of the failings of others. He admitted the authority of Mohammed and also of the Hindu incarnations, and inculcated alike veneration for the cow and abhorrence of the hog. He died in 1539, but his spirit is believed by the Sikhs to have been transmitted to each successive *gooroo*. Many of his sayings are embodied in the Grunth or Holy Book of the Sikhs. Outside the Punjaub his followers are often called Nanukshahis. See Cunningham's *History of the Sikhs* (Lond. 1853).

NAPH'TALI was one of the twelve tribes of Israel, numbering at the first census 53,400 fighting men, and at the second 45,400 (Num. i. and xxvi.), which had its territory in the extreme north of Canaan. It is held by some Biblical scholars that the writer of Genesis xxix. and xxx., who gives a detailed account of the birth of Jacob's sons, with an explanation of all their names (N., 'my conflict,' that is, in prayer with God for his mercy, which had seemed to be restricted to Leah), had the definite purpose before him of assigning to each of the *tribes* its proper rank and importance. According to this theory N., the son of Rachel's slave Bilhah, was inferior to the sons of Rachel and Leah, although superior to the two sons of Leah's slave, as Rachel was nearer Jacob's heart than Leah.

NAPOLEON D'OR, a French gold coin worth twenty francs, named after the Emperor Napoleon I.

NAR'DO, a town of S. Italy, province of Lecce, 22 miles S.S.W. of the town of that name, and 4 from the Gulf of Taranto. It is a bishop's see, and has a cathedral and old feudal castle. N. is the ancient *Neretum* of the Sallentini. From the 10th to the 15th c. it had a university of note. Pop. (1874) 10,220.

NAREV', a river in Poland, rises in the Lithuanian swamps of the Russian government of Grodno, flows past the small towns of N., Tikoczin (where it becomes navigable), Ostrolenka, and Pultusk, and after a W. and S.W. course of 295 miles, falls into the Bug at Sierock.

NARGHILEH (Turk., Pers. *kalioun;* Hind. *hookah;* Chin. *chouë-yin*), a species of pipe much used in the East, consisting of a long serpentine tube connected with a vase, which is half filled with perfumed water, through which the smoke passes before it reaches the mouth.

NARRAGANSETTS, a tribe of North American Indians, occupying, at the time of the settlement of America, the territory which now constitutes the state of Rhode Island. Under their chief Canonicus, they were at first friendly to the whites, but during King Philip's war (1675), they were suspected of aiding him, and they were twice attacked and defeated by the whites. A small remnant of the tribe still lives at Charlestown, R. I.

NASH, or NASHE, THOMAS, born at Lowestoft in Suffolk, England, about 1564, entered St. John's College, Cambridge, and graduated B.A. (1584), but shortly after was expelled the university for his *Terminus et non Terminus*, a satire on the authorities. After rambling awhile on the Continent, N. settled at London (1589), and plunging into the Martin Marprelate controversy, produced *A Countercuffe to Martin Junior*, *Pappe with an Hatchett*, and other caustic pamphlets. He assisted Marlowe in *The Tragedy of Dido* (1590), and his own comedy, *Summer's Last Will and Testament*, was played before Elizabeth (1592). He failed, however, as a dramatist, and in *Pierce Penilesse his Supplication to the Diuell* (1592), and *Christ's Teares over Jerusalem* (1593), describes himself as 'sitting up late and rising early, contending with scarcitie, and cursing the daie of his birth.' A fierce attack on Dr. Gabriel Harvey, *Haue with you to Saffron Waldron* (1596), was suppressed by the archbishop, and a satirical play, *The Isle of Dogs* (1597), lodged N. in the Fleet Prison. He died about 1600. 'A sharp wit, and the master of a scoffing satyricall merry pen,' is Isaac Walton's estimate of this most brilliant of the Elizabethan pamphleteers.

NASHVILLE, BATTLE OF, an engagement of the civil war, Dec. 15–16, 1864, on the heights surrounding Nashville, Tenn. The Union army was commanded by Gen. Thomas, and that of the Confederates, by Gen. Hood. There was severe fighting on both days, the Union army acting on the offensive, and in every instance driving the Confederates from the positions which they attempted to hold. The losses upon both sides were heavy.

NASHVILLE, UNIVERSITY OF, an educational institution, located at Nashville, Tenn., which had its beginnings in 1785. It has fine buildings, a superior museum, and a well patronized medical department.

NA'SMYTH, ALEXANDER, the founder of the Scottish school of landscape painting, was born at Edinburgh in 1757, studied art in London under Allan Ramsay, spent several years in Italy, and on his return to Scotland commenced practising as a portrait painter. To the friendship he formed with Burns we owe the only authentic likeness that exists of the national poet. The bent of N.'s genius, however, was to the delineation of scenes from nature; to this branch of the art he ultimately devoted himself, and his works were much in request by the Scottish nobility and gentry. N. died at Edinburgh 10th April 1843.—PETER N., eldest son of the preceding, was born at Edinburgh in 1786, and early showed a remarkable capacity for art. At the age of twenty he went to London, and soon attained a high reputation. His landscapes are thoroughly English, but nevertheless betray the influence of his favorite masters, Ruysdael and Hobbema. N. died at South Lambeth, near London, 17th August 1831.—Another son, JAMES N., born at Edinburgh, August 19, 1808, and educated at the High School of his native city, studied four years at the School of Arts, and entered the University. He removed to London (1828), and in 1832 opened a small engineering establishment at Manchester. The year following he removed to Patricroft, 4 miles from Manchester, where he realized a considerable fortune by his Bridgewater Foundry, and retired from business (1856). N. is the inventor of the steam hammer, a steam pile-driver, and of various improvements in telescopes and ordinance.

NAST, THOMAS, born in Bavaria, Sept. 27, 1840, removed to America, with his parents, when a child, and entered the service of Frank Leslie, as a draughtsman. N. has now (1885) been in the employ of the Harpers for many years, and has become famous through his political cartoons, which have appeared in *Harper's Weekly*. He has also lectured with considerable success.

NAS'UA (*N. rufa*), a species of Carnivorous quadruped, allied to the Racoon, and inhabiting S. America. It is sometimes known as the Red Coaiti, has a reddish fur, black ears and legs, and a long and pointed muzzle. It feeds on birds, eggs, and the smaller quadrupeds. An allied species is the *N. narica* or Quasje, often known as the Brown Coaiti, also a native of S. America.

NATCH'EZ, a tribe of North American Indians, which formerly occupied a section of territory east of the Mississippi River, where the city of Natchez now is. Their civilization was more advanced than that of their neighbors, and they were brave, although licentious. They were sun-worshipers, and had a large temple, where the sacred fire was never allowed to expire. After some difficulties with the French settlers, the latter combined with the Choctaws, killed many of the Natchez tribe, and sold over four hundred of them into slavery. The remainder of the tribe fled to Texas, where they have since lived with other tribes, although retaining their own language and religion.

NATICA, a genus of Mollusca belonging to the Gasteropoda. It is typical of the family Naticidæ, in which the shell is globular and consists of a few whorles. The 'spire' of the shell is small, and the outer lip acute. The genus is distinguished by a very large foot, and the mantle-lobes cover a great part of the shell.

NATICK, a town of Middlesex Co., Mass., on the Boston & Albany Railroad, 17 miles from Boston. It is engaged in the manufacture of boots, shoes, base balls, and clothing. Pop. 8480.

NATURAL BRIDGES. There are several of these in the U. S., the most remarkable of which is located in Virginia about 14 miles from Lexington. It is a nearly perfect arch over Cedar Creek. The crown of the arch is 40 feet thick. The bridge is crossed by a road which is about 240 feet above the water.

NAUDÉ, GABRIEL, born in Paris, February 1, 1600, studied philosophy and medicine at Paris and Padua (1626), and became librarian at Rome to the Cardinals Bagni (1629) and Barberini (1641), and at Paris to Mazarin (1642). Having formed the design

of founding a great national library, he made a bibliographical tour in Flanders, Italy, Germany, and England, and thus collected some 40,000 volumes for the Bibliothèque Mazarine, which was opened in 1648. On the dispersion of this library by the Fronde Parliament (Dec. 29, 1651), N. purchased 3500 of its medical works, and withdrew to Stockholm, where Christina appointed him her librarian. Recalled by Mazarin, he died on the homeward journey at Abbeville, July 29, 1653. N. was a voluminous writer, but his works (mostly in Latin) are extremely rare. The principal are *Apologie pour les grands Personnages faussement soupçonnés de Magie* (1625), *Advis pour dresser une Bibliothèque* (1627), and *Bibliographia Politica* (1633). See A. Franklin's *Histoire de la Bibliothèque Mazarine* (Par. 1860).

NAUGATUCK, a town of New Haven Co., Conn., connected with Waterbury by the Naugatuck Railroad. It manufactures rubber clothing, boots, shoes, woollen underwear, cutlery, buttons, and farming implements. Pop. 5043.

NAU'MANN, JOHANN FRIEDRICH, a famous German ornithologist, born 14th February 1780 at Ziebigk, near Köthen, and died there, 15th August 1857. His chief works are *Naturgeschichte der Vögel Deutschlands* (2d ed. 12 vols. 1822–44; *Nachträge*, 1846–60); *Taxidermie* (2d ed. 1848); *Haushalt der Nördlichen Seevögel Europas* (1824).—KARL FRIEDERICH N., a well-known German mineralist, born at Dresden, 30th May 1797, was Professor at Freiberg from 1826, afterwards at Leipsic from 1842 to 1870, and died 26th November 1873. He wrote *Lehrbuch der Krystallographie* (2 vols. 1830, 2d ed. 1858); *Elemente der Mineralogie* (8th ed. 1871); *Lehrbuch der Geognosie* (2d. ed. 3 vols. 1857–67).

NEALE, JOHN MASON, born in London, England, 24th January 1818, graduated M.A. of Cambridge (1840), was ordained (1842), and became rector of Crawley, in Sussex, and Warden of Sackville College, East Grinstead (1846). At the latter place he founded the well-known Sisterhood of St. Margaret (1856), and there he died, 6th August 1866. N., while leaning to the Eastern Church, was a warm supporter of the 'Anglo-Catholic' party in the Church of England, as may be seen from his *History of the Holy Eastern Church* (4 vols. 1847–51), *History of the so-called Jansenist Church of Holland* (1858), *Essays on Church History* (1863), &c. He was an able hymnologist, and his *Mediæval Latin Hymns* and *Hymns of the Eastern Church* (collected 1871) are widely popular.

NEBRASKA CITY, in Otoe Co., Neb., on the Missouri River, at the junction of several railroads, 57 miles E. of Lincoln. The town occupies the site of old Fort Kearney and was laid out in 1854. It contains the State Blind Asylum, an Episcopal College, a Catholic Academy, and a number of manufactories. It is surrounded by a fine fruit-growing section. Pop. 7000.

NEEDHAM, a town of Norfolk Co., Mass., extensively engaged in the manufacture of hosiery and other articles. Pop. 5254.

NEGLEY, JAMES S., an American general, born at East Liberty, Pa., Dec. 22, 1826, and was educated at Western University. He served in the Mexican war; and also in the civil war, on the Union side, rising to the rank of major-general. In 1869 he was elected to Congress, and again in 1884.

NEG'LIGENCE, in Law. Every man is legally bound to take care that he does not injure his neighbor. Therefore when a man receives an injury to his person or property by the fault of another—whether the fault be of omission or of commission, whether wilful or by N.—the law will give damage for the injury sustained.

NEGRAIS, a small island which gives its name to a headland in British Burmah, bounding the most W. mouth of the Irrawaddy, in the district of Bassein. An English settlement was established here as early as 1687. After having been more than once abandoned and reoccupied, it was attacked by the Burmese in 1759, when all the Europeans were killed. It is said to afford a very safe harbor, and there is a fine lighthouse on the adjacent reef of Algnada.

NEILL, JAMES GEORGE, GENERAL, one of the heroes of the Indian Mutiny, was the son of a Scottish gentleman of good family, and was born in 1810 in the neighborhood of Ayr. Before he was seventeen he joined the 1st Madras European regiment, now H.M. 102d Fusileers, with which regiment his name is ever associated, and of which he wrote an *Historical Record*. He served through the second Burmese war of 1853, and in 1855–56 was appointed second in command of the Anglo-Turkish Contingent. In April 1857 he returned to Madras as Colonel of his old regiment, and next month was summoned to Calcutta by the news of the Mutiny. His were the first troops to proceed up country, and his resolute treatment of the railway officials at Howrah has become a household story. He arrived in time to save Benares and Allahabad, and followed Havelock into Cawnpore, where it became his duty to inflict condign punishment for the massacre. He was killed while leading his brigade in the street-fighting of the first relief of Lucknow on 25th September 1857. A statute has been erected to his memory in the town of Ayr. See *Lives of Indian Officers*, vol. ii. by Sir J. W. Kaye (1867).

NEJ'ED, or NEJD, the central tableland of Arabia, is surrounded on three sides by the great sand-desert of Dhana, and is mainly occupied by the Jebel Tuweik range, which, nowhere exceeding 5000 feet of elevation, is intersected by a perfect network of fertile valleys and watercourses, dry, except in the rainy season. The heights are covered for a great part of the year with rich grass. The Wahabis form the bulk of the population. Their capital, Riad, is estimated by Palgrave to have 40,000 inhabitants, who live by agriculture and horse-rearing. See Palgrave's *Narrative of a Journey through Central Arabia* (1865); and Pelly, *A Visit to the Wahabee Capital*, in the *Journal of the Geographical Society* (1866).

NE'REIDS, the fifty daughters of Nereus and Doris, chief of whom was Thetis, mother of Achilles. They dwelt in the Ægean Sea, in shell-decked and vine-shaded caves on the seaboard or in the sea-depths along with their sea-born parents. The N. were the attendants of the great sea-gods, especially of Poseidon, whose power over the sea was supreme. Sailors paid honor to them. Milk, oil, honey, and goat's flesh were the gifts invariably offered. In works of art Nereus and his daughters appear crowned with sea-weed over eye, chin, and breast. See Hirst. *Mythol. Bilderb.* (p. 150, tabb. 18, 19).

NER'EUS, in the Greek myth, was the son of Pontus and Gæa, and the husband of Doris, by whom he became the father of the fifty Nereids. Under Poseidon he ruled the Mediterranean. His daughters, whose names are variously given by Homer (*Il.* xviii. 39), Hesiod (*Theog.* 240), and Pindar (*Isthm.* vi. 8), were distinguished, on the one hand, from the Oceanides, the dwellers in ocean, and on the other from the Naiades, the nymphs of streams and lakes.

NEUILLY, a town of France, department of Seine, 1½ miles N.W. of Paris, on the right bank of the Seine, which is here spanned by a magnificent five-arched bridge, 640 feet long, erected by Perronet (1768–73). The château of N., destroyed in the revolution of '48, was a favorite residence of Louis-Philippe, and the spot where his son Ferdinand was killed in a carriage-accident (July 13, 1842) is marked by a Byzantine chapel, designed by Ary Scheffer. Bleaching, distilling, and nursery-gardening are the principal industries. Pop. (1872) 15,466. Being wholly within the French lines, N. came little into notice during the Prussian siege of Paris, but it was the scene of several engagements between the Communists and the Versailles troops, April 20—May 21, 1871.

NEU'TRA or NEITRA (Magyar *Nyitra*), a town of Hungary, in the comitat and on the river of the same name, 75 miles N.W. of Pesth by rail. On Mount Zobor, E. of the town, is a strong castle. M. is a Catholic bishop's see, has three monasteries, two cathedrals, and a theological college. There is considerable trade in wine. Pop. (1869) 10,683.

NEVADA CITY, in Nevada Co., Cal., on Deer Creek, 65 miles from Sacramento. It is surrounded by the richest mining region in California, and is largely engaged in the cultivation of fruit. Pop. 4022.

NEVIANSK', a town of Russia, government of Perm, on the eastern slope of the Urals, 45 miles N.N.W. of Ekaterinburg, has a mint, with a celebrated leaning-tower; and in the neighborhood are extensive gold-washings, and iron-works which yield annually 4950 tons of iron. Estimated pop. 20,000.

NEW'ARK, a city of Ohio, situated on the Licking River, the Ohio and Erie Canal, 33 miles N. E. of Columbus by rail, lies in a rich agricultural district, near large coal-fields. It possesses two banks, several churches, and two newspapers, and, besides important manufactures, has a thriving trade in coal, grain, and live stock. Pop. (1880) 9600.

NEW BRIGH'TON, a town of New York, on Staten Island, and on the opposite side of New York Bay from Brighton. It has the largest dyeing and printing work in the U. S., a silk-printing factory, a paperhanging factory, the 'Snug Harbor,' an institution for aged mariners, and another for sailors' destitute children. Pop. 7495.

NEW CASTLE, a town of New Castle Co., Del., on the Delaware River, at the head of Delaware Bay. It has a good harbor, and is extensively engaged in manufacturing. The surrounding country is devoted to agriculture. Pop. 4,000.

NEW CASTLE, in Lawrence Co., Pa., at the junction of the Neshannock and Shenango rivers, which at this point unite and form the Beaver River. It is an important railroad center, and is engaged in manufacturing iron, glass, pottery, sewer pipe, fire brick, coke, and paper, and in mining bituminous coal, limestone, fire clay, iron ore, and sandstone for building. Pop. 16,500.

NEW JERSEY COLLEGE, founded under the auspices of the Presbyterian Synod of New York, was chartered by New Jersey in 1746, and opened in Elizabethtown in the following year. It was removed to Newark in 1748, and finally to Princeton in 1757. The Rev. Dr. James M'Cosh, elected president in 1868, has greatly advanced the interests of the college. In 1875 it had sixteen professors, four other instructors, and 483 students, endowments to the amount of $600.000, libraries comprising 44,000 volumes, various museums, and observatory.

NEWMAN, John P., D.D., born at New York, N. Y., Sept. 1, 1826, and entered the ministry of the Methodist church. From 1869 to 1874 he was chaplain of the U. S. Senate. He has traveled extensively in foreign lands, and has written *From Dan to Beersheba*, and *Babylon and Nineveh*.

NEWTON, R. Heber, D.D., a divine of the Protestant Episcopal church in America, born in 1840, and educated at the University of Pennsylvania. He became rector of Trinity church, Sharon Springs (1864); of St. Paul's, Philadelphia (1866); and of All Souls', New York (1869), where he still remains (1885). He has published *The Morals of Trade; Studies of Jesus; Womanhood; The Right and Wrong Uses of the Bible; The Book of Beginnings*; and *Lectures on Genesis*. N. is an eloquent preacher and one of the most advanced thinkers of the Episcopal church.

NEWTON, Rev. John, son of the master of a merchant-ship, was born in London, England, 24th July 1725, led a wild life in his youth, but was afterwards converted, and having attained a certain knowledge of Latin and Greek, was ordained curate of Olney, Buckinghamshire, in 1764. Here he made the acquaintance of Cowper the poet, over whom he exercised an influence more intense than wholesome. Together they wrote the famous *Olney Hymns*. In 1779 N. was presented to the living of St. Mary-Woolnoth, London. He died 31st December 1807. N. was deeply, not to say darkly, evangelical. The shadow of a libertine youth threw a gloom over his theology. In his views of human depravity we recognize the distorted image of his earlier self; but no man merits blame who, from whatever cause, is deeply impressed with 'the exceeding sinfulness of sin.' N. wrote, among other things, *Cardiphonia, or the Utterance of the Heart; the Messiah, a Series of Sermons;* and a *Narrative of his own Life*.

NEWTOWN, a town of Fairfield Co., Conn., on the Housatonic River, 19 miles from Bridgeport. It is engaged in the manufacture of belting, hats, and buttons, and has woollen mills. It is also a popular summer resort. Pop. 4013.

NEW YORK, University of the City of, an educational institution founded in New York in 1831, and opened in 1832. It is non-sectarian, and maintains classical, scientific, law, medical, and civil engineering departments. In 1884 it received liberal donations, and many improvements were made. Dr. John Hall is its present Chancellor (1884).

NEXT OF KIN is a legal phase, denoting those that are nearest to a person in relationship by blood. The wife of a testator is not included in the meaning expressed by this phrase, she not being a blood relation.

NGAN-HOI, a province in the E. of China, having an area of 54.001 sq. miles, and a pop., according to the last census, of 36,596,988. The capital is *Ngan-King*, on the left bank of the Yang-tse-Kiang, 190 miles S.W. of Nanking. It is noted for its green tea, porcelain, silks, ink, and varnish, and is the commercial depôt of a rich mineral district.

NICEPH'ORUS, born at Constantinople in 758, held the post of *notarius* to Constantine VI. (780–797), opposed the iconoclasts at the second Council of Nicæa (787), and was raised to the patriarchate (806). Deposed by Leo the Armenian for his opposition to the edict against images (815), he retired to the convent of St. Theodore, on one of the islands of the Propontis, and died there June 2, 1828. N. was one of the ablest of the Byzantine historians, his chief works—all in Greek—being *Breviarium Historicum*, a history of Constantinople from 602 to 770 (Par. 1616); *Chronologia Compendiaria* (Par. 1573); and *Indiculus Labrorum Sacrorum* (Par. 1609).—N. Callistus Xanthopulus, born towards the close of the 13th c., and died about 1350, was the author of an *Historia Ecclesiastica* (Par. 1630), which won for him the title of *Thucydides Ecclesiasticus*. He wrote nine other separate works, besides hymns, sermons, epistles, &c.

NICE'TAS ACOMINA'TUS or CHONIA'TES, a Byzantine historian, born at Chonæ (*Colossæ*) in Phrygia, about 1150, was appointed governor of Philippopolis by Isaac II. (1189), and later held the offices of *logotheta* and *præfectus sacri cubiculi*, with the title of senator. He fled from the sack of Constantinople by the Latins (1204) to the court of Theodore Lascaris at Nicæa, where he died about 1216. N.'s *Historia*, embracing in twenty-one books the period 1118–1206, was published by Wolf (Basel, 1557) and Becker (Bonn, 1835); his *Narratio de Statuis quas Franci destruxerunt*, by Wilken (Leips. 1830).

NICHOLAS OF GUILDFORD, the author of a bright and picturesque poem, called the *Owl and the Nightingale*. It is a fine specimen of Transition English, written in the dialect of the south of England, but free from broad provincialisms. Though composed in the rhymed octo-syllabic verse of the French Romances, it is a genuine English work, not more than twenty words being of French origin in the whole 1792 lines of which the piece consists. It has been assigned on internal evidence to the reign of Henry III., and is certainly not of later origin. The poem was edited for the Percy Society by Thomas Wright, M.A., in 1843.

NIC'HOLS, John, F.S.A., born at Islington, England, 2d February 1745, was the apprentice and successor of William Bowyer, and, during a busy life of authorship, edited the *Gentleman's Magazine* from 1778 till his death, which occurred 26th November 1826. Of the sixty-seven works of which he was either author or editor, the chief are a collection of *Miscellaneous Poems with Historical and Biographical Notes* (8 vols. 1780–82); *Biographical and Literary Anecdotes of William Bowyer, F.S.A., and of many of his learned Friends* (1782), a work recast and extended under the title of *Literary Anecdotes of the Eighteenth Century* (9 vols. 1812–15), and continued, with the aid of his son, in *Illustrations of Literary History* (8 vols. 1817–58); and *The History and Antiquities of Leicester* in four splendid folio vols. (1795–1815). See A. Chalmer's *Memoirs of J. N.* (1826).—John Bowyer N., son of the preceding, was born in London, 15th July 1779, educated at St. Paul's School in 1796, joined his father in business, and was sole proprietor of the *Gentleman's Magazine* from 1833 till 1856. From his press have issued many of the noblest specimens of English typography—*e. g.*, Ormerod's *Cheshire*, Clutterbuck's *Hertfordshire*, Surtees' *Durham*, Hoare's *S. Wilts*, Whitaker's *Histories of Whalley and Craven*, and Dallaway's *Rape of Arundel*. Among his own writings are a *Brief Account of the Guildhall* and *Anecdotes of Hogarth* (1833), and *Historical Notices of Fonthill Abbey* (1836). N. died at Ealing, Middlesex, 19th October 1863.—John Gough N., son of the preceding, was born in 1806, and was long editor of the *Gentleman's Magazine*, which ceased to be the property of the Nichols family in 1856. N. was one of the founders of the Camden Society, and edited several important works issued by it and by the Roxburghe Club, &c. He died at Holmwood, near Dorking, 13th November 1873.

NICKSICS' or NIKSCHITJ', a fortress and capital of a district of the same name, Herzegovina, near the N. frontier of Montenegro, and 34 miles N.E. of Cattaro, was held by the Turks during the late insurrection in Herzegovina, but capitulated to the Montenegrins, 8th September 1877.

NIC'OLAS, Sir Harris Nicholas, an English author, was born in Cornwall, March 10, 1799, entered the navy and rose to the rank of lieutenant (1815), but quitting the service on the close of the war, was called to the bar (1825), and thenceforward devoted himself to historical and antiquarian research. He was created a knight of the Guelphic Order (1831) and Chancellor of the Ionian Order of St. Michael and St. George (1832), and died at Cape Curé, near Boulogne, August 3, 1848. N.'s works are marked by singular industry and critical acumen, but also by an acrimony which embroiled him in frequent literary squabbles. The principal are—*Notitia Historica* (1824), *Scrope and Grosvenor Controversy* (1832), *Chronology of History* (1835), *History of the Orders of Knighthood* (4 vols. 1841–42), *Despatches of Lord Nelson* (7 vols. 1844), and an unfinished *History of the British Navy* (2 vols. 1847).

NIC'OLO, a variety of onyx, with parallel bands of a black or deep-brown and a bluish-white color, found chiefly in Bohemia. It was much used by the Romans in gem-engraving.

NICOSIA, a town of Sicily, province of Catania, has a cathedral, four large churches, and a college with a fine library. It carries on a lively trade in wine, oil, grain, and cattle; but has no manufactures, and is reckoned the most backward of all the Sicilian towns, 94 per cent. of its inhabitants being unable to read. The dialect shows the place to have been a Lombardic colony, founded probably by Roger II. Pop. (1874) 14,789.

NIEL, Adolphe, a French marshal, was born at Muret (Haute Garonne), 4th October 1802, entered the *Corps du Genie* in 1825, became captain in 1835, and led a company at the storming of Constantine. He was head of Marshal Vaillant's staff in the Roman expedition of 1849, was made a general of division in 1853, accompanied the French expedition to the Baltic under Baraguay d'Hilliers, and directed the siege of Bomarsund, and afterwards that of Sebastopol. In 1857 he became a senator, commanded the 4th corps d'Armée in the Franco-Austrian War of 1859, and fought with distinction at Solferino. In 1867 he was appointed Minister of War, and was actively engaged in reorganizing the French Army when he died, 14th August 1869.

NIEM'CEWICZ, Julian Ursin, a distinguished Polish author and statesman, born, 1757, at Skoki in Lithuania, entered the Polish army in 1777, which he left in 1788, with the rank of

major, to work in the Diet for a new constitution. In 1794 he was adjutant to Kosciusko, with whom he was taken prisoner, but liberated by the Emperor Paul, after which both came to America. In 1807 N. returned, and was made secretary of the Senate of the new grand-duchy of Warsaw, and in 1814 chairman of the Constitutional Committee, but lived chiefly on his estate, busied with study. After the failure of the Polish Revolution in 1830, he fled to England, which he afterwards left for Paris, where he founded a Polish library and historical society, and died 21st May 1841. His chief works are *Historical Songs of the Poles* (Warsaw, 1816. *et seq.;* Germ. trans. by Gandy, Leips. 1833); *History of the Government of Sigismund III. of Poland* (3 vols. *ib.* 1819); *Collection of Memoirs for Ancient Polish History* (5 vols. *ib.* 1822); *Levi und Sara, Briefe Polnischen Juden* (Berl. 1825); the novel *John of Tenczyn* (3 vols. Warsaw, 1825; Germ. trans., Berl. 1828); and the posthumous *Notes sur ma Captivité à Pétersbourg* (Par. 1843). His poetical works were collected in 12 vols. (Leips. 1840), and his life was written by A. Czartoryski (Par. 1860).

NIEP'CE, Joseph Nicephore, the first discoverer of photography, was born at Châlon-sur-Saône, March 7, 1765. On the outbreak of the Revolution he entered the army and served as a lieutenant in the Italian campaign in 1793. His weakness of sight, however, compelled him to return to France, where from 1795 to 1801, he acted as administrator of the district of Nice. He then settled in his native town and devoted his time to mechanics and latterly to chemistry. About 1813 the idea of taking pictures by sunlight appears to have suggested itself to him, and by 1824 the first practical difficulties had been overcome, and sun-pictures formed on glass or tin-plate. He communicated his discovery, concealing however, his methods, in 1827 to the Royal Society of London, and two years later entered into a partnership with Daguerre, who after the death of N. published the process, simplified and improved no doubt, under his own name. N. died at Châlon-sur-Saône, July 5, 1833.

NILES, a town of Berrien Co., Mich., on the St. Joseph's River, and the Michigan Central and other railroads, 93 miles from Chicago. The St. Joseph's River is navigable for small steamboats to this point, and affords abundant water power which is employed in several mills. It is surrounded by a fine agricultural districts. Pop. 5200.

NILS'SON, Christine, a leading *prima donna*, the daughter of a peasant, was born at Hussaby, near Wexio, Sweden, August 3, 1843. Her playing and singing at a country fair in June 1857 attracted the attention of a gentleman of means, F. G. Thornerhjelm, who placed her at a school at Halmstad, and afterwards with Franz Berwald, as her master, at Stockholm. On completing her education under Nasset and Wurtel at Paris, she made her first appearance in October 1864 at the *Théâtre Lyrique* in that city, where she obtained a three years' engagement. In the season of 1867 she made a brilliant *début* in London, where, as well as in Paris, St. Petersburg, Vienna, and New York, she has taken the highest rank as a public favorite. On the 20th of August 1872 she married M. Auguste Rouzaud, the son of a well-known French merchant. Her voice is a soprano of extraordinary range and richness, while her dramatic talent is a splendid ally to her wonderful vocalization. Among her grandest parts are Violetta in *Mariota*, and Valentine in the *Huguenots*. But she excels in the more poetical conceptions of the opera. In *Faust* she is the most perfect of Marguerites, in *Lohengrin* the most ideal of Elsas.

NISCE'MI, a town of Sicily, province of Caltanisetta, finely situated in a fertile district, 11 miles from the Tyrrhenian Sea, has corn and oil mills, and some remains of ancient dwellings. Pop. (1874), 10,750.

NISS'A (Turk. *Nisch;* the anc. *Naissos*), a town in the N.W. of Bulgaria, Turkey, on the right bank of the Nissava, an affluent of the Morava, 8 miles from the Servian frontier, and 85 N.W. of Sofia. It is the converging point of three great roads, and is strongly fortified by high walls, moats, palisades, marshes and redoubts. N. has eighteen mosques, two Greek churches, and a synagogue. Pop. 16,000, of whom nearly half are Turks and half Servians. N. was the birthplace of Constantine the Great, and the ancient capital of Servia. In the Russo-Turkish War it was captured by the Servians, January 11, 1878.

NIT'HARD, a Frankish historian, was born about 790. His father was Angilbert, governor of the Frankish borders, and his mother Bertha, daughter of Karl the Great. He died in 853. His *De Dissensionibus Filiorum Ludovici Pii* is valuable as containing the testimony of an eye-witness in regard to what he describes. Published in 1788 by Pithou, it has been reprinted in the collections of *Historiens de France* by Duchesne and Dom Bouquet.

NOAH, one of the patriarchs, who, with his family, was saved from the Deluge, by means of the ark.

NOAILLES, an illustrious French family, who from the 11th c. held the château and domain of N. in the modern department of Corrèze. The following merit special notice:—Adrien Maurice, Duc de N., born at Paris, Sept. 29, 1678, entered the army (1692), won a high reputation as a general in the Spanish War of Succession (1702–13), and was made president of the Council of Finance (1715), a post which he lost (1718) by his opposition to Law, the Scotch adventurer. He was created a marshal and commander-in-chief (1733); at the head of the Sardinian troops expelled the Imperialists from Italy (1734), and was defeated by George II. at Dettingen (1743). He served under Marshal Saxe at Fontenoy (1745), was despatched as ambassador to the Court of Spain (1746), and died at Paris, June 24, 1766. The *Mémoires* (6 vols. Par. 1777) ascribed to N. were composed by the Abbé Millot from materials furnished by the duke.—Louis Marie, Vicomte de N., grandson of the preceding, born at Paris, April 17, 1756, served through the American War of Independence with Lafayette, and married his sister. In the French Revolution N. espoused the cause of the people, sat with the Left in the National Assembly, and was elected its president (1791). Having taken a command in the army, he was defeated at Gliswel (1792), and despairing of his country's future, passed over to England, and thence to the United States, while the countess, who remained behind, was guillotined, July 22, 1794. Re-entering the French service in 1803, N. was despatched to St. Domingo, and in boarding an English corvette off Havana was mortally wounded, and died Jan. 9, 1804.

NODOSARIA, a genus of *Foraminifera* having a long shell resembling a beaded rod in shape, but with the first formed chambers or segments larger than the last. *N. hispida*, a familiar species, derives its name from the small processes that project from the surface of the shell. N. is one of the Polythalamons or 'many-chambered' foraminifera, the new chambers being formed by a process of budding or gemmation.

NO'MANSLAND, or NEW GRIQUALAND, a district of S. Africa, bounded on the N. by Basutoland, on the E. by Natal, on the S. by Independent Kaffraria, and on the W. by Tambookieland. Its length from E. to W. is 125 miles, and its breadth from 40 to 75 miles, the total area being about 8000 sq. miles. N. lies on the S. slope of the Quathlamba Mountains, and in its elevated portions the climate in winter is severe. Wheat is grown in considerable quantities, and the country is also well suited to sheep and cattle. It was thinly peopled by fragments of Kaffir tribes till 1862, when the Amaponda chief Faku ceded his nominal right of sovereignty over a portion of it to the government of Cape Colony, who thereupon parceled out the unoccupied land among 15 000 Griquas, who removed thither to escape the pressure of the Boers, and among various tribes of Basutos and Fingoes. This portion is commonly known as Griqualand E. In 1876 the Griqua chief Adam Kok died, and at the desire of the inhabitants N. was then annexed to Cape Colony. The pop. in 1875 amounted to 62,341.

NOOT'KAS, or AHTS, the name of the Indians of Vancouver's Island, comprising the Ahts proper (3500) who inhabit the W. shores of the island, the Quakewith (3000), scattered along both sides of this island and on the mainland, and the Cowichans in the E. of the island, numbering 7000. The Cowichans have been partly civilized by Protestant and Roman Catholic missions. *Nootka Sound*, on the W. coast of Vancouver's Island, is 10 miles long, and has a breadth of 500 yards.

NORD'ENSKJÖLD, Nils Adolf Erik, a celebrated Swedish naturalist, born 18th November 1832 at Helsingfors, where his father was Professor of Mineralogy, was appointed professor of the same science at Stockholm in 1858. After accompanying (1858 and 1861) the two expeditions to Spitzbergen led by Otto Torell, he himself led two others (1864 and 1868), in the first of which he descried Gillisland, marked on the maps as King Carl's Land, and in the second reached 81° 42' N. lat., the highest point hitherto gained by sea. During these voyages N. fixed astronomically the position of eighty places in the Spitzbergen Archipelago, and made valuable geological and other collections. In 1870 he visited Greenland, whose inland ice he traversed farther north than any previous explorer, and discovered in the S. of Disco Island the three largest meteoric stones yet found—5. 10, and 25 tons' weight respectively. See his *Redogörelse för en expedition till Grönland aar* 1870 (Stockh. 1871). In 1872 he led the fifth Swedish Arctic expedition. With Lindström, Stuxberg, and others, N. left Tromsö, 8th July 1875, made scientific researches on Novaia Zemlia from 23d June to 2d August, passed the Yugor Strait into the Kara Sea, reached the mouth of the Yenissei on the 15th August, sailed up that river for some distance, and then traveled overland to St. Petersburg, having opened the passage to the Siberian rivers, and proved that the Kara Sea was not a 'great ice-house.'

NORD'HOFF, Charles, an American author, born in Prussia, Aug. 31, 1830, and brought to the U. S. when a child. Since 1861 has been connected with New York papers, and has published *Man-of-war Life. The Communistic Societies of the United*

States, Politics for Young Americans, Whaling and Fishing, and other works.

NORTH ADAMS, a town of Berkshire Co., Mass. It has four railroads, and is engaged in cotton, woollen, shoe, and other manufactures. The west end of the Hoosic Tunnel is one mile from the town. Pop. 12,000.

NORTH'COTE, SIR JOHN, an English politician and patriot, was the eldest son of the sheriff of Devon, and was born early in the 17th c. He was elected to the Long Parliament for the village of Ashburton in 1640, and from the first was one of the small party who sought a *via media* between the extremes of monarchic absolutism and Puritan despotism. When the civil war broke out he sided with the Parliament, helped to organize the Devonshire Militia, was proclaimed a traitor by the King in 1642, took part in the defence of Plymouth, shared in the defeat at Modberry (27th Feb. 1643), was made prisoner by the Royalists in 1644 but was soon after exchanged. N. fell under the suspicion of the Cromwellian party in 1646, was 'secluded' before the trial of Charles, was passed over by Cromwell in the New Communion of Peace for Devon (1650), was re-elected to Parliament during the rule of Richard Cromwell, and was a member of the Convention that restored the monarchy. He died in 1676. During his attendance in Parliament he made notes of all the memorable debates—those on ship-money, the impeachment of Strafford, the levying of war against the King, the Scots articles, and the revision of the canons. N.'s valuable *Notebook* was published by Mr. Murray, under the editorship of Mr. A. Hamilton, in 1877.—SIR STAFFORD HENRY N., eighth baronet of the name, was born in London, 27th October 1818, and educated at Balliol College, Oxford, England, taking a first class in classics and a third in mathematics. He was called to the bar in 1847, entered Parliament in 1855 as a member for Dudley in the Conservative interest. N. was private secretary to Mr. Gladstone when the latter was President of the Board of Trade. In 1859 he was appointed Financial Secretary to the Treasury, in 1866 President of the Board of Trade, in 1867-68 Secretary of State for India, and in 1874 Chancellor of the exchequer, a post which he held till April 1880.

NORTHUM'BRIA, one of the Old English kingdoms, was founded in 547 A.D. by Ida the Angle. It extended from the Humber to the Forth, and from the North Sea inland to the eastern offsets of the Penine Range. Its western limit in the country now called Scotland is more uncertain, but would probably be fairly represented by a line drawn from the Liddel through Selkirk or Peebles to the neighborhood of Stirling. N. was sometimes divided into two kingdoms—*Deira* in the south, corresponding to the modern Yorkshire and Durham; and *Bernicia*, embracing the whole S.E. of Scotland and the modern Northumberland. In the reign of Eadwine (Edwin), who ascended the throne in 617, N. was converted to Christianity; and under him and his successors, it held the foremost place among the English states. It was the seat of the earliest English literature. Here Cædmon in the 7th century composed his sacred paraphrases; and here Bede in the 8th began the still unfinished work of translating the Scriptures into English. But for the destructive ravages of the Danes, who pillaged and burnt its monasteries, N. might perhaps have maintained its intellectual supremacy, and its dialect have become the classic tongue of the whole nation, instead of sinking into a rude though racy patois. Only in the poetry of the Scottish Lowlands—in Dunbar and Lyndsay and Burns—has the speech of Cædmon displayed in later times its ancient dignity and power. See Freeman's *Norman Conquest* (vol. i).

NORTON, THOMAS, was born at Sharpenhoe, Bedfordshire, England, 1532. In his youth he served the Protector Somerset, and in 1555 he entered the Inner Temple as a student. In 1561 he published a translation of Calvin's *Institutes*, which speedily went through five editions. In the same year he joined Sackville in the production of the first English tragedy, *Gorboduc*, first called *Ferrex and Porrex*, writing the first three acts. He also translated twenty-seven of the Psalms in the Sternhold and Hopkins version, and wrote some controversial tracts. N. died about 1584.

NORWALK, a town of Huron Co., O., at the junction of the Lake Shore & Michigan Southern and the Wheeling & Lake Erie railroads. It is in the midst of a dairying and stock-raising region. Pop. 7008.

NOSSI-BÉ ('great island'), an island on the N. W. coast of Madagascar, in 13° 14' S. lat., 48° 15' E. long.; area 74 sq. miles. It is volcanic, and has a number of extinct craters. The soil is rich, and the staple products are rice, sugar, and maize. The island also produces valuable timber, and among other exports are beeswax and tortoise-shell. It has been a French possession since 1843, and is subject to the Governor of Mayotta. The chief settlement, Helleville, has a fine harbor. Pop. of the island, about 15,000.

NOSTAL'GIA is a form of *melancholia*, manifested by an inordinate desire to return to one's native country, and to which is added the apprehension that he may never be able to return. Army surgeons often witness cases of N. According to Baron Larrey, the mental faculties are the first to be affected. Ninety-seven soldiers in the French army fell a sacrifice to this disease between 1820-26. In such cases, general paralysis is common; but death is the result of a gradual exhaustion of the vital powers. The Dutch, the Swiss troops, the Highlanders, and the Irish, are the most liable to this form of insanity. N. is a common affection among slaves who have been abducted from their native country; and the disease is evidently referred to by Dr. Livingstone, in his 'Last Journal,' when he states that many of the slaves abducted from Manyuema-land died from what he described as a new disease, 'Broken-heartedness.'

NOTHOSAURUS, an extinct genus of Reptilia, belonging to the order *Sauropterygia*, which also includes the *Plesiosauri* and other well-known fossil genera. In N. the neck, like that of the *Plesiosaurus*, was long, and was composed of at least 20 vertebræ. The vertebræ of the back were 'amphicoelous' (hollow at each end), and were thus modeled on the type of those of the fish; a conformation indicating that the animal possessed a flexible spine, and was probably an active swimmer. The teeth were conical in shape, and numerous; and proceeded from distinct alveoli or sockets. The limbs were in the form of swimming-paddles. All the species of N. are found in the Triassic rocks, and are especially plentiful in the Muschelkalk.

NOTT, ELIPHALET, D.D., LL.D, a successful American educator, born at Ashford, Conn., June 25, 1773, and graduated from Brown University in 1795. He served in the Presbyterian ministry until 1804, when he was elected president of Union College, which position he held until the time of his death, Jan. 29, 1866.

NOTT, GENERAL SIR WILLIAM, G.C.B., one of the heroes of the disastrous British expedition to Afghanistan of 1839-42, was born at Carmarthen in S. Wales in 1782, and joined the Bengal Infantry in 1800. During the winter of 1841, when the Cabul army was exterminated, he held the town of Candahar. In the following spring he joined the avenging army of Pollock at Cabul; and on his way captured for the second time and destroyed the citadel of Ghuzni, and carried away the famous gates of Somnauth. He received a pension of £1000, and was appointed President at Lucknow. He died in 1845.

NOVELL'O, VINCENT, an organist and musical writer, was born in London, England, of an Italian family, in 1781. He became organist to the Portuguese embassy, and published a *Selection of Sacred Music* (2 vols.), *Collection of Motets for the Offertory, &c.*, *Gregorian Hymns for the Evening Service* (in 12 books), *Biographical Sketch of Henry Purcell*, &c. He died at Nice, 9th August 1861. His life has been written by his eldest daughter, Mrs. Cowden Clarke.

NO'VI LIGU'RE, a town of Italy, in the province of Alexandria, 33 miles N.N.W. of Genoa by rail, contains twelve churches, a museum, picture gallery, and public library, and has important silk manufactures. Pop. (1874) 12,162. Here the French were defeated by a Russo-Austrian army under Suvaroff, and lost Joubert, their general, and 16,000 men, August 15, 1799.

NOY, WILLIAM, born at St. Buryan, Cornwall, in 1577; from Exeter College, Oxford, passed on to Lincoln's Inn. As a member of Parliament he at first attached himself to the 'Country Party,' but, being made attorney-general in 1631, went over to the Court, and is chiefly remembered as author of the tax called Ship-Money. He died in August 1634.

NOYES, GEORGE RAPALL, D.D., born at Newburyport, Mass., March 6, 1798; was educated at Harvard College; and entered the ministry of the Unitarian church. In 1840 he became professor of oriental languages and lecturer on biblical literature in Harvard. Died at Cambridge, Mass., in 1868.

NU'CHA, a fortified town in the Russian government of Baku (Transcaucasia), on the Kish-Tchai, which falls into the Alazan, a tributary of the Kur, 125 miles E.S.E. of Tiflis. N. consists of a Tartar town, with 2 large and more than 20 small mosques, and an Armenian town, the seat of an archbishop, with 3 churches. It has large manufactures of silk, and the surrounding district is covered with mulberry woods. Pop. (1870) 23,371, chiefly Mohammedans of the Shiite sect.

NU'DUM PAC'TUM is in law an agreement without Earnest or Consideration. *Nuda Pacta* are void in law.

NUGG'ET (a corruption of *Ingot*), a miner's term for a lump of native gold of any size. The largest masses, usually of very great purity and containing very little disseminated quartz, are found in the alluvium of auriferous districts. The names, places, and

year of discovery, and weights of several of the largest known nuggets are given below.

	Gross Weight. oz.	dwts.
'Welcome Stranger,' Dunolly, Victoria, 1869	2280	
'Welcome,' Ballarat, Victoria, 1858	2217	16
'Blanche Barkly,' Kingower, Victoria, 1857	1743	13
'Precious,' Berlin Diggings, Victoria, 1871	1621	
A N., Ballarat, Victoria, 1853	1619	
A N., Burrangdong, New South Wales, 1858	1286	
A N., near Bathurst, New South Wales, 1851	1272	
A mass found at Miask, Ural Mountains, 1842	1158	2
'Lady Hotham,' Ballarat, Victoria, 1854	1177	17
'Viscount Canterbury,' Berlin Diggings, Vict. 1870	1105	
'Viscountess Canterbury,' Berlin Diggings, Vict. 1870	884	10
'Kum Tow,' Berlin Diggings, Victoria, 1871	718	5

NULLIFICA'TION, a doctrine formerly held which insisted on the sovereign right of States to reject any law of Congress which they considered unconstitutional, and to secede from the Union if its enforcement were attempted. The leader of this party in the memorable controversy of 1832 was John C. Calhoun. The result of the Civil War (1861–65) has been to annihilate the doctrine, which now possesses only a historical interest.

NUR JEHÁN ('light of the world'), the celebrated wife of the Mogul Emperor Jehangir. She was born at Kandahar, of a noble Persian family, and was married by Akbar to a courtier, with the object of removing her from the sight of the young prince. But when Jehangir became emperor, the husband, who refused a divorce, was killed, and, after some years of genuine reluctance, N. J. was made empress in 1611. Her influence was unbounded; her name was placed on the coins, and by herself and her relations she conducted the whole administration. She died in 1646, having survived her second husband nineteen years.

NYACK, a town of Rockland Co., N. Y., on the Hudson River and the N. Y., West Shore & Buffalo and other railroads, 29 miles from New York City. It is surrounded by beautiful scenery and fine drives, and is a summer resort. Pop. 6000.

NYIREGYHA'ZA, a town in Hungary, in the comitat of Szabolcs, 32 miles N.N.E. of Debreczin by rail. It has large yearly fairs, and important manufactures of spirits, salpetre, soda, and oil. Pop. (1870) 21,896.

NYMPH, a term applied to the *chrysalis* or *pupa-stage* of insects. More frequently the term 'pupa' is employed to denote this stage, which in the perfect form of metamorphosis is marked by quiescence, the animal being enclosed in a pupa-case or cocoon.

O.



AK LEAF ROLLER (*Tortrix viridana*), a well-known species of moth belonging to the *Tortricidæ* or 'Leaf Rollers.' It is one of the most brightly-colored members of its family, and is of a prevailing brown hue, but the front wings are a bright green. It feeds on oak leaves, and does immense damage to these trees.

OBELISK (†) in printing, a mark of reference to a note. It was originally employed in Roman Catholic Church books to guide the priest where to make the sign of the cross.

OBERLIN COLLEGE was founded in 1833 at Oberlin, a village in Ohio, 35 miles S.S.W. of Cleveland. It was designed for the liberal education of both sexes, a special feature being that the students support themselves by manual labor. There are departments of theology (under Congregational control), of philosophy, the arts, literature and music, besides preparatory classical and English schools. The library contains 11,000 volumes. In 1875 the total income of O. C. was $20,603; the faculty consisted of a president, 12 professors, 3 principals, and 14 lecturers, and the number of students was 475.

OCC'LEVE, THOMAS, of whom little is known except through his writings, flourished about the beginning of the 15th c., living in Chester's Inn, Strand. He was a writer to the privy seal, and a very frigid but copious poet. A list of his poems, nearly all in MS., may be seen in Warton's *History of English Poetry*. His most successful attempt is a translation of *De Regimine Principum*, by the monk Egidius, in the prologue to which he gives us the only authentic portrait of Chaucer we possess.

OCELL'US, the name given to the rudimentary organs of sight found in lower animals (*e.g.* Jellyfishes, *Echinodermata*, etc.), and which are also found in Insects (in addition to compound eyes), in Arachnida, &c. In insects the O. in its simplest form consists of a modified group of pigment-cells derived from the skin-tissues. According to Newport, a typical O. consists of a 'convex, smooth, single cornea, beneath which is a spherical crystalline lens, resting upon the plano-convex surface of the expanded vitreous humor, the analogues of the transparent cones of the compound eyes.' Müller states that the function of the ocelli in insects is that of perceiving near objects; the compound eyes being used to perceive distant objects. In adult insects they usually number three. In lower animals the O. are simple masses of pigment, covered by a lens; they are adapted to receive impressions of light and darkness, but are useless for more perfect perception.

OCHI'NO, BERNARDI'NO, a noted Italian reformer, born at Siena in 1487, passed in 1525 from the Franciscan to the newly-founded and more rigorous Capuchin order, of which he was chosen general in 1538 and again in 1541. For forty years he had enjoyed a prodigious reputation for his oratory, purity of life, and devotion to the Catholic Church, when, suddenly in the August of 1542, we find him at Florence denouncing that Church as Antichrist. Cited to Rome, he fled to Geneva in the company, says Spondanus, of a young laundress, whom he subsequently made his wife. It is certain at least that he had four children, one of whom was married in 1562. After three years' stay at Geneva, O. visited Basel, Augsburg, and Strassburg, from the last place proceeding to England (1547), on the invitation of Cranmer, who made him a prebendary of Canterbury and Italian preacher at London. On Mary's accession (1553) he returned to Switzerland and held the post of pastor to an Italian church at Zürich from 1555 to 1563, when his *Dialogi XXX.*, containing an approval of polygamy, gave offence to Beza, who calls O. 'a most impure hypocrite, the concealed favorer of Arianism, and a mocker of all Christian doctrines.' Thenceforth O. was hunted like a hare by his co-religionists from Basel to Mühlhausen, and from Nürnberg to Frankfurt, dying at last of the plague at Schlakow, in Moravia, in 1564. He was author of various treatises, both Catholic and Protestant, a list of which is given by J. Voigt in his *Catalogus Librorum Rariorum* (Hamb. 1732). See Karl Benrath's *B. O. of Siena* (Eng. trans. Lond. 1877).

OCHTERLONY, SIR DAVID, a distinguished Indian officer of Scotch extraction, was born at Boston, Mass., February 12, 1758, entered the service of the East India Company, and took part in the wars against Hyder Ali at the close of the last century. In 1804 he defended Delhi with a small force against a Mahratta army under Holkar. In the Goorkha campaign of 1814, his was the only division which did not meet with disaster, and the successful issue of the war in the following year is mainly to be attributed to his wisdom and bravery. He was subsequently employed in the political or diplomatic department. He died July 15, 1825, at Meerut, while Political Resident for Delhi and Central India. A column of mixed architecture was erected to his memory in the Maidan, or Park of Calcutta.

OCK'LEY, SIMON, born at Exeter, England, in 1678, entered Queen's College, Cambridge (1693), became vicar of Swavesey, in Cambridgeshire (1705), and Professor of Arabic in the University of Cambridge (1711), and died at Swavesey, Aug. 9. 1720. His *History of the Saracens* (1708–18) is commended by Gibbon, who speaks of the author as 'an original in every sense, who had opened his eyes;' but it brought little profit to O., the second volume being dated from Cambridge Castle, where he was imprisoned for debt. Other works by O. were *Introductio ad Linguas Orientales* (1706); *An Account of South-West Barbary* (1713); and translations from Italian and Arabic.

O'CLERY, MICHAEL, the greatest of the 'Four Masters,' was born near Ballyshannon, in Donegal, Ireland, about 1575, entered the Franciscan Order, and spent his life in collecting materials for elucidating the history of his native island. He was assisted by three other Irish antiquaries, Conary O'Clery and Cucogry O'Clery, and Forfeasa O'Mulconry. The result of their labors was the *Annala Rioghachta Eireann* ('Annals of the Kingdom of

Ireland'), commonly called *The Annals of the Four Masters*. The best edition is that by Dr. John O'Donovan (3 vols. Dub. 1845–51, 2d ed., 7 vols. 1856), which contains, besides the Irish text, an English translation and valuable notes. Another work of O., *The Martyrology of Donegal*, a *Calendar of the Saints of Ireland*, was also edited by Dr. O'Donovan (Dub. 1864). O. died at Louvain in 1643.

O'CONOR, CHARLES, LL.D., a distinguished American lawyer, born in New York, 1804, and admitted to practice law in 1824. He rapidly rose to distinction, and conducted many important cases. He acted with the Democratic party throughout his life. Died at Nantucket, Mass., May 12, 1884.

O'CURR'Y, EUGENE, an admirable Irish scholar, was born in County Clare about 1795. Along with Dr. O'Donovan he was employed to transcribe and translate the ancient Irish laws, was afterwards appointed Professor of Irish History and Archæology in the Catholic University of Dublin, and died 30th July 1862. His *Lectures on the Manuscript Materials of Ancient Irish History* (1861) are among the finest fruits of Celtic scholarship, and are indispensable to every student of the national history.

ODE'ON (Gr. *Odeion*), a Greek building in the style of a theater, but of a smaller size, used for rehearsal of odes and music. The first O. was erected by Pericles; the most splendid was that of Herodes Atticus.

O'DON'OVAN, JOHN, LL.D., the prince of Irish scholars, was the son of a small farmer, and was born at Atateemore, in the county of Kilkenny, Ireland, 9th July 1809. In 1830 he was appointed to an office in the historical department of the Ordnance Survey, Ireland, and was employed to examine Irish MSS. and gather local information, for the purpose of fixing the orthography of places on the ordnance maps. O. was also conjoined with O'Curry in the transcription and translation of the Brehon Laws. In 1849 he was appointed Professor of the Irish Language in Queen's College, Belfast. He died at Dublin, 9th December 1861. No Irish scholar has equalled O. in the amplitude and accuracy of his philological and historical knowledge of the national language; his topographical erudition was also immense. His most important works are his *Grammar of the Irish Language* (1845), and his edition of *The Annals of the Four Masters* (2d ed. 1856), besides which, however, he edited several very interesting volumes for the *Irish Archæological and Celtic Society*.

ODON'TOPHORE, the name given to the dental apparatus characteristic of the highest classes of Mollusca (*Pteropoda, Gasteropoda* and *Cephalopoda*), which are hence collectively named *Odontophora*, in contradistinction to the *Lamellibranchiata* in which no O. is developed. The O. is often named the 'tongue' of Mollusca. It consists of a *cartilaginous skeleton*, of a *radula* or *lingual ribbon* armed with flinty teeth, and which is gradually reproduced from behind as it is worn away by the friction in front; and of the *muscles*, by means of which the radula is moved like a chain-saw, and thus rasps down the food on which the animal subsists.

ŒCODOMA, a well-known genus of the ant, celebrated for their intelligent habits. The species are abundant in America. *Œ. Mexicana* is common on the Gulf coast of Mexico; *Œ. cephalotes* and *Œ. sexdentata* are found in large numbers in Brazil. The Œ. are popularly termed 'leaf-cutters.' They cut and transport leaves to great distances. They build very large nests, occupying a surface frequently of many square yards. A large tree may be stripped of its leaves in a single night by these insects, who are also known to tunnel beneath rivers and streams when occasion requires.

ŒDENBURG, one of the oldest and most beautiful towns in Hungary, 37 miles S.E. of Vienna by rail, is situated among the spurs of the Leitha mountains, on the Ilka, a branch of the Raab, and two miles W. of the Neusiedler See. It has three large churches, several monasteries and a theater. The town watch-tower is reckoned the highest in Hungary. Cloth, sugar, and preserved fruit are manufactured, and in the surrounding district, one of the finest wines of Hungary is made. The coal obtained from the neighborhood forms also an article of trade in the town, whose annual cattle markets are much resorted to. Pop. (1869) 21,108.

OE'SEL, an island of Russia, in the Baltic, forming part of the government of Livonia, and stretching across the entrance of the Bay of Riga. It is 45 miles long with an average breadth of 25 miles. Area 1200 sq. miles; pop. 46,000. The soil is rocky; but in some places grain is raised and good pasture land obtained. Seal fisheries are also carried on. The only town is Arensburg (3378) on the S.E. coast. O. anciently belonged to the Danes, by whom it was ceded to Sweden in 1645. In 1721 it finally came into the possession of Russia along with Livonia.

OFF'A, KING OF MERCIA, began to reign about 757 A.D. He immediately set himself to deal with the troublesome Welsh on his western border, beating them back from Hereford, and forcing the King of Powys from his capital which changed its name from Pengwern to Scrobbesbyryg ('the town in the scrub;' mod. Shrewsbury). This position he maintained by planting settlements of English in the basin of the Severn. He likewise asserted his lordship over Kent and Wessex, and raised Mercia to a position of such importance as to incur the serious jealousy of Karl the Great, by whose intrigues, when O. died in 795, it was speedily reduced to insignificance. O. was a skillful soldier and a wise king, as the code of Mercian laws which bears his name testifies; but tradition lays to his charge some acts of revolting cruelty. See Green's *History of the English People* (new and enlarged ed. 1877).

Offa's Dike was a ditch and rampart extending from the mouth of the Dee to that of the Severn, built by Offa, King of Mercia, for the purpose of confining the marauding Welsh within their own country.

O'GLETHORPE, GENERAL JAMES EDWARD, a distinguished English soldier, was born at London, 22d December 1696. He entered the army in 1710, and served some time under Prince Eugene and Marlborough. In 1722 he represented Haslemere in Parliament, but having obtained a charter for the foundation of Georgia, he sailed for America in 1733. Two years after he revisited England, but returned in 1735 with John and Charles Wesley to Savannah, which he had founded two years previously. From 1737 to 1742 he commanded in Carolina and Georgia a regiment which he had brought over from Britain. Having returned to England in 1743, he served as major-general against the Pretender in 1745. In 1765 he became general and retired upon half-pay. O. died at Cranham Hall, Essex, 30th June 1785. See his *Life*, by Robert Wright (1867).

OHIO WESLEYAN UNIVERSITY, at Delaware, in the State of Ohio, was founded in 1843. Besides the president, there is a staff of 8 professors, 2 tutors, and a principal of the preparatory department. The University possesses a well-furnished laboratory, the Prescott collection of specimens in natural history, and the Mann cabinet of geological specimens.

OIL BEETLE, a name given to beetles of the genus *Melöe*, and specially to the *M. violaceus*, a common British species, which has the power of exuding a yellowish fluid of oily matter from between the joints of its legs. The color of the beetle is a dull indigo or metallic blue.

OLD'HAM, JOHN, an English poet, born 9th August 1653, was the son of a nonconformist minister at Shipton, in Gloucester. He studied at St. Edmund Hall, Oxford, where he took his degree in 1674. While an usher in a school at Croydon, his gift of verse was accidentally discovered by the Earls of Rochester and Dorset and Sir Charles Sedley. After a short time spent in tutoring, O. proceeded to London, and found a patron in the Earl of Kingston, but was prematurely carried off by small-pox, 9th December 1683. O. had a fine and strong wit, and might have won fame had he lived. His chief work is a series of *Satyrs upon the Jesuits*, in which he imitates Horace and Persius with considerable success.

OLIVENZA, a town of Spain, province of Badajoz, 10 miles S.S.W. of that city, on a small tributary of the Guadiana. It is strongly fortified, has manufactures of oil, cloth, and pottery, and carries on a trade in corn and wine. Pop. 10,000.

OLLIV'IER, EMILE, a French minister not likely to be forgotten, was born at Marseille, 2d July 1825, studied law, and passed advocate at Paris in 1847. At the Revolution of 1848, the Republican Government sent him to the Bouches du Rhône as *Commissaire général*, and soon after he was made préfet of Haute-Marne. Returning to Paris in 1849 he resumed his position at the bar, and rapidly attained distinction as an eloquent pleader. In 1857 he was elected one of the deputies for Paris against a Government candidate, and in the Legislative body became the nucleus of a Liberal opposition which, though very small in point of numbers, was composed of men of brilliant talents, and gave the Emperor much trouble. He took a prominet part in the discussions (1858) on the *Loi sur la Sûreté Générale*, the Franco-Italian War (1859), the liberty of the press (1860), &c. He was more than once 'suspended' professionally for his bold and incisive speech. Yet soon after 1863 he began to show a leaning towards the Imperialist policy, which increased every session, until finally on the 2d of January 1870 he became Minister of Justice and Religion, and nominally, but only nominally, head of the Cabinet. In July 1870 he pronounced passionately for war with Prussia. The 'light heart' with which O. went into the fatal conflict was no doubt heavy enough before the 10th of August, when he and his colleagues were overthrown, and General Montauban, Comte de Palikao, was charged by the Emperor to form a new ministry.

OLMSTED, DENISON, LL.D., an American Scientist, born at East Hartford, Conn., June 18, 1791, and educated at Yale College. From 1817 to 1825, he was pofessor of chemistry in North Carolina University, and from that time until his death was one of the faculty of Yale, first as professor of mathematics and af-

terwards of natural philosophy and astronomy. O. is the author of several valuable scientific works, the best known of which are *School Astronomy*, and *Compendium of Astronomy*. Died at New Haven, Conn., in 1859.

OLOT, a town of Spain, province of Gerona, Catalonia, on the Fluvia, about 12½ miles from the French frontier. Cotton-spinning and weaving, with manufactures of silks, woollens, hardware, and soap, are carried on. Pop. 10,000.

OLYMPIA, a rapidly growing city of Washington Territory, on Puget Sound. It was first settled in 1846, and now has schools, churches, papers, a fine library, and several factories. It has a population of 1600.

OMAHA INDIANS, a North American tribe, now numbering a little less than a thousand, and occupying a reservation in Nebraska. They are honest, industrious, and thrifty.

ONDERDONK, Henry Ustick, M.D., LL.D., an American bishop of the Episcopal church, born at New York in 1789, and graduated from Columbia College in 1805. For several years he pursued the science of medicine, but in 1815 entered the ministry of the Episcopal church. In 1827, he became assistant bishop of Pennsylvania, and on the death of Bishop White, became his successor. In 1844 he was suspended from office for immorality, but was restored in 1856. Died at Philadelphia, Pa., Dec. 6, 1858.

ONEGLIA, a town of Italy, province of Porto Maurizio, on the sea-coast, midway between Genoa and Nice. It is beautifully situated, has a good harbor, constructed in 1825, and receiving yearly some 100,000 tons of shipping. O. is the birthplace of Andrea Doria. Pop. 8047.

ONEIDAS, a tribe of North American Indians, located in Central New York, and one of the Five Nations. They have become civilized and maintain schools and churches.

ONION-FLY (*Anthosmyia ceparum*), a species of fly belonging to the *Muscidæ*, and noted for the habits of its larvæ in attacking the onion. The larvæ cause the affected plants to turn yellow and to die. The young flies become pupæ in two weeks, undergo their transformation in the root, and a fortnight later appear as perfect flies.

OPERA-BOUFFE, an exaggerated form of opera, is a farcical comedy usually in three or more acts, enriched by numerous sprightly airs and rattling choruses, and frequently enlivened by dances. Eccentric situations, ridiculous characters, bizarre costumes, and burlesque subjects are features of such pieces, while the music is often of a mock-heroic style designed to caricature that of the regular opera. Offenbach may be said to have created this species of entertainment, which has become almost as popular in England and America as in France. His most successful imitators and rivals are Lecocq, Hervé, and Johann Strauss.

ORCHARDSON, William Quiller, R. A., was born at Edinburgh, Scotland, in 1835, studied at the Academy there, and, after having gained a reputation as a painter of popular figure subjects, proceeded to London in 1863. His best known works are 'An Old English Song,' 'Flowers of the Forest,' 'Hamlet and Ophelia,' 'The Challenger,' 'Christopher Sly,' 'Day Dreams,' 'Toilers of the Sea,' 'A Hundred Years Ago,' 'On the Grand Canal, Venice' (1871), 'The Casus Belli' (1872), 'The Protector and Cinderella' (1873), 'Hamlet and the King,' and 'Ophelia' (1874), 'Too Good to be True,' and 'Moonlight on the Lagoons' (1875). O. was elected an A.R.A. in December 1877.

ORCHI'TIS, or, INFLAMMA'TION OF THE TES'TICLES, appears first in the interlubular connective tissue, but afterwards the tubuli themselves become loaded with lymph. O. may be caused by a blow, by metastasis in mumps, gonorrhœa, syphilis, &c. The *acute* form commences with rigors, sickening pain in the back and loins, as also in the testicles, heat and redness of the scrotum, swelling and tenderness of the epididymis, and distension of the tunica vaginalis. The treatment consists of rest in bed with the part supported, warm cataplasms, and leeches followed by warm bathing. Careful strapping of the organ is also beneficial. *Chronic* O. consists in a knotty enlargement of the various lobes of the gland, caused by infiltration of lymph into their connective tissue. It is best treated by keeping the patient in bed, and administering calomel and opium till the gums are slightly tender. This treatment should be followed by inunction of mercurial ointment into the scrotum, and the administration of iodide of potassium internally. *Scrofulous* O. occurs in persons of the strumous diathesis, and consists in the deposit of tubercle in and around the tubular structure, as is usually accompanied with enlargement of the vas deferens. The tubercles generally soften and terminate in the formation of abscess. The constitutional treatment is hygienic and dietetic, and the local treatment is that common to suppurating sores. Phosphorized cod-liver oil should be given.

ORD, Edward O. C., an American general, born at Cumberland, Md., Oct. 19, 1818, and graduated from West Point in 1839. He took an active part in the civil war, and was severely wounded at a battle on the Hatchie, Oct. 5, 1862. At the close of the war he held the rank of major-general of volunteers. In 1866 he was made brigadier-general in the regular army. Died at Havana, July 22, 1883.

ORDERS, RELIGIOUS, the societies of men or of women in the Catholic Church who live under a common rule and superiors, and are bound together by the three monastic vows of chastity, poverty, and obedience. The *Gerarchia Cattolica*, or the official catalogue of the Catholic Hierarchy with the Religious Orders, yearly issued from the Vatican, classes these Orders as follows:

I. Regular Canons:—The Lateran Canons of the Most Holy Saviour; the Premonstrateusians; the Canons of the Holy Cross.

II. Regular Clerics:—The Theatines; The Barnabites; The Order of Somascha; The Company of Jesus; The Minor Clerics; The Servants of the Sick; The Clerics of the Mother of God; The Piarists; The Passionists; The Redemptorists; The Fathers of the M. H. Hearts of Jesus and Mary.

III. Ecclesiastical Congregations:—The Fathers of the Christian Doctrine; The Fathers of the Mission (*Lazarists* or *Vincentians*); The Pious Workers; The Fathers of the Holy Ghost and of the Immaculate Heart of Mary; The Fathers of the Most Precious Blood; The Oblates of Mary Immaculate; The Institute of Charity (Rosminians); The Company of Mary (Marists); The Fathers of the Holy Cross; The Fathers of the Resurrection; The Salesian Fathers; The Society of Foreign Missions; The Brothers of the Christian Schools; The Brothers of Our Lady of Mercy. To these must be added the Christian Brothers (Irish), recognized and approved as a Congregation by the Holy See.

IV. Monks:—The Basilians; the Benedictines, comprising nine different Congregations, namely: 1. the Italian Congregation of Monte Cassino; 2. the Congregation of Monte Cassino of the Primitive Observance; 3. the Congregation of Hungary; 4. the Congregation of France; 5. the Congregation of Switzerland; 6. the Congregation of England; 7. the Congregation of North America; 8. the Congregation of Bavaria; 9. the Congregation of Brazil. The Camaldolese Congregation; the Camaldolese Hermits; the Reformed Hermits of Monte Corona; the Vallombrosians; the Cistercians; the Reformed Cistercians (the Trappists of La Grande Trappe); the Trappists of the De Rance Reform; the Congregation of Monte Vergine; the Silvestrines; the Olivetans; the Carthusians; the Antonians (or Chaldean Congregation of St. Hormisdas); the Maronites of the Congregation of Aleppo; the Maronites of the Congregation of Baladita; the Maronites of the Congregation of St. Isaias; the Armenians of Mount Libanon; the Armenian Benedictines (or Melchitarists of Venice); the Benedictine Armenians (or Melchitarists of Vienna); three congregations of Basilian Monks—the Melchite Greeks of St. Saviour, the Melchite Greeks of Aleppo, and these of the Soarita Baladita Congregation.

V. Mendicant Orders:—The Dominicans; the Franciscans (comprising: the Minors of the Observance; the Reformed Observantines; the Minors Recollects and Alcantarines; the Conventuals; the Capuchins; the Third Order of St. Francis living in Community); the Augustinians (comprising: the Hermits of St. Augustine; the Discalced Hermits of St. Augustine); the Carmelites (comprising: the Carmelites of the Primitive Observance; the Reformed Discalced Carmelites); the Servites or Servants of Mary; the Minims; the Order of Mercy for the Redemption of Captives; the Trinitarians (primitive); the Reformed Discalced Trinitarians; the Hieronymites or Order of St. Jerome; the Hospitalers of St. John of God; the Order of Penance (*Scalzetti*).

If we take up the history of Asceticism (Gr. *ἀσκέω*, *ἄσκητής*, exercise, discipline) in the Christian Church, we find that from the apostolic age the followers of Christ strove to imitate both Him and His precursor, the Baptist, in the endeavor either to retire into solitude for the purpose of meditation, prayer, and penitential practices, or to lead in the world a life of rigorous self-discipline, abnegation, and purity. The Apostolical Constitutions mention these Ascetæ as an intermediate class between the clergy and the laity. In 230 was born in the Thebais—the now half-barren wilderness around Egyptian Thebes—St. Paul the Hermit, who, at the age of 22, and during the persecution of Decius, fled into the solitudes near his native place, and lived a solitary life till his 90th year, when he was visited by St. Antony, the founder of monasticism in the East, and prepared by him for death. The early church, like that of later times, was slow to approve of a life of absolute solitude. Indeed among the men most experienced in asceticism, none were permitted to lead the life of a hermit, but such as were of approved constancy in virtue; and even then they were only permitted to live for a time thus separated from intercourse with their brethren. St. Anthony, who was born in 250 and died in 356, led for some time the life of a

hermit; but as a number of disciples gathered round him, eager to profit by his examples and teaching, he constructed cells for them in the neighborhood of his own. This was the first instance of what is known in the East as a *laura* or collection of hermit's cells round a church destined for common prayer and praise. From this there was only a step to the cœnobitic (Gr. κοινος, common, and βιος, life) life or community life.

This form was introduced among the Solitaries of the Thebais in 315, by St. Pachromius. St. Hilarion, a disciple of St. Antony, was the first to introduce this common or monastic life into Palestine. It spread all through Syria and Asia Minor; was introduced into Italy by St. Athanasius, during his exile there; was fostered in Milan by St. Ambrose, from whom St. Martin learned its rules; St. Martin, in his turn, establishing in Gaul, along the banks of the Loire, the monasteries of Marmontiers and Ligugé. St. Augustine, while in Milan, and immediately after his baptism, withdrew for a time into a monastery founded in the suburbs of the city by St. Simplician, who afterward succeeded St. Ambrose in the episcopacy. On Augustine's return to Africa, he led, even after he became bishop of Hippo, a semi-monastic life with his priests. St. Patrick, who had studied at Marmontiers and Lerins, then the most famous monastery and school of the West, took the monastic form with him to Ireland, and encouraged bishops and clergy, in every one of the numerous churches he founded all over the island, to lead a community life. It is certain that within the half-century following St. Patrick's death (493), Ireland was blessed with numbers of these monastic houses, all of them schools, and many of them most famous schools. Of the literary works produced in the monastic schools of Ireland during that half-century those which have survived, such as *The Book of Kells*, *The Book of Durrow*, &c., are incredibly beautiful monuments of the illuminator's skill. Both of these books are from the hand of St. Columbkille, who, as his historian relates, left upward of 300 such books, written and illuminated by himself. It is a matter of well-known history that Columbkille and his disciples spread monasticism and learning from Iona and Lindisfarn through England and Scotland and even as far as Iceland; that, later, St. Columbanus and his disciples were the apostles of Gaul, of Switzerland, southern Germany, and a part of northern Italy. There is not a county of England or Scotland that has not preserved the name of some Irish saint or scholar, who was, in these remote ages, the light of the land and the guide and benefactor of the people. But in the seventh Century the Rule or form of community life inaugurated by St. Benedict, supplanted both that of St. Martin and St. Columbanus. It spread all over Western Europe. Within the Benedictine monasteries themselves very important reforms sprang up in the 10th and 11th centuries, and were called the Orders of Cluny, Camaldoli, Chartreuse, and Citeaux. In the thirteenth century arose the Dominicans, Franciscans, Servites, Augustinians, and Carmelites; in the sixteenth were founded the orders of Regular Clerks, Theatines, Barnabites, Jesuits, &c. But from a very early period, at least from the eighth century, appeared among the parochial or secular clergy, the reform known in history as that of the Regular Canons.

The first person who is acknowledged to have originated it is Chrodegang, Bishop of Metz, who, anxious to promote among his priests a mode of life more conducive to edification and effective labor, gave them a rule (Canon, Gr. κανων) and induced those, at least, of his Cathedral Church to set the example by living together under the same roof, and by renouncing all personal property. The chanting in common of the Divine Office, which had been customary but subject to much irregularity, now became an obligation, to the great delight of the people. Other bishops hastened to effect the same reform in their respective Cathedral Churches, while other considerable churches in each diocese conformed to the discipline of the Cathedrals. Provisions were made by the bishops, princes, or noble personages for the support of the Chapters or Colleges of Canons thus established, relieving these from all anxiety about the morrow. Still these being ages of rude violence and lawless manners among the half-civilized Franks, Burgundians, Saxons, and Goths, the fervor with which this reform began soon cooled down.

In 816 a council of the Bishops of the Frankish Empire, assembled at Aix-la-Chapelle, drew up a rule for the Canons; but as this did not enjoin a vow of poverty, it effected little good. In the councils held at Rome in 1059 and 1063, a vow of poverty was added to the Rule of Aix-la-Chapelle. Nevertheless, the community life thus imposed on Chapters lacked many of the bonds of a strong monastic discipline. Only a minority of them faithfully observed the Rule, which now came to be called the Rule of St. Augustine, because the mode of common life it enjoined resembled that described in Letter cix. of the great African bishop. On this mode of life was moulded the semi-monastic communities implanted in Ireland and Great Britain, and which soon framed regulations of excessive severity, such as those enjoined by St. Columbanus.

The Regular or Augustinian Canons, who thus came into prominence in the eleventh century, became very popular both in Great Britain and in Ireland. Indeed it is a question whether in the latter they were not the natural outgrowth or development of the institutions bequeathed by St. Patrick, his associates, and immediate successors. It is remarkable that in Ireland the Religious Orders never have been accused—at least among the Celtic populations—of the irregularities they were accused of in England and on the Continent. At any rate, in 1537 Ireland possessed 223 Augustinian convents of Canons Regular with 33 nunneries, while in England, at the Suppression, the Order counted 203 houses. They had thus gradually developed into a well organized and perfectly disciplined monastic body.

The Augustinian or Augustine Canons claim an origin which dates from the Apostolic age. But the claim is not clearly established. The Hermits of St. Augustine, who advance similar pretentions to antiquity, existed as separate communities in the beginning of the thirteenth century. They were united into one body in 1265 by Alexander IV. They belong to the class called Mendicant Orders or Friars. A book published in Dublin in 1758, entitled 'Historical Collections,' &c., enumerates 26 houses of Austin-Friars in Ireland, whose Priors then existed and claimed precedence by order or antiquity; but the author states, on the authority of Father Lublin (*Orbis Augustinianus*) that before the Reformation this Order had 61 convents in Ireland.—With regard to the difference between the various groups of Religious Orders, as given in the *Gerarchia Cattolica*, it may be stated thus. Hermits and Monks aimed by their institute and mode of life at seclusion, self-discipline, and personal sanctification. The Canons-Regular were, primarily, priests in the active duties of the ministry, who, both for edification, the effective discharge of their duties, and their own advancement in perfection, adopted a common rule and a life of poverty. The Order of Piémontié served as a model to St. Dominick in the first stage of his order. The Franciscans and Dominicans aimed at laboring among the people, first of all: so that their life was to be one of external ministration, prepared and sanctified by contemplation, prayer, and study, as well as by the most rigorous poverty. The other Friars or Mendicant Orders, who followed in their path—Carmelites, Servites, &c.—only emulated their example and shared their labors.

The Regular Clerks—Theatines, Jesuits, and others above enumerated, while being trained for active labors among the people, are also careful to mould the intellectual and spiritual man by long study, self-discipline, and prayer. The Jesuits, in particular, aim at combining in the most perfect manner the active with the contemplative life. The long years spent by their young men in study, in teaching, in the most powerful ascetic discipline fit them in a peculiar manner for facing every species of active duty. The Ecclesiastical Congregations are all destined for the active life; but they are not subjected to the same rigorous monastic forms, although the Teaching Orders among them obey an exceedingly severe rule, and subject their members to a strong and most careful training.

Of Religious Orders of Women the 'Gerarchia Cattolica' makes no mention. In the first period of Monachism, women were encouraged to emulate men in their zeal for self-renouncement and ascetic generosity. St. Jerome bestowed no little care in cultivating this tendency among the patrician ladies of Rome; and when the great Scholar went to pursue his biblical studies in Palestine, and to seek the means and motives of greater spiritual perfection near Bethlehem, he was followed thither by St. Paula and her daughter St. Eustochium, who founded a convent for women near the scene of Christ's Nativity, where many of their Roman friends joined them. So was it with St. Ambrose in Milan, where his sister, Marcellina founded a house which she governed. In Ireland St. Patrick gave the monastic habit to St. Brigid who, in her turn, sent swarms from her hive at Kildare to various parts of the island, she and her sisters everywhere doing for the persons and children of their own sex, what the numerous houses of men were doing for the people in general and for the education of youth above all. The perpetual fire which Brigid kindled and fed so carefully near the oak groves of the upland on which her monastery arose, was only one form of the charity she and her sisters exercised toward the bodily and spiritual needs of the surrounding populations. St. Scholastica, the sister of the great St. Benedict, followed her heroic brother into the solitudes of the Apennines, and built a house for nuns not far from the monastery which Benedict had made the nursery of the religious life and spirit for all the west of Continental Europe. Thus monastic homes for both sexes flourished all through the middle ages. St. Francis of Assisi gave the religious habit to St. Clare, his towns-woman in the Church of St. Mary of the Angels, and Clare and her nuns vied in heroic poverty and heroic sanctity with Francis and his apostolic band. Even so St. Dominic in Bologna gave the veil to the noble Diana d'Andalò, whose brother afterward was the founder of the Knights of the Glorious Virgin Mary. And Diana's example was

followed in Italy, and all over Europe by noble women, who claimed St. Dominic as their spiritual parent. The Cistercians and the Augustinians beheld countless monasteries of women who acknowledged their respective rules. After the Reformation began to assail not only the center of authority and unity in the church, but the existence of the monastic orders, and the very principles of monastic life, there arose among the Religious of both sexes a tendency toward the active rather than the contemplative life, or, rather, a tendency to combine activity with contemplation, in order to meet the exigencies of their age and country, and to combat error and the prevalent corruption of morals by a greater devotion to education and the manifold labors of charity. Then sprang up in Italy the first great female order devoted to education, the Ursulines, whose houses were soon multiplied all over Europe, and emulated the Jesuits their contemporaries by sending their missionaries to the West Indies and to Canada. Since then, and especially since the French Revolution first overturned in Continental Europe all monastic institutions and began that propaganda of scepticism and incredulity, which has ruined religion and shaken all the foundations of society in ancient Catholic lands, the instinct of the Christian people and of the pastors of the Church has been to favor in preference the orders of both men and women who are most fitted to dispense instruction and have a care of the orphan, the sick, and the needy poor. St. Francis of Sales, in founding the Order of the Visitation, gave them a rule which enjoined the cloister as well as the care of schools. This was in imitation of the change made in the Ursuline Institute by St. Charles Borromeo, who made a cloistered order of Angela Merici's sisterhood.

But these in modern Italy, and after the recent war on religious orders and religion itself, have reverted to the Sainted Foundress's original idea: alongside of the few cloistered houses tolerated by the government have sprung up an army of zealous women, wearing a secular dress, living in their own families, and combining their best efforts to educate little children, to prevent young girls from being led astray, to minister to the sick, and practice charity in all its forms. St. Vincent de Paul had charity principally if not exclusively in view when he founded his great order of Sisters of Charity, whose fame is one of the household glories of all Catholics. Elizabeth Bayley Seton aimed at bestowing on the Church of the United States a similar benefit in founding her Sisterhood, who combine the duties of hospitalers with that of educators. So was it earlier with the foundress of the Grey Nuns of Montreal. Earlier still, in the first half of the 17th century, the Venerable Marguerite Bourgeoys endowed Canada with the Congregation of Notre Dame, whose primary object was to take charge of parochial schools. They have been blessed and multiplied exceedingly, and have offshoots in every part of the American continent. In the France of the nineteenth century nothing in all history has been more marvelous than the multiplication of Religious Orders of Women devoted to the education of all classes and the discharge of all the duties of Christian Charity—nothing, save what has taken place in poverty-stricken Ireland, and in that Greater Ireland which forms so large a portion of the Church in the United States. In France the name of these new and admirable Sisterhoods is 'legion.'

A few only can be pointed out: the Ladies of the Sacred Heart, with their twin-sisters, the Congregation of Notre Dame de Namur; the Sisters of Charity of St. Paul, who, besides hospital duty, take charge of poor schools, and thus supplement the Vincentian Sisters; the Sisters of St. Joseph, devoted to education and charity; the Sisters of Providence; the Sisters of the Good Shepherd, who add to their sublime duties of charity that of educating, wherever they are called on to do so; and a host of other societies of noble women. In Ireland Nano Nagle in the last half of the eighteenth century braved the Penal Laws and founded the Irish Ursulines at Cork and the Sisters of the Presentation. Mary Aikenhead, born a few years after Nano Nagle's death in the same city, founded in Dublin the Irish Sisters of Charity, whose rule is adapted from that of St. Ignatius, and whose manifold services in the twofold sphere of education and charity are the admiration of all who see them at work. The gentle and saintly Archbishop Murray, who fostered their growth, also encouraged the foundation of the Sisters of Loretto (Institute of the Blessed Virgin Mary) by Frances Ball, and that of the Sisters of Mercy by Catharine McAuley, the former devoted exclusively to education, the latter also taking charge of hospitals and orphanages.

There is something in the soil of Ireland, fertilized by the blood of so many generations of martyrs, which favors the growth of heroic devotion, something in the atmosphere of the Irish home, which prompts to the utmost generosity in the divine service. The Irish Catholics give their best to God, and contribute nobly to support those institutions. In England and the United States, Sisterhoods of all kinds are founded with the same liberal spirit. Charity has its armies of apostles; but Education—the great hope of the Church in her struggle with unbelief and licentiousness—has also its hosts of heroic women, the true parents of the future age. Only a few of the other Sisterhoods can be mentioned here: the Sisters of the Holy Child Jesus, an admirable order founded in England by an American lady; the Little Sisters of the Poor, God's visible providence to the aged poor—and a Sisterhood specially devoted to the education of colored children in the United States. Then, in modern times, the Sisterhoods attached to the great Mendicant Orders, Franciscans, Dominicans, Carmelites, &c., as well as the Redemptoristines, do their share in the divine works of education and charity.

ORI'ON, one of the most brilliant of constellations. It lies in the southern hemisphere, but is visible in northern latitudes during the winter months as a striking object above the southern horizon. Of its seven principal stars, two (Rigel and Betelgense) are of the first magnitude, and three of the others lie in a straight line forming the so-called belt. A little below the belt, forming part of the sword-sheath, is an irresolvable nebula, one of the few visible to the naked eye, and one of the most fantastic in shape.

ORME, Robert, the military historian of British India, was born in Travancore, in S. India, 1728. Educated at Harrow, he returned to India as a writer in the East India Company's service in 1744. The first volume of his history was published in 1763, and he was forthwith appointed historiographer to the Company, with a salary of £400 a year. The work was completed in 1778, and covers 'the military transactions of the British nation in Indostan' from 1745 to 1763. O. died at Ealing, Middlesex, 13th January 1801, leaving a valuable collection of MS. and other historical materials to the East India Company, which have never yet been properly catalogued. His literary style was scarcely equal to his industry; but the ornate manner in which he treated an important period of history has stimulated the patriotic spirit of many other readers besides 'Colonel Newcome.' Lord Macaulay, in his well-known essays on Clive and Warren Hastings, has borrowed entire passages from him with but little modification.

OR'MIN, ORR'MIN, or ORM, an author whose work, the *Ormulum*, named after himself, is one of the most valuable specimens of 'Transition English.' He was a canon regular of the order of St. Augustine, and wrote for the spiritual edification of his countrymen. His plan was to give a paraphrastic version of the Gospel for every day in the year, adding to each portion an exposition, in which, as a rule, he draws largely on Augustine, Ælfric, and Bede. Of this complete system of homilies we have nothing now beyond the text of the thirty-second. The metre of the *Ormulum* consists of lines of fifteen syllables pointed at the end of the eighth—one of the first English imitations of a Latin rhythm known. The handwriting, ink, and materials of the M.S. (a vellum folio now in the Bodleian Library, supposed to be in O.'s own hand), lead to the supposition that it was composed in the 13th c. The language is East Midland, with certain peculiarities of spelling, such as the doubling of consonants. Mr. Kingston Oliphant says of O.: 'He is the last of our English writers who can be said to have drunk from the undefiled Teutonic well; no later writers ever use so many prepositional compounds, and on this account we ought perhaps to fix upon an earlier year than 1200 for his date. In the course of his lengthy poem, he uses only four or five French words; his few Latin words are church phrases known in our land long before the Norman Conquest. On the other hand, he has scores of Scandinavian words, the result of the Norse settlement in our eastern shires 300 years before his day. His book is the most thoroughly Danish poem ever written in England that has come down to us; many of the words now in our months are found for the first time in his pages.' Dr. White edited the *Ormulum, with Notes and Glossary* (Oxford, 1852). See also Kingston Oliphant's *Sources of Standard English* (1873).

ORNITHODEL'PHIA ('bird-wombed'), the term given to the lowest division of the Mammalia, represented by the two genera *Ornithorhynchus* and *Echidna*. In these animals there exists a striking resemblance in the disposition of the female generative organs to that which obtains in birds. Thus the two *Fallopian tubes* or *oviducts*, instead of uniting, as in higher mammalia, to form a *uterus* or *womb*, remain separate and distinct throughout. These oviducts, moreover, open separately into a *cloaca* or common cavity, which receives the *rectum* or lower extremity of the intestine, and the *ureters*. A like disposition of parts exists in birds. Other characters of the O. are found in the fact that *marsupial bones* exist, as in *Marsupialia*. The bones of the shoulder also evince birdlike characters. The *coracoid bones* (which are mere processes of the shoulder-blade in other mammals) extend to the breast-bone, whilst a T-shaped bone (the *interclavicle*) supports the united collar-bones. The *cerebellum* or lesser brain is uncovered by the cerebrum. No teats exist on the mammary glands, which are situated posteriorly. The angle of the mandible lower jaw is not inflected, and there is no outer ear. The males have a kind of spur on the hinder feet, the use of this organ—which is perforated and connected with a gland—being unknown. The brain-hemispheres are smooth in *Ornithorhynchus*. The O. are

confined in their distribution to Australia and Tasmania. The higher divisions of the mammalia are the *Didelphia* and *Monodelphia*.

OROSZ'HAZA, a town of Hungary, county of Békés, and 31 miles N.E. of Szegedin by rail. It produces excellent wine, and has a large trade in cattle. Pop. (1869) 14,554.

ORU'RO (in full, San Felipe de Asturia de O.), capital of the province of Oruro, in the republic of Bolivia, S. America, on a plateau 12,442 feet above the level of the sea, and 207 miles N. by W. of Chuquisaca. Founded in 1590, it rose rapidly, its gold and silver mines being second only to those of Potosi, and about the end of the 17th c. it had 70,000 inhabitants, but it sank as rapidly as it had risen, when the mines had become worked out or less profitable, and now has a pop. of 7980.—The *province* of O. is about 21,600 sq. miles in extent, and has a pop. of 111,000. A considerable part of the surface is occupied with swamps and lakes, the largest of which is that of Aullagas (1075 sq. miles), which receives the river Desaguadero. Though the soil is fertile, agriculture is still in a very backward state.

ORYCTEROPUS, a genus of *Edentate* quadrupeds, represented by the *O. Capensis*, ground hog, or 'aard vark' of S. Africa. This animal somewhat resembles a clumsy pig in form. It has long ears; its body is covered with coarse hair, and it attains a length of 5 feet, inclusive of its tail. The toes are provided with very strong claws, by means of which the O. burrows in the earth. The O. is active at night. It subsists, like its neighbor the S. American Ant-eater, on ants, and other insects, which it captures by means of its long tongue and glutinous saliva. It has no incisor or canine teeth; the premolars number 14 above and 12 below, and there are 10 molars in each jaw.

OSAGE INDIANS, a branch of the once great family of the Sioux, are now settled in the Indian Territory and in Nebraska, S. of the river Plate, and N. of the Cherokees.

OS'BORN, Admiral Sherard, born April 25, 1822, entered the navy in 1837, and was present at the capture of Canton (1841), and of the Woodang Forts (1842). As commander of the *Pioneer* in the Franklin Discovery Expedition of 1849, he made a memorable sledge journey to the extreme western point of Prince of Wales' Land (1851); and as post-captain of the *Vesuvius* he led the advanced squadron in the Sea of Azof (1855), at the close of the Crimean war being made a C.B. and an officer of the Turkish Medjidie and French Legion of Honor. He served through the second Chinese war (1857), ascended the Yangtse as far as Hankow, 600 miles from its mouth (1858), and in 1862 accepted from the Chinese government the command of a squadron for the suppression of piracy. O. returned home (1864) to test the newly-turreted *Royal Sovereign*, was for some years managing agent of the Great Indian Peninsula Railway at Bombay, and at the time of his death (May 6, 1875) was serving on a committee for the Arctic Expedition of 1875. O. was author of *Stray Leaves from an Arctic Journal* (1852), *Quedah, or my Journal in Malayan Waters* (1857), *Japanese Fragment* (1860), &c.

OS'CANS (Lat. *Osci* or *Opsci*, Gr. *Opikoi*, connected by Mommsen with Lat. *opus*, 'work'), an ancient Italian race, occupying Campania, and closely connected if not identical with the Ausonians. Invaded from the N. by the Samnites in the 5th c. B.C., they became amalgamated with their conquerors, who borrowed at once the Oscan name and language. The latter, which stood in the same relation to Latin as French to Italian, continued a spoken dialect till the 1st c. A.D. Specimens of it, now rendered intelligible by the labors of Mommsen, are preserved to us in the *Graffiti* of Pompeii, in the legends of coins struck by the Confederates in the Social War, and in various inscriptions. The most famous Oscan inscriptions are the Bantine Tables, of thirty-eight lines, discovered at Oppido in 1793; the Cippus Abellanus, which till 1745 was employed as a doorstep at Avella; the Bronze Tablet of Agnone, discovered in 1848.

OSGOOD, Frances Sargent, born at Boston, Mass., in 1811, and, when 24 years of age, was married to S. S. Osgood. She edited several selections of poems, and was herself a graceful poetic writer. A collection of her poems was published in 1848. Died at Hingham, Mass., in 1850.

OSGOOD, Samuel, D.D., LL.D., born at Charlestown, Mass., in 1812, and graduated from Harvard, in 1832. He entered the ministry of the Unitarian Church, and was pastor of churches at Nashua, N. H., Providence, R. I., and New York, N. Y. In 1870 he entered the Episcopal Church, but never assumed charge of a parish. He published numerous works, among which the following may be noted: *American Leaves; Studies in Christian Biography; God with Men;* and *Mile Stones in our Life Journey*. He also wrote extensively for the various magazines. Died in 1880.

OSKALOOSA, a town of Mahaska Co., Ia., 62 miles from Des Moines and 100 from Burlington. It is extensively engaged in trade, coal-mining, manufacturing, stock-raising, and agriculture; and has fine railroad facilities. Pop. 6800.

OS'MAN PASHA, Ghazi, a distinguished Turkish general, is said to have been born at Tokat about 1832, and to have been educated at a school conducted by his brother, from which he was transferred to the military academy at Constantinople. He obtained a lieutenant's commission in 1853, and on the outbreak of the Crimean War was attached to the general staff at Shumla. After serving with distinction as major in the Cretan campaign, in 1867, he obtained rapid promotion to a colonelcy, and subsequently a generalship. He was commandant at Widdin during the Turco-Servian War in 1876, and for brilliant conduct at the battle of Saitschar was created a mushir or field-marshal. The declaration of war by Russia in April 1877 found him still at Widdin, whence he marched to Plevna immediately on the passage of the Danube, entering that town on 14th July. The enemy's vigorous attempts to oust him on the 24th and 31st of July were repulsed with terrible slaughter. From an open town he transformed Plevna into an entrenched camp, which for five months engaged a Russo-Rumanian army of more than 100,000 men, checked the general progress of the invaders, and cost them the lives or services of 50,000 gallant soldiers. In the desperate and unsuccessful assaults in the second week of September alone, their loss was estimated at 25,000 men. The Sultan conferred on O. in October 1877 the well-won title of Ghazi (Victorious). On General Todleben assuming the direction of the besieging forces he initiated an investment, and his cautious strategy succeeded where the brilliant onslaughts of Skobeloff had failed. Every hope of relief vanished, his stores exhausted, and his troops decimated by disease, O. made a grand but futile effort on the 11th of December to break through the circle of steel which encompassed him. He was himself wounded, and obliged to surrender with 40,000 troops. The Czar returned his sword to the heroic soldier, who has been treated as a prisoner with the greatest courtesy by his conquerors.

OSTRACODA, an order of the class *Crustacea*, represented by several genera of small organisms collectively named 'water-fleas.' To this group belongs the genus *Cypris*, found in fresh water; *Caudona*, in brackish streams; and the marine genera *Cythere* and *Cypridina*. The body is enclosed within a shell or *carapace*, which consists of two valves, united along the back by a flexible membrane. The valves are closed by the action of a special (*adductor*) muscle. The gills or branchiæ are attached to the hinder jaws. The O. are represented as fossils in rocks beginning with the Lower Silurian strata. They are known as fossils through the preservation of the valves of the shell.

OS'TU'NI (*Ostunium*), a town of S. Italy, province of Lecce, 22 miles W.N.W. of Brindisi by rail. It lies in a district rich in grain, vines, olives, and almonds, and has numerous churches and convents. Pop. (1874) 14,422.

OS'WALD, King of Northumbria, began to reign in 634 A.D., and restored to his subjects the Christian religion, which had been deserted for paganism by his predecessors Œric of Deira and Eanfrid of Bernicia. Cædwalla, the Welsh Prince, was slain by this king at Denisesburn (Dilston) after a long and bloody battle. Oswald was one of the mildest yet most capable kings of the Heptarchy, and along with Aidan, whom he made Bishop of Lindisfarne, sought so earnestly to cultivate the spiritual welfare of his people, that the ecclesiastical chroniclers never tire of detailing his acts of charity and his miracles. He died in battle against Penda, king of Mercia, in the thirty-eighth year of his age, 643 A.D. See Bede's *Hist. Eccl. Gent. Angl., Lib. III.*; Freeman's *History of the Norman Conquest;* and Green's *History of the English People* (new ed. 1877).

OTTUMWA, in Wapello Co., Ia., on the Des Moines River, 75 miles W. of the Mississippi. Four railroads connect it with the principal cities of the West. It has excellent water power, and is largely engaged in manufacturing. Pop. 11,500.

OTIS, James, an American patriot, born at West Barnstable, Mass., in 1725. He was noted for his strong support of the Colonial cause, and was the promoter of the Stamp-Act Congress, which met in New York. He was killed by lightning, at Andover, Mass., in 1783. He published numerous works relative to the difficulties between England and the Colonies.

OTOSCOPE, an instrument used by aural surgeons for examining the *membrana tympani*. In a very good light the membrane can be seen without a speculum; but a silver tube is usually necessary, the light of a lamp, with a reflector behind it, being thrown into the tube. In operative procedure a small mirror is placed on the forehead, in order to leave both hands free. An instrument sometimes called the O. consisting of an india-rubber tube about 18 inches long, is used by the surgeon to hear the air passing into the tympanum by the Eustachian tube, the one end of the india-rubber tube being placed in the ear of the patient and the other in the ear of the observer.

OTTAWA, a town of Franklin Co., Kansas, on the Marais des Cygnes River, and the Missouri Pacific and several other rail-

roads. It is the center of an extensive trade, and has flour mills, grain elevators, castor oil mills, railroad machine shops, &c. Pop. 5000.

OTTAWA, a town of Illinois, on the Illinois River, 80 miles W.S.W. of Chicago by rail, has large starch and glass industries, several fine hotels, stores, &c., and four newspapers, and is connected by canal with Plaines River and Lake Michigan. In a handsome park on the S. side of Illinois are great mineral springs. Pop. 10,000.

OTTENDORFER, Oswald, born in Moravia, in 1826, and in 1850 removed to New York City, where he established the *New Yorker Statts-Zeitung*, for many years the leading German paper in America. Died in 1884.

OTTO I., King of Greece from 1833–62, was the second son of King Ludwig of Bavaria, and was born at Salzburg, June 1, 1815. On the 13th February 1832 he was chosen by the Great Powers King of Greece. Being accepted by the Greeks, he arrived at Nauplia, then the capital, on the 30th January 1833, and on the 6th February made a solemn entrance into the town. Till the 1st July 1835 Greece was governed by a regency (under Armansperg, Maurer, and others), but even after O. himself took the government, German officials held the chief influence. In 1836 he married the Princess Amalie of Oldenburg, whose interference in the politics of the Greeks was disastrous. She was understood to be the instigator of that reactionary and autocratic policy that lasted till the revolution of September 1843 forced O. to grant a free constitution. Yet he would not fairly yield to constitutional government, but sought to secure an artificial majority in the Chamber by intrigues and bribery. His pro-Russian feeling during the Crimean war gained him some popular favor, which he soon lost, and at the beginning of 1862 O. appealed to Kanaris to form a ministry. But the attempt failed, as he would not accept Kanaris' terms, and in October of the same year an insurrection broke out at several places. On the 22d October O.'s deposition was proclaimed at Athens. He forthwith lodged his protest, and left for Bavaria. He died at Bamberg, 26th July 1867.

OTT'OKAR II., Przemysl, King of Bohemia 1253–78, son of King Wenceslaus III., was early chosen Duke of Austria, when the old ducal line had died out with Friedrich the Quarrelsome. At twenty-three he married Margaretha (then forty-six years old), sister of the latter and widow of Heinrich, son of the Emperor Friedrich II., but she was afterwards divorced by him. O. also gained possession of Steiermark, for which he had to fight with the Hungarians, whom he defeated at Marchfeld in 1260, and also of Carinthia and Carniola. Soon after his accession he undertook in 1254, in union with the Teutonic Knights, a crusade against the heathen Prussians, whom he subdued, and founded at Pregel a town which, in honor of the king, he named Königsberg. The imperial crown was offered to O., who refused it, but yet would not recognize the election of Rudolf, in consequence of which he had to yield Austria, Styria, Carinthia, and Carniola to Rudolf, and take Bohemia and Moravia as fiefs of him in 1276. When O. shortly after renewed the war, he fell, after a brave resistance, in a battle on the same plain where eighteen years before he had won a glorious victory, in the neighborhood of Vienna, August 26, 1278. See Lorenz, *Geschichte König O.'s II.* (Vien. 1866).

OT'WAY, CAPE, a bold headland, forming the S.W. extremity of the colony of Victoria, and the first land usually made by vessels bound to Port Phillip. It is situated in 38° 52′ S. lat., 143° 33′ E. long., and is crowned by a lighthouse.

O'VAR, a town of Portugal, province of Beira, at the mouth of a river of the same name, and on the lagoon of Ria d'Aveiro. It has a good trade and valuable fisheries. Pop. 10,374.

O'VEN BIRD (*Furnarius fuliginosus*), a species of Insessorial birds, so named from the peculiar shape of their nests, which are constructed in the form of a dome, the walls being fully an inch in thickness. The nest is formed of clay, grass, and vegetable fibres, packed so as to form a thick dense structure, which is usually placed in some exposed situation. These birds lay four eggs, and both sexes appear to assist in the formation of the nest. The plumage of these birds is of sombre color. They inhabit S. America.

OV'IDUCT, the name given to the canal leading from the ovary of animals to the *uterus*, or to the external surface of the body, and through which the eggs or *ova* are conveyed. In *Mammalia* the oviducts are named 'Fallopian tubes,' after the anatomist Fallopius, who first described them.

OVIPOS'ITOR, one of the appendages of the last abdominal segment of certain insects, used for the purpose of depositing the eggs in various situations. Other modifications of the terminal appendages form the 'sting' (*aculeus*) seen in bees, &c. The O. in all insects is formed on one and the same type. By the O. some insects (*e. g.*, gall-flies), slit open the bark of trees, and deposit their eggs therein, while others use the organ to penetrate into the tissues of animals for the same purpose.

OWEGO, in Tioga Co., N. Y., on the Owego River at its junction with the Susquehanna, 250 miles W. of New York. It is engaged in manufacturing and carries on an extensive lumber trade. Pop. 5526.

OWEN, Robert Dale, an American author, born at Glasgow, Scotland, Nov. 7, 1801, educated in Switzerland, and came to America, with his father, in 1823. In 1828 he, with Frances Wright, founded *The Free Inquirer*, a socialistic, irreligious paper. He was an active advocate of emancipation, and in 1863 was made chairman of the American Freedmen's Commission. Among his published works are the following: *Outlines of the System of Education at New Lanark* (1824), *Moral Physiology* (1831), *Hints on Public Architecture* (1849), *Footfalls on the Boundary of Another World* (1860), *The Wrong of Slavery and the Right of Freedom* (1864), *The Debatable Land between this World and the Next* (1872), and an autobiography in 1874. Died at Lake George, N.Y., June 24, 1877.

OWENSBORO, in Dairess Co., Ky., on the Ohio River, 40 miles above Evansville, Ind. It is connected by railroad with Nashville, Louisville, and other important places. It is an important steamboat landing, and is the principal shipping point for the Green-River country. The production of whiskey and tobacco is very large, there being nineteen distilleries and twenty-three tobacco factories in and around the city, which ranks as the largest tobacco and whiskey market in the West, and is one of the leading wood-working towns in the country. Pop. 11,500.

OZANAM, Antoine Frederic, a Frenchman of a singularly pure and earnest character, was the son of a physician, and was born at Milan, April 23, 1813. His father subsequently removed to Lyon, where O. was educated. In 1831 he published *Reflexions sur la Doctrine de Saint Simon*, went to Paris in the following year to study law, and was brought into relation with Chateaubriand, Ampère, Ballanche, Montalembert, and Lacordaire. Along with some other students, he founded (1833) a religious and charitable association which afterwards became the 'Society de Saint Vincent de Paul.' In 1839 appeared his *Dante et la Philosophie Catholique au XIIIe Siècle*, which is considered one of his finest works. After filling for a short time a chair of commercial law at Lyon, he was called at the close of 1840 to assist Fauriel at the Sorbonne in the chair of Foreign Literature, and was made professor in 1844. His career was a brilliant success. Gifted with a rare talent for exposition, both critical and poetic; rich in knowledge, and original in thought; of a sympathetic heart; winning in manner, and chaste in ethics, he drew crowds of admiring auditors, and inspired them for the time with something of his own exalted enthusiasm and religious faith.

Withal, he was a robust Liberal in politics, and never wavered in his hatred of despotism and his hope for democracy. Even the miserable Revolution of 1848 did not discourage him. He died of consumption at Marseille, September 8, 1853. No finer embodiment of the Christian character has appeared in modern France. Among his other works may be mentioned *Études Germaniques pour servir à l'Histoire des Francs* (Par. 1847–49); *Documents inédits pour servir à l'Histoire d'Italie depuis le VIIIe. jusqu'au XIIIe. Siècle* (Par. 1850); *Les Poëtes Francisicans en Italie au XIIIe. Siècle* (Par. 1852). His *Œuvres Complètes* were published at Paris (8 vols. 1855). See Montrond, *Fr. Ozanam. Tableau Historique et Biographique* (Lille, 1869), and Kathleen O'Meara, *Frédéric Ozanam, Professor of the Sorbonne; his Life and Works* (Edinb. 1877).

OZO'CERITE, or OZO'KERITE (Gr. *ozo*, 'I smell,' and *keros* 'wax') is a native mineral wax or paraffin found in sufficient abundance to be of commerical importance in Moldavia and Galicia. It is of a dark greenish brown color, sub-translucent, soft, and waxy, and can be kneaded in the hand. When purified it forms a hard paraffin, having a high melting point, which has been utilized in candle-making. O. is found in small nodular masses at Uphall in Linlithgowshire, and at Urpeth Colliery, near Newcastle-on-Tyne; but these deposits are of no commercial importance.

P.

PACINI, Giovanni, an Italian composer, son of Luigi P., the famous bass buffo-singer of Syracuse, was born 11th February 1796, studied at Rome, Bologna, and Venice, in the last of which cities he brought out the first of his 90 operas, *Annetta e Lucinda*, at the age of eighteen. For thirty years he was Director of the Conservatorio at Viareggio, near Lucca. Among his best operas are *Saffo*, *L'Ultima Giorno di Pompeia*, and *Medea*. He was deficient in originality, imitating alternately Rossini, Bellini, and Donizetti. P. died December 6, 1867, leaving an interesting book of *Memoirs*.

PACU'VIUS, Marcus, a Roman dramatist, the nephew of Ennius, was born at Brundusium about 220 B.C., lived at Rome, where he earned his bread as a painter and actor, and died at Tarentum, having nearly attained the age of ninety. His dramas, modeled on those of Sophocles and Euripides, but less slavishly than was the case with his predecessors, were held in high esteem by his contemporaries and by the later Romans. The fragments still extant have been collected by Ribbeck in his *Tragicorum Latinorum Reliquiæ* (Leips. 1852).

PADDLEFISH (*Spatularia* or *Polyodon Spatula*), a peculiar species of *Ganoid* fishes, belonging to the *Sturionidæ* or sturgeon family. The snout is long and flattened, while the body is smooth and destitute of the hard bony plates and scales so typical of other members of the sturgeon family. The P. inhabits several N. American rivers.

PADDOCK, Benjamin Henry, a Bishop of the Protestant Episcopal church in America; born in Connecticut, educated at Trinity College, Hartford; was rector of churches in New York City, Norwich, Conn., Detroit, Mich., and Brooklyn, N. Y., and in 1873 was made Bishop of Massachusetts.

PAER, Ferdinando, an Italian composer, was born at Parma, 1st June 1771. In his fifteenth year he produced the opera of *Circe* at Venice, where he completed his musical education. In 1801 he was appointed chapel-master to the Elector of Saxony at Dresden, where he composed several operas—*Leonora*, *Camilla*, *I Fuorusciti*, &c.—which were performed with brilliant success. After the battle of Jena he became conductor of the chamber music and composer to the Emperor Napoleon, and took up his residence for the remainder of his life at Paris. In 1810 he produced his *chef d'œuvre*, *Agnese*. For three years (1823–26) he was director of the Italian opera in the French capital. P. died 3d May 1839.

PAHARIAS, an aboriginal tribe in British India, inhabiting the hills of Rajmehal, overlooking the Ganges, in the Bengal district of the Sonthal Pergunnahs, number about 70,000. Ethnologically they are important, as their language proves them to be the most northerly colony of the Dravidian races, whose home is in S. India. See Colonel Dalton's *Descriptive Ethnology of Bengal* (Calcutta 1872).

PAINT'ED LA'DY (*Cynthia Cardui*), a well-known species of *Lepidoptera*, or butterflies, common in the S. parts of England in summer.

PALÆOLITH'IC (Gr. *palaios*, 'old,' and *lithos*, 'a stone'), the name applied to the races of men that existed in the Postpliocene age. The absence of metals and the presence of stone implements in deposits of this age indicate a very primitive state. P. man was a contemporary of the mammoth and other species of extinct mammals.

PALÆ'OPHIS (Gr. *palaios*, 'old,' and *ophis*, 'a serpent'), a genus of serpents, the fossil remains of which are found in rocks of Tertiary age in the United States, and in rocks of a similar age in England. *P. typhæus* occurs in the Eocene beds of Brackleshan. Another species (*P. toliapicus*) has been found in the London clay of Sheppey, and is the oldest known example of a fossil snake.

PALÆOP'TERIS (Gr. *palaios*, 'old,' and *pteris*, 'a fern'), a genus of fossil ferns, highly characteristic of the Carboniferous period. P. was one of the so-called tree-like or arborescent ferns, and presents, along with such genera as *Caulopteris* and *Psaronius*, a striking resemblance to the tree-ferns found in New Zealand at the present day.

PALAMPORE, a town in the district of Kangra, Punjaub, British India, among the lower slopes in the Himalayas, 317 miles S. by mountain passes from the commercial center of Leh in Cashmere. A fair was established here in 1867, to develop local trade and promote intercourse with Central Asia. In November 1871 it was attended by Lord Mayo. 30,000 people are sometimes present, and goods sold to the value of $150,000. English cloth, metal ware and ornaments are exchanged for shawl wool, ponies, borax, musk, and gold. P. is also a center of tea-planting industry under European supervision.

PALAY' is an Indian name for *Cryptostegia grandiflora*, a twining shrub, belonging to natural order *Asclepiadaceæ*, and a native of Hindustan. It abounds in a milky juice, which, when exposed for a short time to the sun, is converted into caoutchouc. The stem yields a very fine strong white fibre.

PALGHAUT', a town in the district of Malabar, Madras Presidency, British India, 332 miles S.W. of Madras by rail, and 74 miles from the W. terminus of the railway at Beypore. Pop. (1871) 30,752. It occupies an important position, commanding the only pass across the steep range of the W. Ghauts, and contains a strong fort built by Hyder Ali; but is now best known for the export of timber, chiefly teak, and its transit trade.

PALINU'RUS, a genus of *Decapodous* crustacea, including the *P. vulgaris* or Spiny Lobster, frequently exposed for sale in the markets under the name of 'sea cray-fish.' It has a spiny carapace or shell, with three prominent spines in front. The members of the family *Palinuridæ*, of which P. is the type, are distinguished by their long and cylindrical body. The outer antennæ is very long and thick, and its basal joint is large. The walking feet are terminated by a single claw, and the sternal plate is wider than in the common lobster. The claws are not large. Its flesh is palatable, but is reckoned somewhat coarser than that of the lobster. An average specimen will weigh 4 or 5 lbs. and attain a length of from 16 to 18 inches. Its color is a purple brown beautifully variegated with lighter spots and markings. *P. ornatus* is a species which may attain the enormous length of from 3 to 4 feet.

PALLISER, Lieut.-Colonel Sir Wm., fifth son of Colonel Wray Palliser of Comragh, Waterford, Ireland, was born at Dublin, June 18, 1830. After leaving the Staff College, Sandhurst, he obtained a commission as ensign in the Rifle Brigade in 1855, and was transferred to the 18th Hussars in 1858. He retired from the army in 1871. He was knighted June 21, 1873, and received the Cross of the Commander of the Crown of Italy in March 1875. He is the author of many improvements in fortifications, the arming of ironclads, &c., but is best known as the inventor of the projectiles and guns which bear his name. The Palliser projectiles now used in the British navy and fortifications were a vast improvement in economy and efficiency on anything previously designed for piercing armor-plated ships. An immense quantity of old smooth-bore cast-iron guns were converted by a simple process invented by Sir W. P. into rifled compound guns, and are known as 'P. guns.'—John P., eldest brother of the preceding, born in 1817, has earned a name as an active and enterprising explorer. He published the *Solitary Hunter, or Sporting Adventures in the Prairies*, an account of travels in North America in 1853. He had command of a British expedition to the Indian country in 1856–57, and was a boundary commissioner in fixing the line of division between British North America and the United States from Lake Superior to the Pacific in 1857–60. His report on the topography and resources of the region was published in 1861.

PAL'MAS CAPE, a low headland on the coast of Northern Guinea, in 4° 21′ N. lat., 7° 44′ W. long. The anchorage on its E. side is the best on the Guinea coast.

PALMER, a town of Hampden Co., Mass., 15 miles from Springfield. It has two railroads, and is largely interested in manufacturing. Pop. 5504.

PALMER, Erastus Dow, an American sculptor, born in N. Y., in 1817. His best known works are 'The Landing of the Pilgrims,' 'The Sleeping Peri,' and 'The White Captive.'

PALM'ER, Edward Henry, an Oriental scholar, born at Cambridge, August 7, 1840, entered St. John's College, and graduated B.A. (1867). He served on the Survey Expedition to

Sinai (1868–69) and to Moab (1869–70), was appointed Lord Almoner's Professer of Arabic in the University of Cambridge (1871), and was called to the bar (1874). Among his numerous works are *The Negeb, or S. Country of Scripture* (1871), *The Desert of the Exodus* (1871), a *Persian Dictionary* (1875), and verse translations of *The Poetical Works of Beha-Ed-Din Zoheir of Egypt* (1877). *The Song of the Reed* (1877), &c.

PALMER-FLIES form well-known flies used as bait by anglers, and especially in summer in trout-fishing.

PALMER, RAY, D.D., an American clergyman and hymn-writer, born at Little Compton, R. I., Nov 12th, 1808, and graduated from Yale College in 1830. He is the author of many favorite hymns, and is at present (1884) pastor of a Congregational Church at Newark, N. J.

PALO ALTO, BATTLE OF, fought May 8, 1846, in the southern extremity of Texas, near Matamoras, between a Mexican army, commanded by Gen. Arista, and U. S. forces under the command of Gen. Taylor. The Mexicans numbered 6,000, while Taylor had with him only 2,300 men. After five hours' fighting, the Mexicans were driven from the field. The losses on both sides were slight.

PALUDAN-MÜLLER, FREDERIK, was born at Kjerteminde in Zealand, and educated at the Cathedral-school of Odense and at Copenhagen University. His first works, *Fire Romancer* (1832), and *Kjærlighed ved Hoffet*, had already considerable success, when the beautiful poem *Danserinden* (1833) gave him the high place he afterwards maintained by *Amor and Psyche* in 1834, and from 1835 to 1838, when he traveled to Italy, by *Zuleimas Flugt*, *Eventyr i Skoven*, *Alf og Rose*, *Trochœr og Iamber*, *Fyrste og page*, *Beatrice*, *Vestalinden*, and *Slaven*. The latter year closed his first or 'æsthetic period,' while the drama *Venus* (1841), and the first part of his greatest poem, *Adam Homo* (1841–48), appearing after his return, are the expression of his second or 'ethical period.' Two mythological poems, *Tithon* and *Dryadens Bryllup*, lead on to the third, or 'religious-speculative' period, whose chief works were *Luftskipperen og Atheisten* (1852), *Kalanus*, *Paradiset*, *Abels Död*, *Kain eller Vredens Barn*, *Ahasverus*, and *Benedict og Hans Amme*. *Ivar Lykkes Historie*, the comedy *Tiderne Skifte* (1874), and the poem *Adonis* (1874) were his last works. He died 28th Dec. 1876. P.-M. is one of the greatest of Danish poets. His characteristics are a high moral earnestness, a richly developed power of reflection, and transparent clearness of style.

PALUDI'NA, a genus of *Gasteropodous* Mollusca, forming the type of the family *Paludinidæ*, in which a conical or globular shell exists with a rounded and entire or unbroken aperture. The *Operculum* is horny or shelly. These gasteropods are inhabitants of fresh or brackish waters. P. is represented by living species, of which *P. vivipara* is a good example. The fossil representatives of the genus begin in the Jurassic or Chalk formations.

PAM'PHILUS, one of the most famous artists of ancient Greece, the founder of its most celebrated school of painting, and the instructor of Apelles, was born at Amphipolis, and flourished in the middle of the 4th c. B.C. In the school of P. the course of study, which embraced drawing, arithmetic, geometry, anatomy, and painting, extended to ten years.

PAMPLONA, the chief town of the province of Navarre, in N. Spain, 40 miles S.S.W. of San Sebastian, with which it is connected by rail, and 19 from the French frontier. Situated in a fertile plain 30 miles in circumference, on the left bank of the Arga, a tributary of the Ebro, on an eminence 1378 feet above the sea, it is strongly fortified, and has a citadel founded by Philip II. Though very uneven, the town is finely built, has three squares, of which Plaza del Castillo is the finest, an Episcopal palace and a Gothic cathedral founded in 1397 by Carlos III. of Navarre, and containing the graves of the kings of Navarre. P. has a medical school, a college with a library and botanic garden, a casa de esposítos ('foundling hospital'), a theater, and a plaza de toros ('bull arena'), the largest in Spain, capable of holding 10,000 people. There is some trade in wine, leather, linen, wax, and guitar-strings. Pop. 22,896. P., the ancient Pompeiopolis, was taken by the Goths in 466, and by Karl the Great in 778. Its Moorish conquerors corrupted the Roman name to Bambloua, whence the modern P. It was taken by the French in 1808, but surrendered to the Duke of Wellington after the Battle of Vittoria, in 1813.

PANACHE (Fr., Old Fr. *pennache*, Ital. *pennachio*, from Lat. *penna*, 'a feather'), in Heraldry, a plume of feathers placed upright in front of the helmet, and so arranged as to form a crest.

PAN'FISH, a name applied to a species of king crabs (*Limulus cyclops*) found in the E. Indies, where it is also known as the 'sancepan crab.' When limbs and tail have been removed, the buckler-shaped body or shell presents some slight resemblance to a sancepan.

PANN'US, or VAS'CULO NEB'ULOUS COR'NEA, is a vascular state of the cornea, with thickening of its epithelium, the result of chronic inflammation. Idiopathic P. is the result of corneitis, and the vascularization of P. differs from other forms of vascularity in that the vessels proceed to the cornea from the conjunctiva and ramify upon the cornea in an irregular manner, with considerable intervals between them, the internal surface of the eyelid being smooth and natural. The blood-vessels of P. are also derived from those of the sclerotica, and they may pervade the whole of the lamellated tissue of the cornea to such a degree as to render it almost impervious to light.

PANTOP'ODA, a division of *Arachnida*, represented by the 'sea-spiders' belonging to the genus *Pycnogonum*, of which *P. littorale* is a familiar species. These animals are notable from the fact that the digestive system extends into the legs, of which there are four pairs. The abdomen is rudimentary, and there are no specialized breathing-organs. The sexes are distinct.

PARADOX'IDES, a well-known genus of *Trilobites*, forming the type of the family *Paradoxidæ*, the members of which have long bodies, the segments of the thorax or chest being free, and numbering from eight to twenty-three. The caudal or tail-shield is small. Some of the largest of the trilobites belong to this group. Its members are chiefly found as fossils within the well-known 'primordial zone' of the Upper Cambrian rocks.

PARADOX'URE (*Paradoxurus typhus*), a species of *Carnivorous* quadrupeds allied to the *Viverridæ* or weasels, &c., and found in India. The common P., or luwack as it is named, is a familiar Indian species, as is also the musang (*P. musanga*) of Java. The luwack is of a dingy yellow color, spotted with black. The tail is long and is capable of being closely coiled or twisted. The musang is noted for its ravages on rats and mice, but it also feeds on berries and fruits.

PAR'ALLEL, a term of extensive application in geometry. According to Euclid, P. lines are straight lines which are in the same plane, and which being produced ever so far both ways never meet. Similarly P. planes are planes which extended ever so far in any direction never meet. Such planes have evidently the same normal; and the definition that P. planes are such as have the same normal can be applied to any curves or surfaces. Generally, then, P. curves or surfaces are any curves or surfaces which have the same system of normals. Concentric circles or spheres form a P. system; also confocal ellipses and ellipsoids, and all involutes of a common evolute. To the mathematician such a conception of parallelism presents no difficulty. At the very beginning of the study of P. lines, however, there is a peculiar difficulty, to surmount which has been the endeavor of many famous geometers. The difficulty is not one of conception but one of demonstration—to pass, namely, from the definition to the proposition that a line falling upon two P. lines is equally inclined to both. To prove it, Euclid was forced to assume as an axiom that, 'if a straight line meet two straight lines so as to make the interior angles on the same side of it less than two right angles, these straight lines being continually produced will at length meet on the side on which the angles are which are less than two right angles.' This, however, is as much a proposition as the seventeenth in the First Book, of which it is the converse, and is therefore not a self-evident truth. Later geometers—Wolfius, Boscovich, Simpson, &c.—have substituted for it other axioms; but these also are open to the same objection, and are more fitly called postulates. Legendre has met the difficulty by establishing the whole theory of P. upon the proposition that the three angles of a triangle are together equal to two right angles. In Euclid this proposition depends for its demonstration upon the previous propositions respecting parallels; consequently Legendre was compelled to prove it by a totally different method. This demonstration is exceedingly refined and subtle, but for that very reason is not admissible into books on elementary geometry.

PARAMŒ'CIUM, a familiar genus of *Infusorian* animalcules, popularly, and from its shape, described as the 'slipper-animalcule.' It is a typical member of the infusorian group, and is found in stagnant water and amidst organic infusions. The *cilia* fringing the body can be well seen in P. *P. bursaria* and *P. aurelia* are familiar species.

PAR'ASOL (Fr. *parasol*, Ital. *parasole*, from *parare*, 'to ward off,' and *sole*, 'the sun'), a small umbrella carried by ladies as a shade from the sun's rays. Sunshades of larger dimensions than those of the present time are of great antiquity. The primitive civilized nations of the East regarded the P. as an emblem of royalty or high nobility, in the same way as the umbrella is now used as a canopy of state among certain barbarous races. The P. was esteemed an article of luxury in ancient Greece and Rome, a lady always having a female slave in attendance carrying the shade. Coryat, the English traveler, mentions the use of the P. in Italy early in the 17th c., and probably it soon thereafter extended to France and England. It is supposed that the P. owes its origin to the practice of the Aryan nations carrying boughs at festivals; the Feast of Tabernacles affords an example of a simi-

lar Jewish custom. The symbolism of these shady boughs is obscure, but probably they had some connection with a sun-myth, and may have typified the death of the sun in the shades of night.

PARASU-RAMA ('Rama with the axe') is the sixth incarnation or avatar of Vishnu, described in the Bhagarata Purana. In this character Vishnu undertook the complete extirpation of the Kshatriya or warrior caste, who were arrogating dominion over the Brahmins.

PARATI or PARATY, a thriving seaport of Brazil, situated on the Bay of Angra, at the mouth of the river of the same name, 90 miles S.-W. of Rio de Janerio. Pop. 10,000.

PARBUTTI (Párvatí='mountain-born') a popular name in India for the goddess Kali or Durgah, the wife of Siva, who is the daughter of the Himalaya Mountains.

PARK, EDWARDS AMASA, D.D., LL.D., an American theologian, born at Providence, R. I., in 1808, and educated at Brown University and Andover Seminary. After serving for a brief period as pastor of a church in Massachusetts, he became professor of Christian theology at Andover, which position he has since held. He is a keen logician and profound thinker.

PARKE, JOHN, an English musician, born in 1745, died in 1829, was celebrated as the best oboe player of his time. His brother, William Thomas P., was an eminent performer on the same instrument.

PARKER, JOHN HENRY, C.B., F.S.A., son of a London merchant, was born in 1806. After being educated at Dr. Haines' school, Chiswick, he entered the book trade in 1821, and in 1832 succeeded to the business of his uncle, Mr. Joseph P., at Oxford. He has devoted himself chiefly to the study of architecture, on which subject he has published some important works. In 1869 he was appointed by the University of Oxford keeper of the Ashmolean Museum, with a salary of £250, further supplemented by a grant of £200, to assist him in prosecuting the excavations which were (1878) being carried out at Rome under his superintendence. He has also been created an honorary M.A. of Oxford. His principal works are *Glossary of Architecture* (3 vols. 1836); *Introduction to the Study of Gothic Architecture* (1849); *Domestic Architecture of the Middle Ages* (3 vols. 1853–59); *Archæology of Rome* (Parts i.–xi., 1874–77).

PARKER, WILLARD, M.D., LL.D., an eminent American physician, born at Lyndeborough, N. H., Sept. 2, 1800, and graduated from Harvard College in 1826. He served as professor of anatomy in the Vermont Medical College, in the Berkshire Medical College, and from 1839 to 1869 was professor of surgery in the New York College of Physicians and Surgeons. In 1869 he became professor of clinical surgery in the same institution. He first reported and described what is known as malignant pustule. Died at New York, 1884.

PARKER'IA, a genus of *Foraminifera*, found in a fossil state in the Upper Green Sand of the Chalk series. It is interesting from its large relative size, a diameter of two inches being common. Its shell was *arenaceous*, that is, it contained sandy particles as elements in its formation.

PARKERSBURG, a town of Wood Co., W. V., on the Ohio and Little Kanawha rivers, 96 miles below Wheeling. It has two railroads; is engaged in oil refining, manufacturing, and trade; and is the second city of West Virginia in point of population and business importance. Pop. 6582.

PARK'ESINE (named after the inventor, Mr. A. Parkes of Birmingham, England), a factitious material, fluid, plastic, or perfectly hard, procured originally from a solution of gun-cotton, and afterwards from cotton, tow, and similar waste substances, by an undivulged process. As it resists the action of the atmosphere or acids, it was proposed to employ P. as a substitute for guttapercha in its various applications in telegraphy and otherwise, and for ebonite in making combs, knife-handles, &c., but it has never come into commercial competition with either of these substances.

PARKMAN, FRANCIS, JR., an American author, born at Boston, Mass., in 1823, and was educated at Harvard College. Most of his life has been spent in Boston, and he has devoted himself largely to a critical study of the career of the French in America. He has published *Pioneers of France in the New World; The Jesuits in North America; The Discovery of the Great West;* and *The Old Régime in Canada.*

PARNELL, THOMAS, an English poet whose reputation surpasses his merit, was born in Dublin in 1679, studied at Trinity College, took holy orders in 1700, and was made Archdeacon of Clogher in 1705. At first a Whig, he joined the Tories towards the close of Queen Anne's reign, obtained a prebend by the help of Swift, and in 1716 was made vicar of Finglass. The death of a charming wife induced habits of intemperance, and P. died at Chester, July 1717, at the early age of 38. In 1722 his friend Pope published a collected edition of his *Poems*, not one of which except the *Hermit* now survives in any human memory, and it is amazing that *it* should survive.

PARNELL, CHARLES STEWART, born in Ireland, in 1847, and educated at Cambridge, England. He was one of the promoters of the 'Irish Land League,' and in parliament has labored arduously for the amelioration of the condition of the Irish people. He visited the United States in 1880, but failed to arouse any extended interest.

PARROTT, ROBERT PARKER, born at Lec, N. H., in 1804, graduated from West Point, and entered the army. He is principally famous as the inventor of the gun which bears his name, and which was used with great effect during the civil war.

PARSONS, a town of Labette Co., Kansas, 49 miles from Fort Scott. It has five railroads, and is surrounded by a flourishing agricultural community. Pop. 7000.

PAR'SONS, ROBERT, born at Nether Stowey in Somersetshire, England, June 24, 1546, passed from Taunton free-school to St. Mary's Hall, Oxford, and became a fellow and tutor of Balliol College. In 1574 he studied law and medicine at Louvain and Padua, at Rome became a convert to Catholicism, and entered the Society of Jesus, July 4, 1575. He came with Campian to England in 1580, and after a year of infinite perils, only escaped that martyr's fate by taking refuge in Normandy, where he founded an English School at Eu (1582). As rector of the English College at Rome (1587) P. labored from afar for England's conversion, pouring forth a flood of controversial tracts, and making several journeys to the Spanish Peninsula, where he founded the colleges of Valladolid (1589), Lucar (1591), Lisbon and Seville (1592), besides St. Omer's in France (1593). He died at Rome, April 15, 1610. Among the pseudonymous writings ascribed to P. are *A Brief Discourse containing the Reasons why Catholics refuse to go to Church* (Douai, 1580), *The Book of Resolution, or Christian Directory* (Rouen, 1581), *Treatise of the Three Conversions of Paganism to the Christian Religion* (3 vols. St. Omer, 1603–4), &c.

PARSONS, THEOPHILUS, born at Newburyport, Massachusetts, February 24, 1750, graduated at Harvard (1769), was called to the bar (1774), and commenced legal practice at Newburyport (1777). As a member of the 'Essex Junto,' he published the famous *Essex Result* (1778), a pamphlet upholding the constitutional doctrines of the New Englanders, and he was one of the framers of the Constitution of 1779. He removed to Boston (1800), became chief-justice of the supreme judicial court (1806), and died October 30, 1813. A Memoir of him has been published (Bost. 1859) by his son, THEOPHILUS P., who was born at Newburyport, Massachusetts, May 17, 1797, graduated at Harvard (1815), and after a tour in Europe and some years' legal practice at Taunton and Boston, was appointed Dane Professor of Law in Harvard College (1847). He is author of treatises on mercantile and maritime law, on marine insurance, and on promissory notes, of *Deus Homo* (1867), *The Infinite and the Finite* (1872), and other theological works in support of Swedenborgianism, and *The Political, Personal, and Property Rights of a Citizen of the United States* (1875). Died 1882.

PARTIAL PAYMENT. No one is bound to accept P. P. of a debt. But a creditor in two or more separate debts, cannot refuse to accept payment of one of these, though the creditor decline to pay even the interest of the others. The holder of a bill is not bound to take payment of a smaller sum than the bill carries; but he is entitled to take a P. P. from the acceptor without cutting off his recourse against the other parties, provided he protest the bill, in so far as it is not paid, and in other respects duly negotiate the bill.

PAR'TIZAN (Fr. *pertuisane*), a kind of halberd, introduced into warfare during the reign of Edward IV., and restricted to the use of body-guards about the close of the 16th. c., when it was usually richly engraved. The blade was long and double-edged, with two lateral projections curving upwards instead of the axe.

PARTON, JAMES, born in England, in 1822, and came to New York when a child. He at first taught, but eventually turned his attention to literary pursuits, and soon attained success. The following are among his chief works: *Life of Horace Greely; Life of Aaron Burr; Life of Andrew Jackson; Famous Americans;* and *Caricature and the Comic Arts.*

PARTON, SARA PAYSON (*née* Willis), born in Maine, in 1812. She wrote numerous articles and sketches for the *New York Ledger*, under the *nom de plume* of 'Fanny Fern.' She also published several novels. In 1856 she married James Parton (her third husband), and spent the remainder of her life in New York. Died in 1872.

PASHMI'NA, the trade name for the shawl-wool of Turkestan and Central Asia, which is exported to a considerable extent by native traders, to be woven in the towns of Cashmere and the Punjaub. In 1875–76 the registered imports into the Punjaub were valued at $1,020,000, showing a decrease on the preceding

year; and it is officially stated that the trade is declining, owing to the absence of demand in Europe.

PASSAIC, in Passaic Co., N. J., on the Passaic River and the New York, Lake Erie & Western and other railroads, 11 miles from New York City. It is extensively engaged in manufacturing. Pop. 6532.

PASSION MUSIC is music illustrative of the Passion of Our Lord as narrated in the Gospels. In the Roman Catholic Church from an early period it was usual to assign the recital of the Gospel of the Passion during Holy Week to a number of different priests who intoned the words of Jesus, Pilate, the High Priest, &c., and the words of the people (turbae) to the congregation or choir. From this custom the Passion-plays, so popular during the Middle Ages, and the German P.M., seem alike to have sprung. After the Reformation, original compositions were introduced into the P.M. of the Lutheran Church instead of the traditional church tones, and such pieces of music were made suitable for performances at other times and places than at particular services in the church.

The oldest known version of P. M., printed at Wittenberg, in 1573, with recitatives and four-part choruses, has been attributed to Antonio Scandell. Heinrich Schütz was the inventor of the feature of a reflective chorus, and Johann Sebastian (about 1672) introduced orchestral instead of organ accompaniments. At the beginning of the 18th c. Keiser utilized original libretti instead of the Gospel narratives for his P. M., *Der Blutige und Sterbende Jesus*, &c., and adopted the 'soliloquia,' a frequent reflective and recitative passage, in which he was followed by Telemann, Handel, and Johann Sebastian Bach. The last-named great master in his two works on the Passion according to St. Matthew and St. John, the most sublime compositions of this kind, made effectual use of the chorale; and selecting simple hymn tunes as his basis, which he grandly harmonized, pressed into his service the voices of the entire congregation. The harmony of the small choir was enforced with the accompaniment of organ and orchestra. It is not customary now, however, in Germany, for the congregation to take any part in the music; and, in the London performances of Bach's works, the singing of the chorales by the choirs, without any instrumental accompaniment, has been found admirable and effective.

PAS'TORAL (in Music), a simple melody of a P. style, usually in $\frac{6}{8}$ time. The term is also applied to music intended to depict P. scenes and incidents.

PATRONS OF HUSBANDRY, a secret society, organized in the U. S., in the year 1867, for the promotion of the best interests of agriculturists. Its origin was the result of the depression that followed the civil war, and which rested very heavily upon the farming interests. The order is thoroughly organized, and in its inner workings, is patterned after Masonry and the ritual of the Odd Fellows. The association is strong in many of the western states, but it has never secured much of a footing in the New England or Middle states.

PATTENS (Fr. *patin*, 'a clog,' 'a high-heeled shoe'), a name applied so early as the 14th c. to wooden shoes, and used in the 17th and 18th centuries to denote the sandals or shoes of wood, having iron rings on the soles, worn by ladies during wet weather. These are still common in country parts of England.

PATTESON, John Coleridge, D.D., born in London, England, April 1, 1827, passed from Eton to Balliol College, Oxford, gained a Merton fellowship (1850), and was ordained to the curacy of Alphington (1852). In 1854, he accompanied Bishop Selwyn to New Zealand, where he labored as a missionary till 1861, when he was consecrated Bishop of Melanesia. The next ten years of his life were spent in cruising among the islands that formed his diocese, in efforts for their improvement, and above all in striving to check the kidnapping of natives to supply the Queensland labor market. This infamous traffic caused his death, for landing in Santa Cruz, he was murdered by the infuriated natives, September 20, 1871. See Miss Yonge's *Life of Bishop P.* (2 vols. Lond. 1874).

PAUCHON'TI or PAUL'EY TREE, are respectively the Malay and Tamul names for *Isonandra acuminata*, a large E. Indian tree brought under the notice of the British Government in 1857 by Dr. H. Cleghorn as likely to prove of considerable economic value. It has a close affinity to *I. gutta*—the gutta-percha tree of commerce—yielding, like it, a non-conducting gum elastic. The trunk rises to an immense height without branching, and the hard, tough wood proves useful in carpentry, &c. It is common in the densely-wooded tracts of Coorg and the Cochin territories.

PAU'ER, Ernst, composer and pianist, was born at Vienna, December 21, 1826. A son of the great Mozart was among his teachers. While Director of Music at Mainz (1847–51), he composed several works, including the operas *Don Riego* and the *Masques Rouges*, and several concertos for the pianoforte. In 1851 he removed to London, England. His opera *La Fiancée* was produced at Mannheim in 1861. P. gave six lectures with musical illustrations in chronological order at Willis' Rooms in 1864, and is well known throughout Great Britain as a lecturer and pianist. He has published many sonatas, tarantellas, valses, songs, &c., among his most popular pieces being *Pensées Fugitives* (1854), two Hungarian melodies for the pianoforte (1865), *Recollections of Meyerbeer* (six transcriptions, 1867). He has arranged and edited the works of many classic composers: Beethoven's *Overtures* (1856) and *Symphonies* (1868); Weber's *Complete Pianoforte, Works* (1872); *The Schumann Album* (1872); Chopin's *Nocturnes. Mazurkas.* and *Valses* 1872–74; 32 *Songs*, and the *Complete Pianoforte Works of Schubert* (1874); *The Complete Works of Mozart* (1874), &c. P. is the author of a primer on the *Pianoforte* (Novello, Ewer, & Co. 1878).

PAUL'DRONS, in armor, were plates introduced early in the 15th c. to protect the shoulders. They sometimes had passguards, or ridges to ward off the blow of a lance, attached.

PAU'LI, Georg Reinhold, a German historian, was born at Berlin, May 25, 1823, and studied at the universities of Berlin and Bonn. He visited England in 1847 to prosecute historical researches in the Scotch and English libraries, and from 1849 to 1852 held the post of private secretary to Baron Bunsen, then Prussian ambassador at the English court. Returning to Bonn (1855), he was successively apointed Professor of History at Rostock (1857), at Tübingen (1859), at Marburg (1867), and at Göttingen (1870), his removal from Tübingen being due to an attack on the Würtemberg Government, published by him in the *Preussische Jahrbücher* (August 1866). P. is author of *König Alfred und seine Stellung in der Geschichte Englands* (Berl. 1851; Eng. trans. 1852), a continuation of Lappenberg's *Geschichte Englands* (vol. iii.–v. Gotha, 1853–58), *Bilder aus Altengland* (Gotha, 1860; 2d ed. 1876; Eng. 1861), *Geschichte Englands seit den Friedenschlüssen von* 1814 *und* 1815 (3 vols. Leips. 1864–73), *Simon von Montfort* (Tüb. 1867; Eng. 1876), *Aufsätze zur Englischen Geschichte* (Leips. 1869). P. has also edited with great care and critical acumen Gower's *Confessio Amantis* (3 vols. 1857).

PAULI'NUS, a follower of Augustine, the first missionary to the English, is memorable as the chief agent in the conversion of the Northumbrians to Christianity during the reign of Eadwine. The story of the great debate among the Northumbrian witan is one of the immortal passages in Bede. In 625 P. became Archbishop of York. On the overthrow of Eadwine at Hatfield, 633 A.D., by the combined forces of Penda, the heathen king of Mercia, and Cadwallon the Welsh prince, P. left the North and returned to Kent, where he was made Bishop of Rochester, and where he died, 10th October 644. The restoration of Christianity in Northumbria was due to the zeal of Iona, and not of Canterbury. Bede's *Hist. Eccl. Gent. Angl.* (Moberly's ed., Macmillan & Co., 1869); Green's *History of the English People.*

PAULL'US, Lu'cius Æmil'ius, surnamed Macedon'icus, a distinguished Roman general, son of the consul of the same name that fell at Cannæ, was born about 229 B.C. In 193 he was appointed proconsul of the province of Further Spain, where he waged a war against the Lusitani, in which he was ultimately victorious. In 182 he was associated in the consulship with Cn. Baebius Tamphilus. When above sixty years of age, he was elected consul a second time 168, and intrusted with the command of an army in the war against Perseus, King of Macedonia, whom he completely defeated near Pydna on the 22d June of that year. P. arrived in Italy in 167, and was honored with one of the most splendid triumphs Rome had ever seen. His successes, however, were greatly embittered by the loss of his two sons, one of whom died only five days before, and the other three days after his triumph. P. died B C. 160. He was declared by a contemporary to be 'one of the few Romans of that age to whom one could not offer money.' See Plutarch's *Life of Æ. P.*

PAUMBAUM (*Pámbám*), a town in the district of Madura, Madras Presidency, British India, on the N.W. extremity of the island of Rameswaram, which runs out towards Ceylon to form Adam's Bridge across Palk Straits. Pop. (1871) with the adjacent town of Rameswaram, 9407. P. has given its name to the narrow channel by which coasting craft avoid the circuit of Ceylon. Since 1822 this channel has been under the care of Government; by convict labor it has been deepened 14 feet, and a lighthouse has been erected. P. is annually used by 2100 native vessels, with an aggregate tonnage of 174,000.

PAWN (*pan*, from Sanse. *parna* = a leaf), the aromatic leaf of the *Piper betel* or *Chavica betel*, which is universally chewed by the natives of India, acting as a carminative and antacid tonic. It is rolled round a few small pieces of the *Areca* or *supari* nut, with a little caustic lime, a few heads of spice, and sometimes a little catechu. Inclosed in gold paper, it forms a common present to guests, &c. The European term 'betel' is derived from the Bengali *bira*, a corruption of the Sanscrit *vitika*. Its cultivation, which is monopolized by a special caste, is highly remunerative,

though a large initial outlay is required on the *buruj* or P. garden, which is a kind of leafy hothouse.

PAWNEES, a tribe of American Indians, hereditary enemies of the Dakotas, formerly occupying Central Nebraska. They are superior physically to most Indians of the Plains, and at one time numbered 2000 warriors, but have been greatly reduced by wars with the Sioux. They removed to the Indian Territory in 1875.

PAYNE, JOHN HOWARD, an American actor, editor, and poet, born in New York, June 9, 1792. When still in his 'teens' he edited the *Thespian Mirror*, and subsequently *The Pastime*. In 1809 he made his appearance as an actor and met with success. He wrote several successful plays, published a volume of poems, and (1826–27) edited *The Opera Glass* in London. Payne is best known by his poem *Home, Sweet Home*, which, wherever it is sung, touches the tenderest chords in the human heart. It was written for one of his dramas, entitled *Clari, or The Maid of Milan*. Died at Tunis, Africa, where he had gone as U. S. consul, April 10, 1852.

PEABODY, a town of Essex Co., Mass., on the Eastern Railroad, two miles from Salem. It is engaged in tanning, currying, and the manufacture of morocco. Pop. 9028.

PEACOCK, THOMAS LOVE, born at Weymouth, October 18, 1785, was educated at Englefield, in Berkshire, and in 1801 commenced a course of independent reading at the British Museum. He went to Flushing as under-secretary to Sir Home Popham (1809), held an appointment at the India House (1819–56), and died at Shepperton, January 23, 1866. He was author of the poems *Palmyra* (1806) and *The Genius of the Thames* (1812), and of the novels *Headlong Hall* (1816), *Nightmare Abbey* (1818), *Crochet Castle* (1831), and *Gryll Grange* (1860). The lyrical beauty and fine comedy of his novels have charmed, as Shelley says, 'the chosen spirits of the time,' but their strain is 'too learned for a shallow age,' and their covert satire, disregard of plot, and strange blending of the Pantagruelic and Johnsonian elements, have rendered them *caviare* to the multitude. See H. Cole's edition of his collected works, with a memoir by his granddaughter, and a preface by Lord Houghton (1875).

PEALE, REMBRANT, an eminent American portrait-painter, born in Pennsylvania, Feb. 22, 1778. In 1801 he went to Europe, where he studied under West in London, and under the leading artists of France, in Paris. In 1809 he returned to Philadelphia, where he rapidly rose to distinction as a portrait-painter. Among his most celebrated works are *The Roman Daughter* and *The Court of Death*. Died at Philadelphia, Pa., Oct. 3, 1860.

PE'BA (*Tatusia peba* or *T. septemcinctus*), a species of Armadillo found in Guinea, Brazil, and Paraguay, and which may attain a length of thirty inches. The color is a brownish-black. The flesh is tender and palatable.

PE'COCK, REGINALD, born about 1395 in Wales, entered Oriel College, Oxford, of which he became fellow (1417). Ordained priest (1421), he received the mastership of Whittingdon College, along with the rectory of St. Michael-in-Riola (1431), was consecrated Bishop of St. Asaph (1444), and translated to the see of Chichester (1449). P. wrote in English several treatises against the Lollards, in which, however, he himself fell into heresy on the questions of infallibility, transubstantiation, and liberty of conscience. Accordingly, he was cited and condemned by the Archbishop of Canterbury (1457), and in spite of a recantation at Paul's Cross in the presence of 20,000 persons, was deprived of his see, and confined in the abbey of Thorney, Cambridgeshire, where he died about 1460. The best known of P.'s writings, *Repressor of overmuch Blaming of the Clergy* (1449), has been edited, with an Introduction, by Mr. C. Babington (2 vols. 1860).

PECU'LIUM, in Roman law, was that property which a slave, or a *filius familias*, could acquire with his master's or father's consent. It might be acquired in war, or in exercise of public duty, or of the liberal arts, or derived from a stranger, or from the father.

PEDES'TRIANISM, taken in its most general meaning, is the art of walking, running, or otherwise engaging in foot exercise. With the development of artificial and more speedy means of transit, P., as a mode of traveling, has fallen greatly into disuse, and consequently in the present day the word is understood nearly always to mean what might be distinguished as *professional* P. Just as we have our professional cricketers, oarsmen, swimmers, boxers, &c., so have we our professional pedestrians. The most popular and most prevalent form of P. is foot-racing, which has always held a high position as a training exercise amongst nations where athletics were practised.

For short races under half a mile speed is a great desideratum, but for long stretches of several miles speed is not of such importance as staying power. In 1861 various long races were held between Deerfoot, a Seneca Indian, and English and other champions. In these competitions the Indian showed to advantage, running 12 miles in 65 minutes 5 seconds. He was beaten, however, in 1863 by White, who ran 10 miles in 52 minutes 14 seconds. In walking feats we have another phase of P., which has excited considerable attention. The famous journeys of Powel, Barclay, and Manks have been excelled by the pedestrian triumphs of Weston, O'Leary, and Gale. In 1788 Richard Powell walked from London to York and back, a total distance of 400 miles in 140 hours. Captain Barclay, in 1809, undertook to walk 1000 miles in 1000 successive hours, and won in accomplishing his task a large wager. This feat was repeated with similar success by Richard Manks, a native of Warwickshire, in 1850. In 1876 the feats of E. P. Weston, attracted general attention. In 48 hours (on February 15 to 17) he accomplished 180 miles 668 yards—a distance never before covered in the same time—and (starting 23d December) 460 miles in 33 minutes less than 144 hours. Long distances have been accomplished in several six days go-as-you-please contests by Rowell, Hazael, and Fitzgerald. The last is now (1885) the long-distance champion of the world.

PEDICELL'INA, a genus of 'social' *Polyzoa*, somewhat resembling moss, and consisting of a series of organisms united together by root-like processes. They are found in the sea, are of soft consistence, and the tentacles are arranged in a horse-shoe or crescentic shape. *P. echinata* is a familiar species.

PEEKSKILL, in Westchester Co., N. Y., on the Hudson River and the Hudson River Railroad, 48 miles from New York City. Several iron foundries are located here, which give employment to a large number of workmen. Pop. 5742.

PEG'ANUM is a monotypic genus of *Zygophyllaceæ*, interesting botanically from possessing certain characteristics of *Rutaceæ*. The species *P. Harmala* is common in S. Europe and Asia Minor, and is a powerfully-smelling herb, with alternate, entire, or divided stipular leaves, white axillary flowers, and a capsular fruit opening by three valves. In Turkey the seeds are used as a vermifuge, and also, it is said, as a spice and for dyeing red.

PEKIN, in Tazewell Co., Ill., on the Illinois River, 10 miles below Peoria. It has three railroads, and is connected by steamboat with the various points on the Illinois and Mississippi rivers. It has large manufacturing, grain, and pork-packing interests, and adjoins extensive coal beds. Pop. 7500.

PEL'AMIS, a well-known genus of water-snakes or *Hydrophidæ*, of which the *P. bicolor* or black-backed P. is a good example. It is essentially a sea-inhabiting species, and is found swimming in the ocean at great distances from land. The tail is compressed, to fit it for serving as a swimming organ, and the nostrils are valvular. The color is black above and yellow beneath, the tail being variegated with these colors. The average length is 2½ feet. The P. is poisonous, and belongs to the sub-order of *Colubrine* snakes.

PEL'AMYS, a genus of *Teleostean* fishes, belonging to the *Scomberidæ* or mackerel family, and represented by the Bonito.

PEMBERTON, JOHN C., a Confederate general, born at Philadelphia, Pa., in 1817, and graduated from West Point in 1837. He served during the Mexican war on the staff of Gen. Worth, and was brevetted captain for bravery at Monterey, and major for bravery at Molino del Rey. At the outbreak of the civil war he resigned, and entered the Confederate service. He rose to the rank of lieutenant-general, was defeated at Champion Hills (May 16, 1863) and Big Black (May 17, 1863), and falling back upon Vicksburg, was compelled to surrender the city and his army to Gen. Grant. After the war he became a farmer in Virginia. Died July 13, 1881.

PEN'DA, a famous Mercian king of the 7th c., who for a time successfully resisted the progress of Christianity in England. In 626, at the age of fifty, he ascended the throne. A heathen reaction was beginning to show itself in several of the English states —Kent, East Anglia, and Essex. In this movement P. saw a chance of Mercia freeing itself from the overlordship of the Christian kingdom of Northumbria, and allying himself with the Cymric prince Cadwallon, he attacked and slew Eadwine at Hatfield in 633. Nine years later he defeated and slew Oswald, the successor of Eadwine, at Maserfield. P. now stood supreme in England. Northumbria alone stubbornly resisted his overlordship, though year by year he wasted the land in ruthless invasions. Nor could he extirpate Christianity or daunt the courage of its missionaries. Everywhere they were at work and his power was quietly undermined in spite of his valor and craft. His own son, whom he had made king of the Middle English, received baptism from the monks of Lindisfarne. At last the extension of Northumbrian influence along the eastern coast stirred the aged monarch to a fresh, and, as it proved, a final struggle. In his eightieth year he marched against Oswi, the Northumbrian king. The two armies met at Winwidfield, by Leeds, in 665. P. was utterly routed, and fell along with thirty men of kingly family. 'The river over which the Mercians fled was swollen with a great rain; it swept away the fragments of the heathen host, and the

cause of the older gods was lost forever.' See Bede's *Hist. Eccl. Gent. Angl.; The English Chronicle;* and Green's *History of the English People* (1877).

PENIN'SULA (Lat. *pæne*, 'almost,' and *insula*, 'an island') a portion of land nearly encircled by water, and connected with the mainland by an isthmus.

PE'NIS, the term applied to part of the male organs of generation in animals, the P. being the copulatory organ. It is found in many Invertebrates (*e.g.*, some insects, molluscs, &c.), and may be wanting in some vertebrata (*e.g.*, fishes, &c.). In mammalia it is attached to the *Symphysis pubis*, and consists, in the human subject, of a body, root, and glans. The root is attached to the pubis by two fibrous processes, the *crura*, and by a fibrous membrane termed the *suspensory ligament*. The body of the organ is covered by a very thin integument, which at the *glans* or extremity becomes folded on itself, to form the *prepuce* or *foreskin*. The mucous membrane covering the glans is unprovided with sebaceous glands, but its surface is covered with *papillæ* which are highly sensitive. The substance of the body consists of erectile tissues, capable of undergoing distension when filled with blood. These tissues are disposed in three chief masses, of which the two *corpora cavernosa* are the chief, the *corpus spongiosum* forming the remainder of the organ. The corpora cavernosa lie side by side and form the upper portion of the P., whilst the corpus spongiosum encloses the *urethra*. Each of the former bodies consists of a strong envelope of fibrous tissue, containing erectile tissues. The corpus spongiosum is also erectile in its nature, and in addition contains a layer of muscular fibres. The *veins* of the P. are very numerous, and form the chief elements in the erectile tissue. They are largest in the middle of the corpora cavernosa, and open into the *dorsal vein* of the P. The *arteries* are derived from the *internal pudic* branch, and the nerves from the *internal pudic nerve* and *hypogastric plexus*.

PENNAIR', or PINAKINI ('the bow of Siva'), the name of two rivers in S. India, both of which rise near Nundidrug in Mysore, and flow E. into the Bay of Bengal. (1) The north P. falls into the sea about 19 miles below Nellore town. Total length, 355 miles. Area of drainage basin, 20,500 sq. miles. It is useless for navigation, being liable to heavy floods, which in 1874 carried away an important railway bridge. At Nellore ferry an *anicut* or weir was constructed in 1857, and repaired in 1869 by Sir A. Cotton. It is now capable of irrigating 64,000 acres. The canal of the Madras Irrigation Company, completed in 1871, connects the P. with the river Krishna. (2) The south P. falls into the sea a few miles from Cuddalore. Total length, 245 miles. Area of drainage basin, 6200 sq. miles. In the upper portion of its course the water is collected in large reservoirs for irrigation.

PENNSYLVANIA, UNIVERSITY OF, an American educational institution, located at Philadelphia, Pa. It was chartered as a college in 1755, and as a university in 1779. It has well equipped departments of arts, sciences, law, medicine, and engineering.

PEN'TAIL, a remarkable species of *Insectivorous* quadrupeds, scientifically known as the *Ptilocerus Lowii*. It inhabits Borneo, and derives its popular name from the length of its tail, which is hairless except at its tip, where rows of stiff hairs are developed on either side, after the fashion of the barbs on the sides of a feather. The hairless portion of the tail is scaly. The P. attains the size of a small rat. Its color is a blackish-brown above, and a yellowish-grey beneath. The tail is black, the feather-like tip white.

PENTAM'ERA (Gr. *pente*, 'five,' and *meros*, 'a part'), one of the subdivisions of the order *Coleoptera*, or that of the beetles. The P. has five joints in the *tarsi* or feet.

PENTAS'TOMA (Gr. *pente*, 'five,' and *stoma*, 'a mouth'), a genus of lower *Arachnidans*, allied to the mites, &c., and forming the type of the order *Linguatulina* or *Pentastomida*. *P.* (or *Linguatulina*) *tænoides* is a familiar species inhabiting the liver and lungs of herbivorous mammals in a sexless state, and attaining sexual and mature development in the frontal sinuses of dogs and other *Carnivora*. The body is worm-like, the mouth being surrounded by a horny ring. The sexes are distinct, and the females are larger than the males.

PE'ON, a word of most uncertain derivation, adopted by all European nations in India for a kind of civil orderly or footman in the departments of police, justice, and customs. They usually wear an official badge, and formerly bore arms.

PEPUSCH', JOHANN CHRISTOPH, a German musician, born at Berlin about 1667, settled in England in 1700, and after an engagement at Drury Lane Theater became a teacher of music. He received the degree of Mus. Doctor from Oxford in 1713. He wrote the overture and set the music to Gay's *Beggar's Opera*, and published a treatise on *Harmony* (1731). P. died in 1752, and was buried in the Charter-House, of which he had been organist for fifteen years.

PEQUODS (or PEQUOTS), a tribe of American Indians, originally occupying what is now Eastern Connecticut. They were nearly exterminated in 1637 by a war with the whites, known as the 'Pequot War.' A remnant of the tribe still live at Green Bay, Wis.

PERCIVAL, JAMES GATES, an American poet, born in Connecticut in 1795, and was educated at Yale College. He was professor of chemistry at West Point, 1824–27, and at the time of his death, in 1856, was State Geologist of Wisconsin. He was the author of numerous poems, some of which are highly meritorious.

PERENNIBRAMCHIA'TA ('perpetually gilled'), a name applied to those members of the Amphibian order *Urodela*, which retain the external gills of early life, in addition to the lungs with which they are also provided. Of the P., the Proteus, Siren, and Axolotl are good examples.

PERI, JACOPO, born in Florence about 1570, is celebrated as the earliest operatic composer. He introduced recitative, and his *Dafne* (1597) and *Euridice* (1600) were the first real operas known to have been performed. He died about 1638, but the exact date is unknown. See Fétis, *Biographie des Musiciens* (Par. 1878).

PERIHEPATI'TIS, or INFLAMMA'TION OF THE CAPSULE OF THE LIVER AND GLISSON'S CAPSULE, is generally caused by disease of the liver itself, or by inflammation of neighboring structures, such as peritonitis and pleurisy. The prominent symptoms are: tenderness on pressure, motion, or deep inspiration; but the disease is not serious unless the inflammation extends to the portal or hepatic veins, or causes obstruction of the larger bile-ducts.

PERITYPHILI'TIS is the term used in medicine to denote inflammation of the areolar connective tissue round the *caput cæcum*, a lesion of frequent occurrence during typhoid fever. It may be caused by accumulations of fæces or of foreign substances in the vermiform appendix. When perforation takes place where the bowel is free from peritoneal covering, an abscess generally appears in the iliac region occupied by the cœcum; but when perforation takes place directly into the peritoneal cavity, the result will be fatal peritonitis. In the early stage, leeches, followed by hot fomentations and poultices, should be applied, and opium should be given internally. Drastic purgatives should be avoided, and only liquid food should be used.

PEROUSE', JEAN FRANÇOIS DE GALAUP, COMTE DE LA, born at Guo, near Albi, department of Tarn, August 22, 1741, became a midshipman in the French navy in 1756. He was taken prisoner in the battle of Belle Isle (1759), and in 1762 returned to France, and served in the East Indies from 1773 to 1777. In 1782 the French Government sent him to destroy the English settlements in Hudson's Bay. He took the forts of Prince of Wales and York; but the expedition ended in the peace of 1783. In August 1785, P. was sent to explore the Pacific. He doubled Cape Horn, followed the W. Coast of America to California, crossed the Pacific, and traced the Asiatic coast from Manila to Petropaulovsk. The 'Strait of La P.,' between the island of Saghalien and the Japanese island of Yesso, still bears his name. From Petropaulovsk he sent his journals and charts to Paris. In September 1787 he started southwards, and a letter was received from him dated Botany Bay, 7th February, 1788. After this the expedition disappeared. Searches were made by D'Entrecasteaux in 1791, and by Dumont D'Urville in 1828; and it is now supposed that it was wrecked at Vanikoro, in the New Hebrides, in 1788.

PERRON, JACQUES DAVY DU, born at Saint Lo, Normandy, November 15, 1556, was educated at Switzerland, passed from school at ten, and at twenty was a *savant* in Latin, Greek, Hebrew, mathematics and philosophy. Presented by Count Mantignon to Henri III., and by Henri to the poet Desportes, he was persuaded to abjure Protestantism for Roman Catholicism, and he was soon preaching eloquently before the king. Henri IV. appointed him Bishop of Evreux. For his success in converting the king to Catholicism, and for other services to the Church, he was appointed successively Archbishop of Sens, Grand Almoner and Commander of the Order of the Holy Ghost, and Cardinal. In his threefold character of poet, controversialist, and pamphleteer, he was one of the leading men of the age. He died at Paris, September 5, 1618. His works, of which the principal is a *Treatise on the Eucharist*, were printed in 1620. See the Abbé Ferret's *Le Cardinal du P., Orateur, Controversiste, Ecrivain: Etude historique et critique* (Par. 1877).

PERRY, MATTHEW CALBRAITH, COMMODORE, an American officer, born at South Kingston, R. I., in 1795, and entered the navy in 1809. In 1854 he negotiated a treaty with Japan, which for the first time brought that country into commercial relations with the United States. Died in New York City in 1858.

PERRY, OLIVER HAZARD, an American naval officer, born at South Kingston, R. I., Aug. 23, 1785, and entered the U. S. navy

in 1799. He took part in the war with Tripoli, and in 1813 served on Lake Erie under Com. Chauncey. He afterwards fitted out a squadron of nine small vessels, with which he defeated and captured the British fleet, on Sept. 10, 1813. This victory, sometimes called the 'battle of Lake Erie' and sometimes 'Perry's victory,' was one of the most brilliant known to American naval warfare. At its conclusion, Perry sent to Congress the famous despatch, 'We have met the enemy and they are ours.' Congress rewarded him for his gallantry on this occasion with a vote of thanks and a medal, and promoted him to the rank of captain. He continued in active service until the time of his death, at the island of Trinidad, from yellow fever, Aug. 23, 1819. Monuments have been erected to his memory in various parts of the U. S., and the story of his life has been fully written by Capt. A. S. Mackenzie (1841).

PERSIA'NI, MADAME FANNY, operatic singer, was the daughter of Signor Tacchinardi, a celebrated tenor, and was born at Rome, October 14, 1818. She was a leading soprano in the Italian Opera-Houses of London and Paris from 1838 to 1850. Among her greatest successes were in the operas of *Matrimonia Segreto*, *Lucia di Lammermoor*, *L'Elisire d'Amore*, and *Linda di Chamouni*. She excelled in light and sprightly characters.

PERTAPGHUR (*Pratapghar*, 'fort of Pratap'), (1) The capital of the native state of the same name in the N.E. of Rajputana, India, 33 miles S. of Neemuch, and 206 N. of Baroda, the *state* of P. has an area of 1460 sq. miles; pop. 150,000, the majority of whom belong to aboriginal tribes; the gross revenue is £60,000, of which £20,000 is enjoyed by feudatories, and £7200 paid as tribute through the British Government to Holkar, the Mahratta Rajah of Indore. The crops are maize and millet. The title of the chief is Maharawul.—(2) *Pratapgarh*, the chief town of the district of the same name in Oudh, British India, 2 miles from the right bank of the Saee river, 32 miles from Allahabad, and 90 S.E. of Lucknow; pop. (1869) 6240. It is an old town with a ruinous rampart and fort of mud. The *district* of P., which lies in the S. corner of the province, has an area of 1458 sq. miles; pop. (1869) 784,156. The crops are rice, wheat, Indian-corn, barley, sugar-cane, &c.; saltpetre is also produced.

PERTH, the capital of W. Australia, is picturesquely situated on the Swan River, 12 miles from its mouth, in 31° 20′ S. lat., 115° 46′ E. long. It consists principally of one main street nearly two miles long and lined with trees, and contains some good public buildings. The chief of these are the City Hall (built entirely by convict labor), the basement of which is used as a market, and the Protestant and Roman Catholic cathedrals. Pop. (1870) 5007, including the military and 400 convicts.

PERU, a town of La Salle Co., Ill., on the Illinois River, at the mouth of the Illinois & Michigan Canal, and on the Chicago & Rock Island Railroad, 100 miles from Chicago. Coal is here found in abundance, and mining is extensively carried on. Pop. 5057.

PERU, a town of Miami Co., Ind., on the Wabash River and the Wabash & Erie Canal. Distant 75 miles from Indianapolis and 56 from Fort Wayne, it carries on a large trade with the surrounding agricultural district, and is also engaged in manufacturing to a considerable extent. Pop. 5800.

PETAU'RIST, a name given to various species of Marsupial mammals, and, among others, to the opossum mouse (*Acrobates pygmæus*), a creature attaining to the size of a common mouse, and which, like the other members of the family *Phalangistidæ* or phalangers, is marked by an expansion of the skin of the sides of the body, serving as a kind of parachute, and enabling the animal to take flying leaps from tree to tree. The P. is brown above and white beneath. The Taguan (*Petaurista Taguanoides*), another animal belonging to this family, and also known distinctively by the name of P., inhabits New Holland. This animal is blackish-brown on the upper parts and white below.

PETAU'RUS, a genus of *Marsupial* mammalia belonging to the family *Phalangistidæ* or that of the phalangers, and including a species known as 'flying phalangers.' The great flying phalanger or Hepoona Roo (*P. Australis*) of New Holland is a familiar species. It is about 3 feet in length. Its color is a greyish-brown above and white below. Its tail is as long as the body. The squirrel P. (*P. sciureus*) of Norfolk Island is another species. Its length is about 16 inches, and its fur is of a brown color tinted with grey. The tail is long and bushy, and the wing-membrane is well developed. The aerial P. (*P. Ariel*) is the size of a small rat, and exceedingly graceful in its leaping.

PE'TERMANN, AUGUST, a celebrated geographical writer and cartographer, was born at Bleicherode, near Erfurt, April 18, 1822, and educated first at Nordhausen, and after 1839 at the geographical school founded by Berghaus at Potsdam. After working for Berghaus, he went to Edinburgh in 1845, and was there employed on Keith Johnson's physical atlas. In 1847 he removed to London, and became known as a contributor to the *Athenæum* and *Encyclopædia Britannica* on such subjects as the Franklin search, the travels of Barth, Overweg, Vogel, &c. In 1854 he was appointed professor of geography at Gotha, and editor of the *Mittheilungen aus Justus Perthes Geographischer Anstalt*, a periodical famous throughout the world for scientific method and thoroughness, as well as for freshness and range of information. Many of its maps are from his own hand, and on the subject especially of Arctic exploration he has contributed many valuable articles. Among P.'s finer maps are those of Australia and the United States, many in Sticler's *Hand Atlas* (1874), and one of the Eastern States of the American Union in the *Mittheilungen* (Part xi., 1877). P. died at Gotha, 27th Sept. 1878.

PETERS, HUGH, the regicide, born at Fowey, Cornwall, in 1559, entered Trinity College, Cambridge, and graduated M.A. (1622). He first went on the stage, then taking orders, held the lectureship of St. Sepulchre's, London, till an intrigue with a married woman forced him to fly to Rotterdam, whence in 1634 he sailed for America. He was pastor for five years at Salem, returned to England in 1641, became Cromwell's chaplain, and took an active part in the trial and condemnation of Charles I. Kennet even maintains that he was one of the masked executioners. At the Restoration P. was exempted from the Act of Indemnity, and hanged with nine others, October 16, 1660. He was author of *Lectiones in Psalmos* (1647), and *Last Legacy to an Only Child* (1660). See Samuel Peters' *History of the Rev. H. P.* (New York, 1807).

PETH'ERICK, JOHN, an African traveler, of English parentage, was born in 1820, entered the service of Mehemet Ali as a mining engineer in 1845, and became a merchant in 1849 at Khartum, where he was made British consul. He subsequently made two journeys (1857–58 and 1861–63) in the basin of the Upper Nile and the Bahr-el-Ghasal, its great western tributary. He published *Egypt, the Soudan, and Central Africa* in 1861, and sent home much valuable geographical intelligence. Schweinfurth says P. was 'the first to open mercantile transactions with the tribes of those remote regions.'

PE'TRE, an English Catholic family, descended from Sir William P., 'the silent man,' who was Secretary of State under four reigns, and died in 1572. His only son, Sir John P., was raised to the peerage as Baron P. of Writtle, in Essex, July 21, 1603. William, the fourth baron, on Oates's discovery of the 'Popish plot' (1678), was sent to the Tower, where he died, January 5, 1683. His kinsman, Edward P., the famous Jesuit (born 1631), shared his captivity, but was released on the accession of James II., and called to the Privy Council (1687). Hated and threatened by the populace as James's evil genius, he escaped at the Revolution to the Continent, was rector of St. Omer (1693–97), and died at Watten, May 15, 1699. Another ecclesiastic, Francis P., consecrated bishop *in partibus* (1750), and appointed Vicar Apostolic of the northern district of England, died December 24, 1775.

PETROGALE, a genus of kangaroo, popularly including the species named rock kangaroos. Of this genus the *P. pencillata* is the most familiar. Its length is about 4 feet, the tail measuring 23 inches. The color is a purple grey, which is light on the under parts. The P. has no canine teeth, the muzzle is bald, and the tail is tufted at its tip. It is a native of the N.W. of Australia.

PETTICHAPS, the name applied to several kinds of warblers or *Insessorial* birds of the sub-family *Luscininæ*. The greater P. is the Garden White-throat (*Sylvia hortensis*), a bird attaining a length of 6 inches, of a brown color above and white below, the throat being pale brown. Its song is very melodious. The lesser P. (*Sylvia rufa*) is otherwise named the 'Chiff-Chaff' from its cry. It is ashen brown above, and white, tinted with light brown, beneath. Its length is 5 inches. These birds are migratory.

PETT'IE, JOHN, R.A., born in 1839 at Edinburgh, studied at the Royal Academy classes there from 1855 till 1862, and in the latter year removed to London, where he has won a brilliant reputation for vigor, variety, and resource in art. He was elected Associate of the Royal Academy in 1866, and Royal Academician in 1873. Of his numerous works, which are chiefly historical or higher *genre*, it is impossible to mention more than a few of the more prominent, as 'What d'ye lack, Madam?' (1861), 'The Trio' (1863), 'The Rival Roses' (1871), 'The State Secret,' 'Juliet and Friar Lawrence' (1874). 'The Sword and Dagger Fight' (1877), and 'Disbanded' (1878). His painting is remarkable for character, force, and technical dexterity, and in portraiture he occupies a high place.

PETT'Y, SIR WILLIAM, the earliest English economist, was born at Romsey, in Hampshire, May 16, 1623, and was educated at the grammar school of his native town, and at Caen in Normandy. After serving for a short time in the navy, he studied medicine for three years at Leyden, Utrecht, and Paris, and returning to England (1646), obtained a patent for his 'pantagraph' or copying-machine. He went to Oxford (1648), became a fellow of Brasenose (1649) and anatomical professor (1650), and was one

of the earliest members of the Royal Society. Appointed physician to the army in Ireland (1652), he obtained the surveyorship of the forfeited Irish estates (1654), a post which brought him in £10,000, and afterwards became secretary to Henry Cromwell and member for West Looe (1658). At the Restoration he was knighted and created surveyor-general of Ireland, where he did much to promote the mining, timber, and fishing industries, whilst at London he was one of the chief revivers of the Royal Society. He died at Westminster, 16th December 1687, leaving two sons, the second of whom was the ancestor of the Lansdowne family. Besides his valuable treatises on population, P. wrote *Taxes and Contributions* (1662), the financial *Quantulumcunque* (1682), *The Political Anatomy of Ireland* (1692), &c.; and he was the inventor of a double-bottomed ship, which was to sail against wind and tide, but came to an untimely end whilst crossing the Irish Channel.

PEUTINGER, Konrad, a celebrated German antiquary, was born at Augsburg, 14th October 1465. After an education at Padua, Bologna, Florence, and Rome, he returned to Germany about 1486, and became town-clerk of his native city about 1493. After his death (24th December 1547) his valuable library fell to his own family, afterwards, however, to the Jesuits at Augsburg. P. wrote several works on antiquities. He discovered in a Benedictine monastery at Tegernsee the so-called Tabula Peutingeriana, a map of the military roads of the West Roman Empire, dating from the 4th c. A part of it was published by Marcus Welser as *Fragmenta Tabulæ Antiquæ ex Peutingerorum Bibliotheca* (Venice, 1591). From this date the map was mislaid till 1714, when, being discovered among P.'s MSS., it was sold to a bookseller, from whom it was bought by Prince Eugene, who presented it to the Vienna Library. Complete editions have been published by Franz Christoph von Scheyb (Vienna 1753), by Mannert (12 vols. Leips. 1824), who gives a complete account of its fortunes from the 4th to the 19th c., and by D'Urban in his *Recueil d'Itinéraires Anciens* (Par. 1845).

PEYER'S GLANDS, an important group of glands, occurring chiefly in the small intestine, and which appear to be specially affected in typhoid fever. They are most abundant at the terminal part of the *ileum*, near the *ileo-cæcal valve*. These glands are met with in two forms, *solitary* and *agminated*, the latter being also known as *P.'s patches*. The patches vary from 1 to 3 inches in length, and attain a width of about half an inch. They are of oval form. Each gland is from half a line to a line in diameter, and consists of a network of fine fibres containing lymphoid corpuscles. The glands are penetrated by blood-vessels and surrounded with lymphatic vessels. Their functions would appear to be that of absorbing certain materials from the *chyle* or digested food. P. G. are largest in the young, and disappear in adult life.

PHAL'ANX, the name given to each of the joints or small bones of which the digits of vertebrates are composed. Three *phalanges* exist in each digit of man, with the exception of the great toe and thumb, in which only two are found. In some mammals (and particularly in Cetacea) the number of P. is very great.

PHASCOLARC'TOS, a genus of *Marsupial* mammals, represented by the koala or kangaroo bear (*P. cinereus*), also named the 'native sloth' by the Australian colonists. The koala attains a length of 2 feet, and is covered with a bluish-grey fur. The tail is rudimentary, and the claws are strong, and adapt the animal for an arboreal life. The great toe is opposable to the other toes, and the fingers are divided into two sets, so as to constitute a hand-like member capable of grasping the boughs of trees.

PHASCOLOTHE'RIUM, an extinct genus of mammalia, believed to include species of insectivorous marsupialia. The remains of this genus are among the earliest relics of mammalian life on the globe. They occur in the Stonesfield slates of the Lower Oolites. The extinct P. is regarded as being most nearly represented by the existing Opossum.

PHELPS, Elizabeth Stuart, born in Massachusetts, in 1815. She was a daughter of Prof. Stuart of Andover Seminary, and became the wife of Prof. Phelps of the same institution. She published numerous works, such as *The Sunny Side, Tell Tale, Angel over the Right Shoulder*, &c., and died in 1852.

PHELPS, Elizabeth Stuart, daughter of the preceding, born in Massachusetts, in 1844. She has written numerous works, many of which have had wide circulation. Among them are *Men, Women, and Ghosts; Hedged In; The Silent Partner; Story of Avis;* and *Gates Ajar*.

PHIL'IBEG (Gael. *feilcadh*, 'cloth or covering,' and *beag*, 'little'), an article of male apparel, and the characteristic garment of the Scottish Highlanders. It resembles a short petticoat, being suspended from the waist and only extending to the knees. In the lowlands of Scotland and in England the P. is better known by the name *kilt*, a Saxon word signifying 'a tucked-up garment.' The P., which is made of tartan, is usually covered in front by the *sporan* (Gael. 'a purse or pouch'), formed of an animal's skin, and frequently tasseled and otherwise ornamented.

PHILIPPS'BURG, an ancient imperial fortress on the Rhine, 16 miles N. of Carlsruhe. After the Thirty Years' War, in which it played a prominent part, it was ceded to France; in the War with Louis XIV. it was recovered for Germany by Charles of Lorraine; and in 1688 it was taken by the French under Vauban, but restored at the Peace of Ryswick. Again captured by the French in 1734, when their leader the Duke of Berwick was killed, it was only held till 1735. It was finally dismantled by the French in 1800. There is a village of the same name with 2317 inhabitants.

PHILL'IPS, Thomas, R.A., the successor of Fuseli as professor of painting in the Royal Academy, and an able lecturer and art critic, was born at Dudley, Warwickshire, England, in 1770, apprenticed to a glass-painter at Birmingham, and removed to London in 1790. He first exhibited in the Royal Academy a view of Windsor Castle (1792), became an associate in 1804, a full member in 1808, and professor of painting in 1824. Early in his career he painted classical and historical subjects, but afterwards found his true vocation in portrait-painting, in which, though a contemporary of Lawrence, he achieved much distinction. P. died 20th April 1845.

PHILL'IPS, Wen'dell, one of the most distinguished advocates of the abolition of slavery in America, was the son of John Phillips, the first Mayor of Boston, and was born at Boston, November 29, 1811. He was educated at Harvard College, where he graduated in 1831. He then entered the Cambridge Law School, and after remaining there for two years, was admitted to the Suffolk bar in 1834. But he soon gave up the study of law to throw himself heart and soul into the anti-slavery movement, which was then, under the powerful advocacy of William Lloyd Garrison, beginning to agitate American society. He made his *début* as an orator in 1837, at a meeting held in Boston to protest against the murder of the Rev. E. P. Lovejoy, the editor of an anti-slavery newspaper in that town, who had fallen a victim to the fury of a mob; and from that time until the abolition of slavery (February 1, 1865), he was incessantly occupied in promoting the end to which he had devoted his life and his fortune. With a great amount of solid learning, P. united an oratory distinguished for its powerful logic, its pungent wit, and its rich variety of language. He spoke without notes, in a manner grave and dignified, using gesture seldom, but always with great effect. After the abolition of slavery, P. devoted himself chiefly to lecturing on temperance and women's rights. He published *The Constitution of a Pro-Slavery Compact* (1844); *Can Abolitionists Vote or take Office under the United States Constitution?* (1845); *Speeches* (1852); *Defence of the Anti-Slavery Movement* (1853); *Addresses on Slavery, Temperance, &c.* (1859); *Speeches, Lectures, and Letters*, 1853–63 (1863). Died Feb. 2, 1884.

PHIL'POTTS, Henry, D D., born at Bridgewater in Somersetshire, England, May 6, 1778, passed from the College School, Gloucester, to Corpus Christi College, Oxford, graduated B.A. (1793), and was elected a fellow of Magdalen. He became chaplain to the Bishop of Durham (1806), prebendary of Durham (1809), rector of Stanhope (1819), Dean of Chester (1828), and Bishop of Exeter (1830). A strong High Churchman, he was the originator of the Gorham Controversy, whilst in the Parliament he signalized himself by his bitter eloquence against the Reform Bill, the Ecclesiastical Commission, and other Liberal measures. He died at Torquay, September 18, 1869.

PHLYCTENÆ or PHLYCTENULÆ, are semitransparent vesicles, filled with watery fluid, which occur during *humid* mortification, and frequently on the edges of the eyelids, especially at the inner canthus, sometimes single, often in groups, varying in size from a mustard seed to a pea.

PHOTOPHO'BIA (Gr. *phos*. 'light,' and *phobos*, 'fear') is an intolerance or dread or light characteristic of some forms of ophthalmia, more especially those of a strumous nature. In cases of recurrent vascular ulcer, the P. is excessive, and the child hides its head in the darkest corners or in its mother's dress, screams and struggles at every attempt to expose it to the light, and contracts the orbicular muscles spasmodically. The subjects of this disorder are nearly always strumous children, and the state of their eyes often renders them additionally unhealthy.

PHYSOSTOMATA, a division of Teleostean fishes, represented by the eels, herring, salmon, pikes, &c. In this group the air-bladder opens into the throat by means of a pneumatic duct, and the fin-rays are 'soft' or many-jointed. The scales are cycloid, although some of the fishes included in this group are destitute of scales, and in one or two cases ganoid scales may be developed. Ventral fins may be absent, as in the eels (*A. poda*), and when present, they are abdominal in position (*e.g.*, salmon).

PHYTOL'OGY (Gr. *phyton*, 'a plant,' and *logos*, 'a description') is that part of Botany that treats of plants in general.

PIAT'RA, an old town of Moldavia, Roumania, on the W. bank of the Bistritza, an affluent of the Sereth, about 40 miles N.W. of Bakau, a station on the Sereth valley railway. It has paper-mills, and one of the oldest churches in Moldavia. Pop. 20,000.

PIATTI, ALFRED, violoncellist, was born at Bergamos, in N. Italy, in 1825. He received his first lessons in music from Zanetti, after which he was a pupil of Merighi at the Conservatorio of Milan. After obtaining a high Continental reputation, he took up his residence in England in 1846, where he was without a rival as a performer on the violoncello, particularly in chamber music. He has composed some excellent music, including *Un Passetemps Musicale*, *Mazurka Sentimentale*, &c. One of the best of his songs is *The Swallow*.

PIAZ'ZA (Italian *piazza*, 'square, market-place'), an uncovered space enclosed by buildings.

PIAZ'ZA ARMERI'NA, a town of Sicily, province of Caltanisetta, on the left bank of the Terranova, 17 miles E. by S. of Caltanisetta. It has an episcopal palace, several good churches enriched with pictures, and many fine villas. Its trade is in grain, wine, oil, chestnuts, and walnuts. Pop. (1874) 20,310. P. is said to have been founded by Greeks from Platæa.

PICCINI or PICCINNI, NICOLO, a composer of extraordinary fertility, born at Bari, Naples, in 1728, studied for twelve years at the Conservatorio de St. Onofrio under Leo and Durante. On leaving this institution in 1754, he produced his first opera, *Le Donne Dispettose*, followed by shoals of similar works, among the best of which were *Allesandro nell' Indie* (1758) and the graceful *Buona Figlinola* (1760). He visited Paris in 1778, where he produced *Roland* (1778), *Atys* (1780), *Iphigénie in Tauride* (1781), and *Didon* (1783), with such success that many critics pronounced him superior to his great contemporary Glück, a verdict which posterity has scouted. He died at Passy, 7th May 1800. P. wrote over 150 operas, and numerous oratorios and cantatas.—LUIGI P., a second son of the preceding (born 1766, died 1827), had also some musical talent, and composed a number of operas, &c., now forgotten.

PICCOLOMINI, MARIETTA, an operatic singer, born at Siena in Tuscany in 1835. Visiting England with a great Italian reputation, she made her first London appearance as 'Violetta' in *La Traviata* (specially written for her by Verdi) in 1856, and achieved a great success in that country. In 1861 she married, and withdrew from professional life at the early age of twenty-six. Among her best characters were 'Lucia di Lammermoor' and 'Zerlina' in *Don Giovanni*.

PICKENS, ANDREW, an American patriot, born at Paxton, Pa., in 1739, and removed to South Carolina, when young. He served in the Continental army, during the Revolution, and for his gallantry at Cowpens, was presented with a sword by Congress. Died in 1817.

PICKETT, GEORGE E., a Confederate general, born at Richmond, Va., Jan. 25, 1825, and graduated from West Point in 1846. He rendered gallant service during the Mexican war, and was promoted for bravery at Contreras, Churubusco, and Chapultepec. In 1861 he resigned, and entered the Confederate service with the rank of colonel. He was severely wounded at Gaines' Mill, and on July 3, 1863, led the fierce assault that was made upon the Union lines at Gettysburg. Died at Norfolk, Va., July 30, 1875.

PIC'TON, SIR THOMAS, a distinguished English general, was the second son of John Picton, Esq., of Poyston, Pembrokeshire, where he was born in 1758. He entered upon his military career as an ensign in the 12th Regiment of Foot in 1791, was sent to the Antilles in 1794, and after the capture of Trinidad in 1797 he was appointed governor of that island, with the rank of colonel. In 1809 he assisted at the siege of Flushing, and after it had been taken was appointed governor. He afterwards took part in the Spanish war, and stormed the citadel of Badajos in the face of a deadly fire. Appointed in 1815 to the command of the 5th Division of the army, P. saw a large part of his troops destroyed in the engagement at Quatre-Bras, and he himself received a wound. Notwithstanding, he resumed active command at the battle of Waterloo two days after, and was killed by a cannon-ball as he charged the enemy at the head of his men, June 18, 1815. A monument to his memory was erected by command of Parliament in St. Paul's Cathedral.

PIE, the lowest fraction of the Indian currency, being $\frac{1}{12}$th of an anna, or half a farthing in value, used only in accounts. The actual coin in use is the pice = 3 pies, or $1\frac{1}{2}$ farthings.

PIE'TRASAN'TA, a town in the province of Lucca, Italy, on a hill 2 miles inland, and 20 N.W. of Lucca. It is girt by a castellated wall, and has many fine buildings of the 14th and 15th centuries. P. is the chief place from which the Serravezza marble is sent to market. The vicinity produces much oil and wine. Pop. (1874) 13,227.

PIGEON ENGLISH, a mixed dialect, consisting of English, Chinese, Portuguese, and Hindustanee words, employed for business purposes in China. The words are few and it is never printed. A dialect very similar to it is used in some of the western cities of the U. S., where there are large Chinese populations.

PIKE, ZEBULON MONTGOMERY, an American general, born at Lamberton, N. J., Jan. 5, 1779, and entered the army in early life. He conducted surveys of large parts of the Louisiana purchase, for which he received special thanks from Congress. In 1813 he was made brigadier-general, and was killed, April 27 of the same year, while leading an assault upon York (now the city of Toronto), Canada. His life has been written by H. Whiting.

PILE'OLUS, a fossil genus of *Gasteropodous* molluscs, the shells of which are of small size and of limpet shape, and occur in the Lower Oolitic rocks. It belongs to the family *Neritidæ*.

PILLOW, GIDEON JOHNSON, born in Tennessee, in 1806, and became a successful lawyer, at Columbia, in his native state. He served with distinction during the Mexican war, and was twice wounded, at Cerro Gordo and Chapultepec, winning, by his gallantry, promotion to the rank of major-general. At the outbreak of the civil war, he entered the Confederate service, and continued therein until the termination of that struggle. Died in 1878.

PILOTY, KARL, one of Germany's greatest painters, was born at Munich, October 1, 1826, and studied first under his father, Ferdinand P., an eminent lithographer (died January 8, 1844), and afterwards in the Academy of Munich under Schorn. Shortly after his return from a journey to Paris, Brussels, and London, he was commissioned by the king to paint 'The Founding of the Catholic League (1854), and the fame which this picture gained him was greatly enhanced by his 'Seni before the Corpse of Wallenstein' (1855). In 1856 P. became a professor in the Munich Academy, and its director in 1874. He has painted some fine portraits, but his masterpieces are the great historical pictures 'Nero on the Ruins of Rome' (1861), exhibited at the London International Exhibition of 1862, 'Galileo in Prison' (1864), 'The Death of Cæsar' (1866), 'Thusnelda in the Triumphal Procession of Germanicus' (1873), and 'The Arrest of Anne Boleyn' (1874).

PINCKNEY, CHARLES COTESWORTH, LL.D., an American lawyer and statesman, born at Charleston, S. C., Oct. 23, 1750, was educated at Oxford, England, and began the practice of law in his native city in 1769. He served with distinction in the war of the Revolution, was one of the framers of the U. S. Constitution, was special minister to France (1796–97), was the candidate of the Federalist party for Vice-President in 1800, and was the author of the oft-quoted words, 'Millions for defence, but not one cent for tribute.' Died at Charleston, S. C., Aug. 16, 1825.

PINDAR'IS, a collection of freebooters who established a system of terrorism in Central India at the beginning of the present century. They were mostly Mohammedans, but were bound together by no common nationality or discipline. They followed in the wake of the Mahratta armies, and were encouraged by the Mahratta leaders. In 1812 their numbers were estimated at 60,000 horsemen, armed with spear and matchlock. Their plunderings, torturings, and other excesses knew no bounds; and in 1817 Lord Hastings' resolution to restore order in Central India led to what is sometimes known as the fourth and last Mahratta War, in which the names of Elphinstone and Malcolm figure conspicuously. One of the Pindari chiefs, Ameer Khan, agreed to disband his followers in consideration of a *jageer* which has now become the State of Tonk. Of the other three principal chiefs, one took poison, one surrendered himself, and the third was miserably destroyed by a tiger in the jungle. Their Mahratta allies, the Peishwa and Holkar, were completely defeated, and thirty hill fortresses were captured in a few weeks. The native states of Central India and Rajpootana were formally taken under British protection; order was enforced among the Bheels and other wild tribes, and this part of India was placed in the direction of progress which it has since continued to pursue.

PINE BLUFF, a town of Jefferson Co., Ark., on the Arkansas River, at the head of low water navigation, 45 miles from Little Rock. It is surrounded by an agricultural region, and cotton is the principal staple. Pop. 4126.

PINNIGRA'DA and PINNIPE'DIA, terms applied to that section of *Carnivorous* quadrupeds, including the seal and walrus, in which the limbs are modified to form swimming paddles. In these animals the body is long and fishlike. The tail is short and rudimentary, and the limbs are also short. The hinder legs are placed far back on the body, so that their axis nearly corresponds to that of the body itself, and the hind limbs together with the posterior extremity of the body form an admirable swimming apparatus.

The toes are provided with strong nails. External ears may be wanting, and at most are rudimentary. Both ears and nostrils are valvular, and may be closed at will. The bones are of spongy texture and light construction. The canine teeth are long and pointed.

PIQUA, a town of Miami Co., O., on the Great Miami River and the Miami & Erie Canal. It has two railroads, and is 73 miles from Columbus and 28 from Dayton. It has some manufacturing and is a place of considerable trade. Pop. 6031.

PITCAIRNE', ARCHIBALD, a Scotch physician, born at Edinburgh, Scotland, 25th December 1652, studied at the university of his native city and at Paris, and acquired a wide reputation at home as a practising physician. His celebrity even secured him 'a professorship' in Leyden University, which, however, he held only for a year. He died 20th October 1713, and was buried in Greyfriars' Churchyard. P.'s chief professional work, *Elementa Medicinæ Physico-Mathematica* (1718), consists of his Leyden lectures. It was long a standard treatise on its subject. The author was an ardent disciple of Harvey in his great doctrine of the circulation of the blood. An elegant scholar, and a verse-maker of some skill, P. occasionally employed his leisure in irritating his Presbyterian countrymen by satirical effusions which exposed him to the charges of atheism and impiety.

PIT'MAN, ISAAC, born at Trowbridge, Wilts, England, January 4, 1813, was educated at the grammar-school of his native town, and at the Normal College of the British and Foreign School Society in London, became master of the British School at Barton-on Humber, Lincolnshire (1832), and established a similar school at Wotton-under-Edge, Gloucestershire (1836), publishing his *Stenographic Sound-hand* (1837). He removed to Bath (1839), and there elaborated a phonetic system, which Max Müller pronounces the best of its kind, his *Phonography, or Writing of Sound*, appearing in 1840. In 1843 he founded the Phonetic Society and the Phonetic Institute, the latter a printing-office, from which have issued the *Phonographic Reporter's Companion* (1853), a large number of standard works in phonetic spelling, and the *Phonetic Journal*.

PITT, THOMAS, the founder of the famous family of English statesmen, was born at St. Mary's Blandford in 1653. Towards the close of the century he went to the East, and was governor of Fort St. George, Madras (1698–1702). In 1714 he was made governor of Jamaica. He sat in four Parliaments, and died 28th April 1726. The P. diamond is so called from having been in his possession. His son, ROBERT P. of Boconnoc in Cornwall (died 1727), was father of the illustrious Earl of Chatham.

PITTA, a genus of Insessorial birds, belonging to the Dentirostral group of the order, and including, among other forms, the Giant Ant-Thrush or Giant Breve (*P. Bengalensis*), the Black-headed P. (*P. melanocephala*), and the Crimson-headed P. (*P. granatica*). The true ant-thrushes are found in both Old and New Worlds; the breves are confined to the former.

PITTSTON, in Luzerne Co., on the N. branch of the Susquehanna River, at the head of Wyoming Valley. It has coal mines and considerable manufacturing. Pop. 7472.

PLAC'ODUS, an extinct genus of Vertebrate animals, the remains of which occur in rocks of *Triassic* age. It was formerly regarded as a fossil fish of the *Ganoid* kind, but is now held to be reptilian, and is included in modern systems of classification in the order *Sauropterygia*, a group to which the *Plesiosauri* and other extinct reptiles belong. In P. the teeth occupied distinct sockets. They were of rounded form, and resembled the flat plate-like teeth found in some rays and sharks, and which are adapted for crushing the hard shells of crustaceans, &c. A double series of teeth were developed in the upper jaw of the P.; only a single row in the lower jaw.

PLAGUES OF EGYPT were ten calamities brought upon the country by Moses, with the purpose of compelling Pharaoh to let the Hebrews leave Egypt and set out for Canaan. Opinion regarding these P. (enumerated Exod. vii.–xii.) has been somewhat modified of late years. Travelers have discovered that they correspond in a remarkable degree with natural phenomena which occur in the country: *e. g.*, the Nile at certain season has a blood-red appearance; extraordinary numbers of frogs sometimes make their appearance; the country is sometimes visited by a murrain among the cattle, or a plague of locusts; a species of stinging fly and a painful skin disease occasionally afflicts man and beast; and a wind from the desert at times raises such clouds of sand as to obscure the air for days. Accordingly, while the Rationalistic school consider the P. myths have arisen out of the natural phenomena, the ablest conservative critics explain the first nine as 'having become signs and wonders through their vast excess above the natural measure of such natural occurrences and their supernatural accumulation.'

But by many the greatest difficulty is felt to be the implied idea that the displeasure of God is expressed by physical disaster, an idea which, though universally held in ancient times, is now regarded by educated people with considerable suspicion. Again, perhaps the greatest difficulty encountered by rationalizing critics is how to account for what the magicians of Egypt are said to have done. According to the Christian Fathers they did it by the help of demons, or according to the latest theory it was mere jugglery. But that the writer meant that the magicians did the same things as Moses in certain of the wonders, is just as clear to a candid reader as that he understood the P. to be miracles. And hence the real difficulty here is the implied belief, which was also universally held in ancient times, that magicians could do things which far surpassed the power of ordinary mortals. See *The Speaker's Commentary* (vol. ii. Lond. 1872), *The Bible for Young People*, by Oort, Hooykaas, and Knenen (vol. ii. Eng. trans. 1875).

PLAITING, or PLATTING, is the art of interlacing flexible materials in order to produce a basket, mat, or other articles. This art, which is allied to weaving, only differing from it in the fact that the fibres employed are not previously spun, has been universally practised from the most remote ages to the present time. Many degraded races, ignorant of the art of weaving, are very expert in P., while in civilized communities it is the foundation of the straw-plait and basket-making industries.

PLANT-CUTTER (*Phytotoma*), a genus of Insessorial birds, allied to the *Plantain-Eaters* and found in S. America. The Chilian P. (*P. vara*) is a familiar species. It attains the size of a thrush, and derives its name from its habit of cutting the stalks of cereals with its sharp bill. The color is grey tinted with bronze above; the breast and belly are a slaty-blue. The quills of the wing and tail are black.

PLAN'ULA, the name given in zoology to the general form of the embryo in *Cœlenterate* animals, and especially in the class *Hydrozoa*. The P. is a minute speck of protoplasmic matter, of oval shape, and having numerous *cilia*.

PLATANIS'TA, a genus of *Cetacea* belonging to the Dolphin family, inhabiting the estuary of the Ganges. It has a very long slender muzzle, and about 120 teeth. The beak is somewhat expanded in the middle. It is of a greyish-black color above and white below. The eyes are very small. There is no dorsal fin. The P. is familiarly known as the 'Soosoo,' and as the 'Gangetic Dolphin.'

PLA'TEN-HALLERMUND, more commonly PLATEN-HALLERMÜNDE, AUGUST GRAF VON, a German poet, born at Ansbach, 24th October 1796, studied philology at Würzburg and Erlangen, and first appeared as an author in his *Ghaselen* (Erlang. 1821). This was followed by *Lyrische Blätter* (Leips. 1821), and *Vermischte Schriften* (Erlang. 1822). The fruits of a visit to Italy are seen in his *Sonette aus Venedig* (Erlang. 1825). Later works as *Das gläserne Pantoffel*, *Das verhängnissvolle Gabel* (1826), *Der Romantische Œdipus* (1829). *Schauspiele* (Stuttg. and Tüb. 1828), *Die Liga von Cambrai* (Frankf. 1833), and *Geschichte des Königreichs Neapel von* 1414–43 (Frankf. 1833). His last work was *Die Abbasiden* (Stuttg. 1835), a large poem in nine cantos. P. died of fever at Syracuse, 5th December 1835. His *Gesammelte Werke* were published at Stuttgart in 1838 (later editions 1847 and 1853). A complete edition of his *Gedichte* appeared at the same place in 1848 (new ed. 1852). P. was a true and earnest if not a great poet; somewhat didactic and formal, but pure in spirit and of high intent. See Minckwitz, *Graf P. als Mensch und Dichter* (Leips. 1838), and *Briefwechsel zwischen P. und Minckwitz* (Leips. 1836). P.'s *Tagebuch* was edited by Pfeufer (Stuttg. 1860).

PLATYCRI'NUS, a genus of fossil *Crinoids* or lily-stars. *P. tricontadactylus* of the Carboniferous series is a familiar species. The stalk or column was of oval or elliptical shape, and had its articulating surfaces or facets marked by striæ or lines radiating from the center of the joint. P. is one of the Palæocrinoids or older group, attaining its highest developments in Palæozoic rocks.

PLATYRHI'NA (Gr. 'broad-nosed'), a genus of *Quadrumana* or Monkeys, confined to the New World. In this division the Marmosets (*Hapale*), Spider monkeys (*Ateles*), Howlers (*Mycetes*), the Capuchins (*Cebus*), &c., are included. The P. have no callosities or cheek ponches. The tail is long and is usually prehensile. The thumbs are wanting in *Cebus*. The nostrils are placed far apart and separated by a broad septum—hence the name 'P.' The premolar teeth number 6 in each jaw. These monkeys live on trees.

PLAYFAIR, LYON, son of Mr. George P., chief inspector-general of the hospitals of Bengal, was born at Meerut, May 21, 1819, and commenced his chemical studies at St. Andrews and the Andersonian University, Glasgow (1834). After revisiting India to recruit his health (1837), and studying organic chemistry under Liebig at Giessen (1838), he became head of some large calico printworks at Clitheroe, whence he was called to the chair of Chemistry in the Manchester Royal Institution (1843). He served on the commission to inquire into the sanitary condition of towns (1844); for his services as special commissioner of juries

in the Great Exhibition of 1851 was made a Companion of the Bath, and received a joint-secretaryship with Mr. Cole in the newly-founded department of Science and Art (1853). He became inspector-general of Government museums and schools of science (1856), President of the Chemical Society of London (1857), and Professor of Chemistry in the University of Edinburgh (1858), besides acting on the mines, Scotch fisheries, cattle plague, and other commissions. A Liberal in politics, he represented the Universities of Edinburgh and St. Andrews, in parliament, held office as Postmaster-General in the Ministry of 1869–74, being also made a Privy Councilor and Chairman of Committees of House of Commons (1880). Besides some translations of Liebig's works, he has published *Science in its Relation to Labor* (1853); *On Primary and Technical Education* (1870), and other treatises.

PLAY'FORD, JOHN, a writer and publisher of music, was born in England, in 1613. His *Introduction to the Skill of Music* passed through ten editions from 1665 to 1684. He also published *Court Ayres* and *Psalms and Hymns in Solemn Music*. He died about 1693.—His son, HENRY P., published *Orpheus Britannicus*, the celebrated collection of Purcell's works.

PLEAS'ONTON, ALFRED, an American general, born in the District of Columbia, in 1823, and graduated from West Point in 1844. He served in the Mexican war, and was promoted for gallantry at Palo Alto and Resaca de la Palma. In 1862 he was made brigadier-general of volunteers, and placed in command of a division of cavalry of the army of the Potomac, which he led at Boonsboro', South Mountain, Antietam, Fredericksburg, and Chancellorsville. For his valuable services at the last of these, he was promoted to be major-general. He was present at Gettysburg, and was afterwards transferred to Missouri, from which state he drove Gen. Price. He resigned from the army in 1868.

PLECO'TUS, a genus of *Cheiroptera* or Bats, including the *P. communis*, the common long-eared bat of Britain, and other species. In this genus, which belongs to the insectivorous family *Vespertilionidæ*, the ears are large, and are united at their basis. The teeth number 36. The length of the *P. communis* is 3 inches, its wing membrane when spread out to its fullest extent from 13 to 14 inches. The fur is a greyish-brown.

PLENTY, BAY OF, a bight on the N.E. coast of the N. Island of New Zealand, so named by Cook on account of the abundance of food and water he there obtained. It is about 100 miles wide, and is studded with a number of small islands, one of which contains a hot lake, geysers, and mud springs. The shores of the B. of P. are for the most part thickly wooded, but the western portion is more open, and adapted to agriculture and sheep-farming. The principal settlement is Taoranga, near the W. extremity. It has a good harbor.

PLEURACANTHUS, a genus of fossil Elasmobranchiate fishes, belong to the Rays. The remains of P. consist chiefly of fin-spines or ichthyodorulites which occur in the Carboniferous rocks. The spines were provided with a double row of sharp processes or 'teeth.' P. remains are the oldest known fossil traces of Rays.

PLEUROBRACH'IA, a typical genus of *Cœlenterate* animals belonging to the order *Ctenophora*. *P. pileus* is a well-known species, attaining the size of a lemon or orange, and having a body of the shape of these fruits, and of clear colorless nature and gelatinous consistence. The mouth is at one extremity or pole of the body, which is divided into spaces externally by eight meridional bands of *cilia*, arranged in comb-like fashion and named *ctenophores*. Two long tentacles are also present, which are capable of being retracted at will. From the stomach of P. three pairs of canals (*radial*, *apical*, and *paragastric*) are given off, and at the lower or apical pole of the body there is a small sense-organ named a *ctenocyst*, together with a nervous ganglion, the latter being one of the first defined appearances of a nervous system in the animal world.

PLEURODONT LIZ'ARDS, a group of Lizards including those which have the teeth inserted in a groove on the inner side of the jaw. The term is used in contradistinction to 'Acrodont,' which is applied to lizards having teeth ossified to the summit or top of the jaw-bones.

PLEV'NA, a fortified town in Bulgaria, on a tributary of the Vid, 5 miles E. of the main stream, and 25 S.S.W. of Nicopolis on the road leading, *via* Lovatz, across the Balkans to Philipopolis. It was an unimportant open town till Osman Pasha surrounded it with entrenched works, and it is mainly remarkable as the scene of the great decisive struggle in the late Russo-Turkish War. Osman Pasha advanced from Widdin with thirty-six battalions and forty-four guns to the relief of Nicopolis, but arriving too late for this object, was allowed, without opposition, to occupy P. on the 14th July 1877. Krudener sent Schilder with three regiments against P. on the 24th July, only, however, to be repulsed with terrible loss. The importance of the position being at length realized by the Russians, a determined effort to take it at any cost was ordered to be made under Krudener and Schakofskoy. All the available troops were hurled against P. on July 31, but the result was a repulse even more disastrous than the first. The two leaders acted independently; Schakofskoy went recklessly forward, while Krudener was unable to give him support. The whole plan of the campaign had to be altered, as a general advance was impossible with P. untaken on the flank. A period of inactivity followed, in which the Russians brought up reinforcements, and Osman strengthened his fortifications. Early in September the Grand Duke Nicholas was at the head of 60,000 men, but military critics considered that the task required double the number. After four days bombardment the great assault was made on September 11th, in presence of the Czar himself. It was repulsed with heavy loss at all points except the center, where the Roumanians took and held the Grivitza redoubt, and the S., where Skobeleff took two redoubts from which he had to retire on the following day.

This crushing defeat compelled the Russians to turn the assault into a siege, and General Todleben was charged to invest and starve P. into surrender. By adroit management on the part of the Turks, large reinforcements and convoys of provisions and ammunition were safely got into P. before the investment was complete. But Gourko and Skobeleff, driving the Turks from a line of villages, eventually closed the road to Orkanye, where Chefket Pasha was contributing to the relief of P. and providing a retreat for Osman. Not only was P. now hemmed in, but the assailants were strengthened by the arrival of the Imperial Guards. Week after week passed, however, and Osman, cut off from the world, held out with heroic firmness, until to hold out longer was impossible. On December 11, he failed in a supreme effort to break through the encircling band in the direction of Widdin, and was forced to surrender with an army reduced by this time to little more than 20,000 men and with sixty guns. The Russian loss has been estimated at 50,000 lives, 25,000 in the September assault alone.

PLI'OCENE PERIOD is the third and highest member of the Tertiary Period. Above 50 per cent. of its fossil shells are existing species. The formations belonging to this age are of small development in Britain, being met with only in Suffolk and Norfolk, where, spreading over the Lower Eocene, they overlap the Chalk. Three groups are distinguished—(1) *The Coralline Crag*, a series of soft, marly, whitish sands, sometimes speckled with green, containing occasionally thin bands of limestone. Of the 350 species of marine mollusca, about 30 per cent. are extinct. (2) *The Red Crag*, a group of beds of red sands and gravel, with accumulations of rolled shells. It is usually found side by side with the Coralline Crag, though here and there in hollows of the latter portions of it exist. Of its 256 marine shells 25 per cent. are extinct. (3) *The Norwich Crag*, a series of beds of sand, gravel, and loam, which contain a mingling of marine, freshwater, and land shells, with bones of several extinct mammals. There is evidence of the beginning of that severity of climate which attained its climax in the glacial period. Pliocene formations are found in Belgium, in Italy flanking the low heights of the Apennines, in Sicily covering nearly one-half of that island, and in S. Russia round the coasts of the Caspian and Aral Seas, and the N.-western shores of the Black Sea.

PLOJES'TI, a town of Roumania, on the Dimbow, a sub-affluent of the Danube, 33 miles N.N.E. of Bucharest by rail. It is embowered amid gardens and groves, and has some trade in grain, wool, &c. During the Russo-Turkish War (1877–78) it was for some time the headquarters of the Russian Emperor. Pop. (1870) 26,468.

PLOVER-CREST (*Cephalephis Delalandii*), a species of Humming-bird, found in the southern parts of Brazil. The males have a very prominent head-crest. The color is green above; the under parts are violet.

PLUME BIRD (*Epimachus*), a genus of Insessorial birds belonging to the *Tenuirostral* group of the order, and to the family *Upupidæ* or Hoopoes. It forms a sub-family (*Epinachinæ*), in which the bill is slender and arched, and the wings of moderate size and rounded. The hinder toe is very long, as is also the tail. The tarsi are scaled in front, and the sides of the body are covered with expanded feathers. The P. B. is an inhabitant of Australia and New Guinea, where it represents the Humming-bird. The Superb P. B. (*E. magnus*) has a small body; the plumage, however, being developed to such an extraordinary extent that the body appears to measure about 4 feet in length. The head, neck, and under parts are green, the back and wings being of a lustrous violet tint. The Twelve-thread P. B. (*E. albus*) somewhat resembles the 'Bird of Paradise' in appearance, and derives its name from the silken plumes of the back, which give off long thread-like prolongations. The plumage is for the most part of a rich violet hue.

PLUMPTRE, REV. EDWARD HAYES, born August 6, 1821, obtained a scholarship at University College, Oxford, and was

elected fellow of Brasenose (1844). He became chaplain at King's College, London (1847), Professor of Pastoral Theology in that institute (1853), Prebendary of St. Paul's (1863), and Professor of New Testament Exegesis (1864). In 1869 he was presented to the rectory of Pluckley, and in 1873 to the vicarage of Bickley, both in Kent. Professor P. has published *Sermons at King's College* (1859); *Lazarus and other Poems* (1864); *Christ and Christendom: the Boyle Lectures for* 1866 (1867); translations of Sophocles (1866) and Æschylus (1870); *Biblical Studies* (1870); *Popular Exposition of the Epistles to the Seven Churches of Asia* (1877), &c.

PNEUMOTHOR'AX (Gr. *pneuma*, 'wind,' and *thòrax*, 'the breast'), or air within the cavity of the pleura, may be caused by fractured ribs, or blows; but, in the great majority of cases, air is admitted by the bursting of a small cavity into the pleura in the progress of phthisis. The symptoms of P. are sudden and severe pain, faintness and dyspnœa, followed by swelling and lividity of the face and lips. The percussion sound on the affected side is abnormally clear or dull, the intercostal spaces are bulged out, and the respiration sounds are absent, or are greatly diminished. In general, there is, in addition, an influx of fluid, which may be detected at the base of the pleura by dullness on percussion, and by a splashing sound when the patient is shaken.

POCOCK, Edward, D.D., born at Oxford, England, November 8, 1604, passed from Thame free school to Magdalen Hall, Oxford (1619), and thence to Corpus Christi, of which he became a fellow (1628). Having already studied Oriental languages, he went to the Levant in 1630 as chaplain to the English factory at Aleppo, and there perfected himself in Arabic, made great progress in Syriac and Ethiopic, and collected for Laud a vast number of Oriental MSS. Returning to Oxford (1636), he was appointed Laudian Professor of Arabic, but shortly repairing to Constantinople on a second quest after MSS., came back to find the archbishop in the Tower. P. thereupon retired to his college living of Childrey, Berkshire, but in 1647 regained his professorship through the offices of Selden, and a year later was promoted to the chair of Hebrew, with a Christ Church canonry annexed. He was ejected from the latter (1650), but reinstated at the Restoration, aided Brian Walton in his Polyglot Bible (6 vols. 1657), and died at Oxford, September 10, 1691, leaving two sons, Edward and Thomas, who were also distinguished Orientalists. P. published *Specimen Historiæ Arabum* (1649), *Porta Mosis; or, Six Discourses of Maimonides* (1655), *Carmen Abu Ismaelis Tograi* (1661), commentaries on Micah, Malachi, Hosea, and Joel, &c. His *Theological Works* were edited by L. Twells, with a life prefixed (2 vols. Oxf. 1740).—Richard Pococke, D.D., a member of the same family as the preceding, was born in 1704 at Southamptom, entered Corpus Christi College, Oxford, and graduated LL.D. (1733). He traveled on the continent (1734–36), and in Egypt, Syria, Mesopotamia, and Asia Minor (1737–41), publishing on his return to England *A Description of the East and of some other Countries* (2 vols. Lond. 1743–45). He became precentor of Waterford (1744), Archdeacon of Dublin (1745), and Bishop of Ossory (1756). Hence he was translated to Elphin, and lastly to Meath, where he died, September 1765.

POINTE-A-PITRE, the chief town of the division Grand Terre in the French island of Guadeloupe, on the Petit Cul-de-Sac, 20 miles N.E. of Basse Terre. It has an excellent harbor, and carries on an active export trade in sugar, rum, coffee, tobacco, &c. Pop. 15,000.

POI'TREL is the name that was applied to the hinged or flounced plate which covered the breast of an armor-clad warhorse in the 15th c.

POLE'WIG (*Gobius minutus*), a species of Teleostean fishes belonging to the Gobies, and distinguished by its small size and transparent grey color, varied with black dots and dark patches.

POLITICAL PARTIES IN THE UNITED STATES. Under a republican form of government it is essential that there should be at least two political parties, in order that each may serve as a safeguard against the other; and it is perhaps desirable that they should be nearly balanced in power. Then, if the party in authority, should violate its trust, the people can promptly remedy the evil, by transferring their allegiance to the other. It is the purpose of this article to briefly outline the careers of the parties which have appeared from time to time in the political history of the U. S. During the exciting times which immediately preceded the Revolutionary struggle, and during that struggle, the colonists were divided into Whigs and Tories.

The former of these were ardent patriots and in full sympathy with the movement for independence, while the latter still clung to the mother government and aided the armies of Great Britain in every possible way, many of them taking up arms and entering the British service. The conflict with England having been brought to a happy conclusion, the next question which engaged the minds of American statesmen, had reference to what mode of government should be permanently adopted. This gave rise to a difference of opinion and resulted in producing what are known as the Federal and Anti-Federal parties. The Federalists favored a strong central government, and were led by such men as Hamilton, Madison, and Jay. The Anti-Federalists, on the other hand, were opposed to making the Union of the States anything more than a loose confederation. They were led by Patrick Henry, Samuel Adams, and others. The former of these parties desired the adoption of a constitution, while the latter were opposed to any great modification of the original Articles of Confederation. In this struggle the Federalists were the victors.

In 1787 a convention met at Philadelphia and framed a Federal Constitution, which was subsequently ratified by the requisite number of states. The Anti-Federalists eventually developed into the Republican Party, and by 1793, the line between the two parties, Federalists and Republicans, was plainly drawn. The latter opposed all further grants of power by the states to the Union, and charged their opponents, the Federalists, with monarchical tendences. It does not lie within the province of this article to pursue the struggle between these parties in its details, the general character of their aims having already been indicated. Among the leaders of the Federalists were John Adams, Thomas Pinckney, De Witt Clinton, Alexander Hamilton, and Rufus King; while among the Republican leaders were George Clinton, Thomas Jefferson, Aaron Burr, Madison, Monroe, and others. Early in the present century, about 1805, the Republicans dropped their name and accepted that of Democrats, thus beginning the history of the Democratic Party of to-day.

In 1828 the National Republican Party appeared upon the scene of action, and nominated J. Q. Adams for the presidency against Andrew Jackson. This party subsequently developed into the Whig Party, which, in 1840, elected Harrison president over Van Buren, Democrat. The struggle between Whigs and Democrats, principally over matters of public improvement, continued down to 1856, when the Republican Party, an outgrowth of the Free Soil Party and anti-slavery Whigs, appeared. The struggle between these two parties for dominance has continued down to the present day. The first issues between the Democratic and Republican parties were with reference to slavery, but since the abolition of that institution through the Civil War, new issues are springing up, and the memory of old ones is ceasing to influence voters. Besides these there have been numerous other political parties, based upon lesser issues, and failing to influence large votes. In 1856 the American Party nominated Fillmore for president. This party, sometimes called Know-Nothings, was based upon opposition to the foreign element in American politics, and had but an ephemeral existence. See Anti-Renters and Anti-Masons in Am. Supplement.

POLK, Leonidas, a Confederate general, born at Raleigh, N. C., in 1806, and graduated from West Point in 1827. Having resigned from the army, he was in 1831 admitted to the ministry of the Episcopal church; in 1838 became bishop of Arkansas and the Indian Territory; and in 1841 was made bishop of Louisiana. In 1861 he entered the service of the Confederate States, with the rank of major-general. He was engaged at Murfreesboro', Chattanooga, and Chickamanga, and was killed at Pine Mountain, Ga., June 14, 1864.

POLLARD, Edward A., an American historical writer, born in Virginia in 1838. During the civil war, he edited the Richmond *Examiner*. His principal works are *The Lost Cause Regained*, *Eight Months in Prison*, *Life of Jefferson Davis*, *Southern History of the War*, *Life of Jefferson*, *The Lost Cause*, and *Lee and his Lieutenants*.

POLLILORE, a town in the district of Chingleput, Madras Presidency, British India, near Conjeveram, and 43 miles S.W. from Madras. It is the scene of two battles. In 1780 Colonel Baillie was here completely defeated and taken prisoner by Hyder Ali. This was the greatest defeat the British had hitherto sustained in India. The lives of the prisoners were only saved by the intervention of Hyder's French officers. Paintings commemorative of the victory are still to be seen at Seringapatam. But in the following year, on the anniversary of the former battle according to the lunar calendar, Sir Eyre Coote won his first victory over Hyder Ali on the same spot.

POLL'OCK, Sir George, a son of David P., saddler to George III., was born in Westminster, England, 4th June 1786, and educated at a school in Vauxhall. He entered the Military Academy of Woolwich (1801), sailed for Calcutta (1803), and received his commission as lieutenant of artillery in the service of the East India Company (1804). He was present at the storming of Deeg and the unsuccessful assault on Bhurtpore (1805), in the Nepaulese campaign commanded the artillery under General Wood (1817), and for his services as lieutenant-colonel in the war with Burmah received the Companionship of the Bath (1825). In the Afghan War of 1842, with a single battalion of infantry, one regiment of dragoons, and fourteen guns, he forced the Khyber Pass, defeated Akhbar Khan, and by his occupation of Cabul effected the relief

of Jellalabad, being rewarded for these splendid services by the thanks of Parliament, the Grand Cross of the Bath, and a life pension of £1000 from the East India Company. He was appointed envoy at the court of Oude (1843) and military member of the Supreme Council (1844), returned to England (1846), and took up his residence at Clapham, obtaining his promotion as lieutenant-general (1851) and general (1859), whilst holding the senior directorship of the Company (1854–56). He was created field-marshal (1870), Constable of the Tower (1871), and a baronet (1872), and dying at Walmer, 6th October 1872, was buried in Westminster Abbey. See C. R. Low's *Life and Correspondence of Sir George P.* (1873).—SIR FREDERICK P., elder brother of the preceding, was born in London, 23d September 1783, and passing from St. Paul's School to Trinity College, Cambridge (1802), was Senior Wrangler and Smith's Prizeman (1806), and obtained a college fellowship (1807). Called to the bar at the Middle Temple in the same year, he traveled the Northern Circuit, dividing its honors with Brougham, Scarlett, and Campbell, was made a King's Counsel (1827), and returned as Conservative member for Huntingdon (1831). Having served as Attorney-General in Peel's Ministries of 1834 and 1841, he was created Lord Chief Baron of the Exchequer (1844), on the resignation of which office in 1866 he received a baronetcy. He died 23d August 1870.

POLYCYSTI'NA, a group of *Protozoa*, belonging to the class *Rhizopoda*, and allied to the *Foraminifera*. These animals are all microscopic, and possess shells of flinty material, and of exceeding delicacy of form and beauty of outline. They are usually included in the group *Radiolaria*. Many species occur in a fossil state, the so-called 'Infusorial earth' of Barbadoes being almost entirely composed of the minute shells of P. This deposit is of Tertiary age.

POL'YGAR (*palegara*, 'tent-man'), the name applied to a class of petty chieftains, who were found by the British at the close of the last century established in the S. of India, especially in the Carnatic. They occupied hill forts, and lived by plunder. They offered a strenuous opposition to the pacification of the country; but the majority were dispossessed, and the remainder, deprived of their independence, have settled down into ordinary *zemindars* or landholders.

POLY'PIDE, a name used in Zoology to indicate the separate individuals composing a *Polyzoön*, or member of the class *Polyzoa*.

POLYPRI'ON, a genus of Teleostean fishes represented by the Stone Basse (*P. cernium*), or Couch's P., and by other species. It is nearly allied to the perch, and is included in the family *Percidæ* itself. Its color is a dark brown, tinted with purple. The first fin rays are spiny. The Stone Basse usually swims near floating timber and wreckage, and appears to feed on smaller fishes.

POMEROY, in Meigs Co., O., on the Ohio River, 239 miles below Pittsburgh. It is connected with Cincinnati and the other river towns by a daily line of packets, and is engaged in coal-mining and the manufacture of salt. Pop. 7600.

PONCE, a town on the S. coast of the Spanish island of Puerto Rico, standing about 3 miles inland from its harbor, has a Catholic church in semi-Moorish style, an Anglican church (1874), a well-built townhall, a theater with accommodation for 2000 people, and an hospital erected (1875) at a cost of $40,000. The streets are lit with gas, and waterworks have been constructed. The steamers of the Royal Mail Company touch weekly at the port, and there is telegraphic communication with Jamaica and Santa Cruz. The exports (sugar, molasses, coffee, and tobacco) amounted in 1884 to $2,400,000; the imports (hardware, lumber, provisions, &c.) to $2,100,000. Estimated pop. (1877) 12,000.

PONSÆ'LION is the name of a new and beautiful scarlet pigment prepared by boiling cyanide of potassium with binoxide of mercury, adding a solution of caustic potash, and when cold bisulphide of carbon. The resulting precipitate passes rapidly through a variety of tints, and after a day's exposure to the air assumes a brilliant vermilion hue, which is permanent. P. was first obtained from Newcastle coals, and it derives its name from *Pons Ælii*, the Roman Newcastle-on-Tyne.

PONTIAC, a North American Indian chief of the Ottawa tribe, born in 1712. He early allied himself with the French, and it is thought that he was present at Braddock's defeat. In 1760 he organized a vast conspiracy with other tribes for the extirpation of the English. The effort, however, proved a failure, and, deserted by his followers, he was forced to submit to English rule. In 1769 he was murdered by an Illinois Indian. An account of his life can be found in Parkman's *Conspiracy of Pontiac*.

PONTIAC, in Oakland Co., Mich., on the Clinton River, and the Detroit, Grand Haven & Milwaukee and other railroads, 26 miles from Detroit. It is one of the principal wool and produce markets of the state, and is a place of active trade. The Eastern Michigan Insane Asylum is here located. Pop. 5100.

POOLE, PAUL FALCONER, R.A., a self-taught painter, was born at Bristol, England, in 1810. He exhibited his first Academy picture, 'The Well, a Scene in Naples,' in 1830; his second, 'The Farewell,' in 1837, after which he was a regular exhibitor, being elected A.R.A. in 1846 and R.A. in 1861. His works, if somewhat defective in drawing and monotonous in color, are strikingly original and harmonious. Among his later productions are 'Philomena's Song by the Beautiful Lake' (1867), 'The Spectre Huntsman of Onesti's Line' (1870), 'Imogen before the Cave of Belarius' (1871), and 'A Lion in the Path' (1873), the last a noble Poussinesque landscape.

POPE, JOHN, an American general, born in Louisville, Ky., March 16, 1823, and graduated from West Point in 1842. During the Mexican war he won promotion, by his gallantry at Monterey and Buena Vista. In 1861 he was made brigadier-general of volunteers, and given a command in Missouri, where he captured a Confederate camp at Milford, with large supplies, in Dec. of that year. In 1862 he was made major-general, and in April of that year led the force which captured Island No. 10, an important Confederate station in the Mississippi. By this victory nearly 7000 prisoners and large quantities of arms were taken from the enemy. In July, 1862, Pope was brought East, and placed in command of the army of Virginia, but after the battles of Bull Run, and Chantilly, he resigned the position, and was returned to his command in the North-west. He is now (1884) living at Fort Leavenworth, Kansas.

POPERINGHE, a walled town of Belgium, province of W. Flanders, within 4 miles of the French frontier, and 10 W. of Ypres by rail. It has manufactures of linens, woollens, lace, tobacco, and pottery, and a trade in hops, which are extensively raised in the vicinity. Pop. (1873) 10,868.

PORCELAIN CRAB, the general term applied to the members of the family *Porcellanidæ*, in which the shell is smooth and porcelain-like. The *Porcellana platycheles*, or broad-clawed porcelain crab, is a familiar species.

PORCUPINE CRAB (*Lithodes hystrix*), a species of crab occurring on the coasts of Japan, and so named from the numerous spines that everywhere spring from its shell and limbs. The hinder pair of legs are small. The northern spine crab (*Lithodes maia*) of the English coasts also belongs to the genus of P. C.

PORDENONE, properly, GIOVANNI ANTONIO LICINIO, one of the greatest of the Venetian fresco and oil painters, was born at Pordenone, in Friuli, in 1484, and was the contemporary and the not unsuccessful rival of Titian and Giorgione. Many specimens of his best works are to be seen in the churches and mansions of Upper Italy; his noblest oil-painting is the altar-piece in the church of Santa Maria dell' Orto, Venice; while in England he is represented by portraits and other subjects in the National Gallery, South Kensington, and in private collections. P. died in 1540 at Ferrara.

POR'PORA, NIC'OLO, a musician, born in Naples in 1689, died in 1767. He was a pupil of Scarlatti, and the composer of about fifty operas and a number of religious compositions, which, though now but little known, were received with great favor at the time. His style in recitative has always been highly esteemed. See Fétis, *Biographie Universelle des Musiciens* (1878).

PORR'IDGE (a corruption of *pottage?*) is a very nutritious article of food, made from oatmeal by sprinkling it in boiling water, slightly salted, and constantly stirring till the whole thickens. It is usually eaten to breakfast with milk, butter, or treacle, and is a favorite diet of the Scottish peasantry.

PORTAL VEINS, the system of veins existing in Vertebrate animals for the purpose of conveying blood to the liver, for the manufacture or secretion of bile. This system of veins consists of four trunks, receiving the venous blood from the digestive system. These four trunks are the *inferior* and *superior mesenteric*, *splenic*, and *gastric* veins. The single vein (*vena portæ*) formed by their union enters the liver. It is destitute of valves. The splenic and gastric veins unite with the other two veins, the inferior and superior mesenteric; and these two in turn unite to form the *portal vein*. The union of the two mesenteric veins takes place in front of the vena cava, and behind the upper border of the larger extremity of the *Pancreas* or sweetbread.

PORT BLAIR, the chief town of the Andaman Islands, and the headquarters of the Indian convict settlement. The penal settlement contains 7000 prisoners, arranged in six classes, and employed in clearing jungle, cultivation, &c. The annual cost is about $500,000. It was on the pier of the harbor at this place that Lord Mayo, the Governor-General of India, was stabbed by a Mohammedan convict from the N.W. frontier on 23d February 1872.

PORTER, FITZ JOHN, an American general, born at Portsmouth, N. H., in 1822, and graduated from West Point in 1845. He served in the Mexican war, was promoted for his gallant con-

duct at Molino del Rey and Chapultepec, and was wounded in the assault upon the capital. In 1861 he was made brigadier-general of volunteers, and in the latter part of that year, was placed in command of a division of the army of the Potomac. He participated in the battles of Mechanicsville, Gaines' Mill, Malvern Hill, Second Bull Run, and Antietam. In Nov. of 1862 he was tried by court-martial for disobeying the orders of his superior, Gen. Pope, at Manassas, and on Jan. 21, 1863, was cashiered from the service. He is now (1884) living in New York City, where he holds the office of police commissioner.

PORTER, Noah, D.D., an American philosopher and author, born at Farmington, Connecticut, December 14, 1811, graduated at Yale College (1831), was a schoolmaster at New Haven (1831–33) and a tutor at Yale (1833–35). He became pastor of the Congregational Church at New Milford (1836), removed to Springfield (1843), and was chosen Clark Professor of Metaphysics and Moral Philosophy at Yale College (1846), succeeding Dr. Woolsey in the presidency of that institution (1871). A scholarly metaphysician, and in particular well versed in modern German philosophy, P. has written *The Educational Systems of the Puritans and the Jesuits Compared* (1851), *The Human Intellect* (1868). *Books and Reading* (1870). *Elements of Intellectual Philosophy* (1871), *The Science of Nature versus the Science of Man* (1871), &c.

PORTER, Sir Robert Ker, K.C.H., an English artist and traveler, brother to the novelists Jane and Anna Maria P., was born at Durham in 1780, and became a student in the Royal Academy in 1790. Two years afterwards he produced his first large work, 'The Storming of Seringpatam,' which was followed by 'The Siege of Acre,' 'The Battle of Agincourt,' 'The Battle of Alexandria,' and 'The Death of Sir Ralph Abercromby.' In 1804 he visited Russia, was created historical painter to the Emperor, and executed some important works, including the decoration of the Admiralty Hall at St. Petersburg. Here he became acquainted with the Princess Mary, daughter of Prince Theodore von Scherbatholff, whom he married in 1811.

After accompanying Sir John Moore throughout the Spanish campaign to the final catastrophe at Corunna, P. returned to England, where he was knighted by the Prince Regent in 1813. From 1817 to 1820 inclusive he was occupied in making those extensive travels in Asia, of which he has given an interesting and valuable account in his work *Travels in Georgia, Persia, Armenia, Ancient Babylonia, &c* (2 vols. 1821–22). From 1826 to 1841 he resided as consul at Caracas, Venezuela, where he painted three of his best pictures, viz., 'Christ at the Last Supper Blessing the Cup,' 'Our Saviour Blessing the Little Child,' and an 'Ecce Homo.' In 1841 he revisited St. Petersburg in company with his sister Jane, and died there, May 4, 1842. His other books are *Traveling Sketches in Russia and Sweden* (2 vols. 1808); *Letters from Portugal and Spain. Written during the March of the Troops under Sir John Moore* (1809); and *Narrative of the late Campaign in Russia* (1813).—Jane P., sister of the preceding, was born at Durham in 1776, and educated at a school in Edinburgh, and afterwards in London. In 1803 she published her first novel, *Thaddæus of Warsaw*, which was translated into several languages, and led to her being afterwards elected 'lady canoness' of the Teutonic order of St. Joachim. In 1809 appeared *The Scottish Chiefs*, which greatly added to her fame as a 'historical' novelist. The best known of her other works are *The Pastor's Fireside; Duke Christian of Luneburg; The Field of Forty Footsteps; Sir Edward Seaward's Diary*. She also wrote along with her sister *Tales Round a Winter's Hearth*. In 1842 she went with her brother to St. Petersburg, returning to England after his death. She died at Bristol, 24th May 1850.—Anna Maria P., sister of the two preceding, was born in 1780, and died at Bristol, 21st June 1832. Like her sister, she wrote tales chiefly of a historical character, of which the principal are *Octavia* (1798); *The Hungarian Brothers* (1807); *Don Sebastian* (1809); *The Barony* (1830), and *Artless Tales* (1793).

PORT HURON, in St. Clair Co., Mich., on the Canada Grand Trunk and other railroads, 56 miles from Detroit. It is engaged in lumbering, ship-building, and lake commerce. It is also an extensive grain and wool market. Pop. 11,000.

PORT JERVIS, a town of Orange Co., N. Y., on the Delaware River, the Delaware & Hudson Canal, and the N. Y., Lake Erie & Western Railroad, 88 miles from New York City. It is connected with Monticello, the county seat of Sullivan Co., by the Port Jervis & Monticello Railroad. Extensive tracts of timber lands are within easy reach. Pop. 9500.

POSAUNE, a reed organ-stop. The pipes in connection with the manuals are generally metal, 8 feet in length; those in connection with the pedals, metal or wood, 16 or 32 feet in length. The tone is peculiarly rich and resonant.

POST'-HORN, a wind instrument formed by a simple metal tube.

POTENTIAL is a function of great importance in the theory of attractions. Its value was first recognized by Laplace in his investigations upon the figure of the earth, but it received its present name from Green, who applied it with great power to electrical problems: and now it forms the central conception of the mathematical theory of attraction. Sir W. Thomson has defined the P. of a conductor charged with positive electricity as the work which must be spent in removing an unit of negative electricity from the surface to an infinite distance, supposing the distribution to remain constant during the operation. With a slight modification the definition may be made to apply to the cases of magnetism and gravitation. Further, the P. at any point with reference to the attracting body is the work which must be done to remove an unit quantity from that point to an infinite distance. Hence the work done upon an unit quantity in removing it from one point to another is measured by the difference of the potentials at these points. If the points are very close together, then the work done may be represented by the product of the distance into the average force overcome through that distance; and therefore the force at any point in any direction due to an attracting system is the rate of increase of the P. at that point per unit of length in the given direction. In electrokinetics there cannot be a transfer of electricity without a difference of P. Accordingly, P. is in the theory of electricity what temperature is in the theory of heat, what pressure is in hydrodynamics. As heat flows from a body of higher temperature to a body of lower temperature, as fluid flows from the place of greater pressure to the place of less, so does electricity flow from the region of higher P. to the region of lower. In the mathematical theory of attractions, the existence of a P. for a given system of forces is the criterion that that system is a conservative system—*i. e.*, that it satisfies the principle of the conservation of energy. All known forces belong to this category.

POTICHOMANIE is a process by which pretty and tasteful imitations of opaque painted porcelain can be made from vases, &c., in plain clear glass. It consists in gumming painted or printed designs, cut out of paper, to the inside of the glass article, coating the paper with size, and afterwards applying white or tinted oil paint over the whole internal surface.

POTTER, Alonzo, D.D., LL.D., an eminent American bishop of the Episcopal church, born at La Grange, N. Y., July 10, 1800, and graduated from Union College in 1818. After holding various important positions in his denomination, he was made bishop of Pennsylvania in 1845. Died at San Francisco, Cal., July 4, 1865. He published *Political Economy, Handbook for Readers and Students, Religious Philosophy*, and other works.

POTTER, Cipriani, an English musician, born in London, England, in 1792, was principal of the Royal Academy of Music from 1832 to 1859. He composed nine symphonies, a number of overtures, the cantata of *Medora e Corado* (1830), several violin quartets, and a great quantity of works for the piano. P. greatly improved the English school of pianoforte playing, and trained many of the most distinguished players and teachers of that instrument. He died September 26, 1871.

POTTER, Horatio, D.D., LL.D., brother of Alonzo, born in Dutchess Co., N. Y., in 1802, and educated at Union College. He entered the ministry of the Protestant Episcopal Church, and, after presiding over several parishes, was, in 1854, made provisional bishop of the diocese of New York; and, in 1861, became bishop, upon the death of Bishop Onderdonk, which position he continues to hold (1885).

POTTINGER, Eldred (Major), the hero of the siege of Herat, was born in 1811 at Mount Pottinger in County Down. At the age of seventeen he went out to Bombay as an artillery cadet. His uncle, Sir Henry P., was Resident in Scinde, and under his patronage he started from Peshawur in 1837 as an independent traveler to penetrate Afghanistan. He adopted the disguise of a *Syud* or holy man, which he did not put off till he had reached Herat, after many risks. This town, then held by an Afghan prince, was forthwith besieged by the Persians, led by the Shah in person, and it held out for almost a year, until relieved by a British diversion in the Persian Gulf. The successful defence is entirely attributed to the exertions and courage of P. As political agent during the disastrous Afghan war of 1841–42, he was compelled to sign the treaty which Lord Ellenborough repudiated. In 1843 he died of fever at Hong-Kong, while on a visit to his uncle, Sir H. P. See *Lives of Indian Officers*, by Sir J. W. Kaye (Lond. 1867).—Sir Henry P., uncle of the preceding, born in 1789, was also a distinguished Indian officer in the political or diplomatic department. For his services in Scinde he received a baronetcy in 1839. He was ambassador to China (1841–42), governor of Hong-Kong (1843–44), of Cape Colony (1846–47), and of Madras (1847–54). P. died at Malta, 18th March 1856.

POWHATTAN, an Indian chief of Virginia, who with his confederated tribes, occupied the country about Jamestown, at the time of its settlement in 1607. He was the father of Pocahontas.

the Indian princess, who interfered, and saved the life of Capt. Smith, when he was about to be put to death by her father's orders. The number of Powhattan's subjects has been estimated at about 8000. Died in 1618.

POYN'INGS LAW, or Statute of Drogheda, passed in 1495, provides that all Acts then or lately passed in England concerning its common weal should be effectual in Ireland. It further provided that no parliament should be held in Ireland until the Lord-Lieutenant had certified to the English crown the cause for holding it, and license had been given by the sovereign. P. L. was repealed, and the Irish Parliament emancipated, in 1783.

PRAED, WINTHROP MACKWORTH, a kinsman on his mother's side of the 'Father of Massachusetts,' was born in London, England, July 26, 1802, and sent in his ninth year to Langley Broom School, near Colnbrook. Thence he passed to Eton (1814), where his career was singularly brilliant, his editorship of the *Etonian* (1820–21) revealing to Charles Knight, its publisher, 'an unbounded fertility of mind and readiness of resources.' Entering Trinity College, Cambridge (1821), he gained six university medals for Greek and English verse, came out third in the classical tripos (1825), and was elected fellow of his college (1827). At Cambridge, with Macaulay, Moultrie, and Sidney Walker, he wrote for Knight's *Quarterly* (1822–23), and during a residence at Eton as tutor to the Marquis of Ailesbury's son (1825–27) had the chief management of the short-lived *Brazen Head*. In 1829 he was called to the bar at the Middle Temple, and traveled the Norfolk circuit with high success; but a seat in Parliament had always been his ambition, and in 1830 he stood for St. Germains as a Conservative, he and Macaulay having changed places in politics, since the days when they debated at the Cambridge Union. This borough was disenfranchised two years later, and P. afterwards sat for Yarmouth and Aylesbury, in 1834 filling the post of secretary to the Board of Control. His parliamentary career was hardly equal to the expectations formed of him, and its possibilities were closed by his early death, July 15, 1839. P.'s mock heroics, charades, *vers-de-société*, and political pasquinades, many of which appeared in the *Literary Souvenir*, are admirable in their kind, sparkling with subtle wit and polished sarcasm, while their freedom from the least taint of bitterness reflects the lovable nature of their author. Some of them were collected and reprinted at New York in 1844 and 1859, but the first complete edition is that published at London (2 vols. 1864), with a Memoir prefixed by Derwent Coleridge.

PRA'TI, GIOVANNI, an Italian poet, born at Dascindo, near Trent, January 27, 1815, studied jurisprudence in the University of Padua, and in 1841 published the sorrowful love-poem *La Edmenegard*, which won so wide a popularity that its author resolved henceforth to devote himself entirely to the Muse. Early inspired by the vision of a united Italy, he nevertheless incurred the suspicion of his countrymen by his devotion to the House of Savoy, and on the outbreak of the Revolution of 1848 was hunted from Padua to Venice, and from Florence to Turin. In 1849 P. was appointed *Poeta Cesareo* to Charles Albert; in 1862 he was elected a deputy in the Italian Parliament. P.'s earlier romantic and political poems are infinitely superior to his later productions, in which he seeks to develop a mystic philosophy, though both are marked by a grace of thought and diction which go far to make up for a lack of spontaneity and original conception. To the former class belong *Canti Lirici*, *Canti per il Popolo*, and *Ballate* (1843). *Memorie e Lacrime* (1844), and *Passegiate Solitarie* (1847); to the latter, the epics *Rodolfo* (1855), *Il Conte Riga* (1856), and *Ariberto* (1860). A complete edition of his works appeared at Milan (1862). See Marchese, *Le Poëte P.* in the *Revue des Deux Mondes* (March 1856).

PRATO ('the meadow'), a town of Italy, province of Florence, 10 miles N.W. of the city of Florence, lies in a fertile plain on the right bank of the Bisenzio, and is a station on the Florence and Pistoja Railway. It has an ancient citadel, a magnificent cathedral, manufactures of straw-plait, silk, and woollen fabrics, and important publishing works. Pop. (1874) 39,594.

PREBLE, EDWARD, an American naval officer, born at Portland, Me., Aug. 15, 1761. In 1779 he entered the Continental navy, and by his daring courage, rapidly gained distinction. From the close of the Revolutionary war until 1799, he was engaged in the merchant service. In 1803 he was placed in command of the fleet sent against Tripoli. In this enterprise he met with highest success, and, upon his return home, was awarded a gold medal, with the thanks of Congress. Died in Portland, Me., Aug. 21, 1807.

PRELL'ER, FRIEDRICH, a German painter, was born at Eisenach, 25th April 1804, and educated at Weimar, Dresden, and Antwerp. He resided from 1827 to 1831 at Rome, whence he returned in the latter year to become a professor at Weimar. Among the chief works of P., who excelled equally as a landscape and historical painter, are the series of mural paintings from the *Odyssey* in the museum at Weimar, the landscapes from Wieland's *Oberon* in the 'Wielandzimmer' of the grand-ducal palace of Weimar, and his sixteen cartoons from the *Odyssey* in the museum at Leipsic (reproduced by M. Jordan, Leips. 1875, and chromo-lithographed by Steinbock, Minn. 1876 *et seq.*). P. produced another series of forty illustrations to the *Odyssey* (engraved on wood by Brend'amour and Oertel; 2d ed. Leips. 1873), and more recently a series of similar cartoon illustrations to the *Iliad*. He died in April 1878.—LUDWIG P., born at Hamburg, 15th September 1809, after studying (from 1828) philology at Leipsic, Berlin, and Göttingen, settled first (1833) as a 'privat-docent' at Kiel, then as a professor at Dorpat (1838–43), and in 1844 became professor at the University of Jena. Appointed in 1847 chief librarian at Weimar, he traveled in 1852 through Greece and Asia Minor, and died at Weimar, 21st June 1861. P.'s chief works are *Demeter und Persephone* (Hamb. 1837); *Griechische Mythologie* (3d ed. by Plew, 2 vols. Berl. 1872–75); *Römische Mythologie* (2 ed. Berl. 1865); *Historia Philosophiæ Græcæ et Romanæ*, which he wrote in conjunction with Ritter (5th ed. by Teichmüller, Gotha, 1875); and *Aufsätze aus dem Gebiet der klassischen Alterthumswissenschaft* (edited by R. Köhler, Berl. 1864).

PREN'TICE, GEORGE DENISON, an American editor and wit, born at Preston, Conn., Dec. 18, 1802, and graduated from Brown University in 1823. He was admitted to practice law in 1829, but devoted his life solely to literary pursuits. For a short time he conducted the Hartford *Weekly Review*, but in 1830 became editor of the *Louisville Journal*, which sheet he continued to edit during the remainder of his life. He was the author of numerous poems, and was celebrated for his keen and ready wit. Died at Louisville, Ky., Jan. 22, 1870.

PRENTISS, ELIZABETH PAYSON, a distinguished American writer, born in Portland, Me., Oct. 26, 1818. She was the daughter of Dr. Edward Payson, and wife of Dr. George L. Prentiss. She wrote numerous works of fiction, which were noted for their sweet Christian sentiment. Her best known work, and the one upon which her fame principally rests, is *Stepping Heavenward*, which has had an enormous circulation both in the U. S. and in England. Died Aug. 13, 1878.

PRESBYO'PIA, a term used in ophthalmic science to denote long-sightedness. The opposite condition of vision is termed *Myopia*, or short-sightedness.

PRESBYTES, a genus of *Catarhine* or Old World monkeys, represented by the Simpai of Sumatra (*P. melalophos*), or Black Crested monkey; by the Entellus (*P.* or *Semnopithecus entellus*), and by the Proboscis monkey (*P. larvatus* or *Kahau*). In these monkeys the cheek-pouches are rudimentary, the thumbs short, and the tail may exceed the body in length.

PRES'IDENCY, the name given by the East India Company to their settlements at Fort William, Fort St. George, and Bombay, each of which was placed under a Governor and Council, who exercised a delegated authority over the neighboring commercial factories. Ultimately the P. of Fort William or Bengal being interpreted to include all the rest of British India which was not either Madras or Bombay, owing to the supremacy of the Governor-General, became unwieldy and has been split up into five manageable provinces, under Lieutenant-Governors or Chief Commissioners. The threefold division, however, survives in the administration of the army, and the nominal organization of the Covenanted Civil Service; and the three capitals are still known as the P. towns.

PRESSEN'SÉ, EDMOND DE, D.D., a French Protestant minister, born at Paris, 27th January 1824, was educated there, at Lausanne under Vinet, and at the Universities of Halle and Berlin. He settled in Paris as pastor of the Taitbout Chapel, and soon became celebrated as an eloquent, learned, and liberal preacher. In 1863 the degree of D.D. was conferred upon him by the University of Breslau. He has written numerous works, many of which have been translated into English:—*Histoire des Trois Premiers Siècles de l'Église Chrétienne; Jésus-Christ, son Temps, sa Vie, son Œuvre* (1866); *Discours Religieux* (1859; Boston 1867); *L'Église et la Révolution Française* (1864; Eng. trans. 1869), and *Études Évangeliques* (1867). P. is the founder of the *Revue Chrétienne*, and the *Bulletin Théologique*.—MADAME DE P., wife of the preceding, is favorably known as a writer of religious and educational works.

PRETO'RIA, the capital of the Transvaal territory, S. Africa, is situated in 25° 50′ S. lat., 28° 40′ E. long., 1050 miles N.E. of Capetown. It derives its name from Pretorius, one of the Boer leaders, and is a thriving place, well-built and with a considerable trade. Since the annexation of the Transvaal by Great Britain, the progress of P. has been so rapid that its population can only be approximately stated. It is probably 5000. P. is the see of a Bishop, who was consecrated in 1878. The surrounding district is very fertile, being capable of producing wheat, tobacco,

indigo, coffee, cotton, and the sugar-cane. Coal and other minerals are also found within it.

PRICE, Bonamy, born in Guernsey, May 22, 1807, entered Worcester College, Oxford, gained a double first in classics and mathematics (1829), became an assistant master at Rugby (1831), and was appointed Professor of Political Economy in the University of Oxford (1868). He is author of *The Anglo-Catholic Theory* (1851), *The Principles of Currency* (1869), *Currency and Banking* (1876), *Chapters on Practical Political Economy* (1878), &c., and has been a frequent contributor to the *Edinburgh* and other reviews.

PRICE, Sterling, a Confederate general, born in Virginia in 1809, and when 21 years of age removed to Missouri. He served with distinction during the Mexican war, and in 1853 was elected governor of Missouri. At the ontbreak of the civil war, after a futile attempt to lead Missouri into secession, he entered the Confederate service, in which he reached (1862) the rank of major-general. He participated in the battles of Pea Ridge, Iuka, and Corinth. In 1863 he entered into a combination with Clement L. Vallandingham and other sympathizers with the South, and established the 'Knights of the Golden Circle,' a secret association, animated by treasonable designs. In 1864 he marched into Missouri with a force of 20,000 men, but failing to receive the assistance he had anticipated from the 'Knights of the Golden Circle,' he was compelled to retreat before the army of Pleasanton and Curtis. After the termination of the war he went to Mexico, and upon land granted by Maximilian, established a colony of ex-confederates. Upon the downfall of the empire, he returned to the U. S. in very reduced circumstances, and died at St. Louis, Mo., Sept. 27, 1867.

PRIDEAUX, John, born at Stanford, Devonshire, England, September 17, 1578, entered Exeter College, Oxford, as a servitor (1596), obtained a fellowship (1602), took orders (1603), and was elected rector of his college (1612). In 1615 he became Regius Professor of Divinity, canon of Christ Church, and rector of Eweline, and in 1641 was consecrated to the See of Worcester. The outbreak of the civil war, and P.'s adherence to the king, lost him its revenues, and he was forced to find bread for himself and his children by the sale of a precious library. He died at Bredon, in Worcestershire, July 12, 1650.

PRIM, Juan, a Spanish soldier and politician, born at Reus, in Catalonia, December 6, 1814, rose rapidly in the army of the Christinos to the rank of colonel (1837), and as a *Progressiota* aided Narvaez in his overthrow of the regent Espartero (1843). By the new government he was created count, general, and governor of Madrid, but in 1845 his opposition to Narvaez led to his arrest and condemnation to six years' imprisonment. Christina, however, pardoned him, and he held the governorship of Puerto Rico, till, being dismissed in 1848, he rejoined the opposition, and in 1853 was banished to France. He served as a volunteer in the Turkish army (1854), under O'Donnell's ministry was returned to the Spanish Senate (1858), and in the war with Morocco won by his services as commander of the reserves the title of Marquis de los Castillejos (1860). Appointed to the command of the Spanish contingents in the Mexican war of the Allied Intervention, he formed with Juarez the Convention of Soledad (1862), which measure he barely justified by his three days' defence before the Cortes. In 1864 he was banished to Oviedo on a charge of conspiracy, and after an abortive rising at Aranjnez (1866) fled to Portugal, thence to England, and finally to Belgium. From Brussels he directed the insurrection of 1868, which resulted in the flight of Isabella and in his own triumphal entry into Madrid, where he was minister of war in Serrano's provisional government, and became marshal, commander-in-chief, and president of the cabinet (1869). As such he had successively offered the vacant throne to Espartero, Prince Leopold of Hohenzollern, and Amadeus, when on December 27, 1870, he was shot in his carriage by some unknown assassins, and three days later died at Madrid. A splendid monument was consecrated to his memory in the Atocha Basilica, June 5, 1875.

PRIMATICCIO, Francesco, the founder of the Fontainebleau school of painting, was born at Bologna in 1490, and became a pupil of Giulio Romano, whom he helped in the decoration of the Palazzo del Tò at Mantua. In 1531 Duke Federigo Gonzaga recommended him to François I. of France, who, after employing him to collect statues and casts, bestowed on him the office of court-painter, with the abbacy of St. Martin de Troyes. He was appointed Superintendent of the Royal Buildings by François II. (1559), and died in 1570. The grace and harmonious coloring of P.'s allegorical frescoes at Fontainebleau go far to redeem their tasteless and often obscure subjects and their frequent faultiness of design. Other works by him are the 'Continence of Scipio' in the Louvre, 'Moses striking the Rock' at Vienna, and 'An Angel showing a Young Man the way to Heaven' at Darmstadt.

PRIME, Samuel Irenæus, D.D., a prominent American clergyman and editor, born at Ballston, N. Y., Nov. 4, 1812, and graduated from Williams College in 1829. He pursued theological studies at Princeton Seminary and was admitted to the ministry of the Presbyterian Church. He filled several pastorates, and in 1840 became editor of the New York *Observer*, which he has made one of the leading religious journals of America, and which he still edits (1885). He has published *Life of Samuel F. B. Morse. Travels in Europe and the East, The Alhambra and the Kremlin, Letters from Switzerland, The Bible in the Levant*, and others.

PRINCETON, Battle of, a battle of the Revolution, fought near where Princeton College, N. J., now stands, between Continental forces, under the command of Washington, and a British force, commanded by Lord Cornwallis, Jan. 3, 1777. The Americans surprised their adversaries and routed them, after a fierce struggle of less than a half hour, with severe loss. Washington took 230 prisoners, and his own losses were slight. The result of the battle did much to inspire the disheartened colonists with new hopes.

PROCŒ'LIA, a division of the order *Crocodilia*, including all the living members of the group, and named from the form of the bodies of the vertebræ or joints of the spine, these being hollow, or concave in front and convex behind. Extinct crocodiles had *amphicœlous* or fish-like vertebræ (*i. e.*, hollow at either extremity) or *opisthocœlous* vertebræ—the opposite of the procœlous.

PROCTOR, Richard Anthony, a distinguished astronomer, born at Chelsea, England, March 23, 1837, and educated at King's College, London. He has published numerous works on astronomical subjects, the most celebrated of which is *Other Worlds than Ours*. He has twice visited the U. S. and lectured before large audiences in our largest cities.

PROCYON, a star of the first magnitude in the costellation *Canis Minor*. It is readily found from its proximity to Orion, which it follows through the heavens. It forms with Sirius and Betelgeuse a nearly equilateral triangle.

PRODD, a light crossbow used in sporting, especially by ladies, during the 16th and 17th centuries. Queen Elizabeth is reported to have been very expert in shooting deer with it. In the reign of Charles I. the P. was sometimes combined with the petronel.

PRODUC'TA, a well-known genus of Brachiopodous shells, forming the type of the family *Productidæ*. In this group, which includes only fossil forms, the shell was free, or was attached to rocks directly, and without the intervention of a stalk. No 'carriage-spring apparatus' existed for the support of the arms. The genus P. itself first occurs in a fossil condition in the Devonian period, and ranges through the Carboniferous to the Permian rocks. It is thus exclusively Palæozoic in its distribution. *P. Cora* of the Carboniferous is a typical example. The shell is long, crosswise, and may have ear-like proeesses. The hinge-line is straight, and the ventral-valve is convex. The shell surface is marked with prominent lines.

PROME, the chief town of the district of the same name in British Burmah, on the left bank of the Irawaddy, 175 miles N. of Rangoon; pop. (1872) 25,631. It was captured in the first Burmese war of 1825, and permanently annexed after the second war in 1852. P. has considerable commercial importance, as the highest station in British territory of the steamboat traffic on the Irawaddy, and the frontier town towards Independent Burmah. In 1877 a state railway was opened from Rangoon to P.—The *district* of P., which lies on the E. bank of the river, has an area of 2887 sq. miles, and a pop. (1872) of 274,872.

PROOF, in engraving is an early impression from an engraved copper or steel plate, and when it is taken on thin paper, of a pale buff color, prepared from bamboo stalks, and imported from the East Indies, it is called an *India-P.* In printing, the first impression is called a *first-P.*; after correction, the second is termed a *clean-P.*; then follows a *revise;* and finally a *press-P.*

PROTHALL'US (Gr. *pro*, 'forth,' and *thallos*, 'a young shoot'), a term used by botanists to denote the first results of spore germination in the higher cryptogams. This is a kidney-shaped membrane in ferns, a bulb-like form in adder's tongues, and a bundle of adnate threads in horsetails. In all these cases the new plant springs from the impregnation of a cell in peculiar organs called archegonia.

PROTOR'NIS (Gr. 'first bird'), a genus of fossil *Insessorial* or Tree-Perching Birds. The *P. Glarisiensis* of the Eocene deposits of Switzerland represents the oldest known fossil of Insessorial birds. P. appears to have been related to the existing larks.

PROV'IDENCE is the name given to the order of nature in reference to the provision made beforehand for the existence and well-being of all living creatures, especially mankind. In a wider sense P. is made to refer also to inanimate nature, and is sometimes used as a synonym for God.

PROVINCETOWN, a town of Barnstable Co., Mass., on the Northern extremity of Cape Cod, and the terminus of the Old Colony Railroad, 120 miles from Boston. It has a commodious harbor, and is extensively engaged in mackerel, cod, and whale fisheries and ship-building. It is also a summer resort, and is celebrated as the first landing place of the Pilgrims in America. Pop. 4345.

PROVO CITY, in Utah Co., Utah, at the junction of the Denver & Rio Grande and the Utah Central Railroads. It contains grist and saw mills, tanneries, a large woollen factory, and the Territorial Insane Asylum. The surrounding community is engaged in agriculture. Pop. 5200.

PTEROSAU'RIA (Gr. 'winged lizard'), an order of extinct reptiles represented by the *Pterodactyl*, &c., and which possessed powers of flight. Their fossil remains are limited to Mesozoic rocks. The chief genera besides the *Pterodactyl* are *Ramphorhynchus*, which had no teeth in the front of either jaw, and *Dimorphodon*, which had large well-developed front teeth. The tail in the latter genus was probably abortive; that of *Ramphorhynchus* was long and slender.

PTERYGO'TUS (Gr. 'wing-shaped'), a well-known fossil genus of *Crustaceans* belonging to the order *Eurypterida*. *P. anglicus* attained a length of 6 feet. Its remains occur in rocks ranging from the Upper Silurian to the Upper Devonian. The front part of the body was covered by a carapace; two large compound eyes, and small single eyes were developed, and five pairs of legs were present. Thirteen segments succeeded the head, and the *telson* or tail-segment was frequently spinous. These extinct Crustaceans appear to be related to the living *Limuli* or King Crabs.

PUBLISHERS IN AMERICA. It is intended under this title to give a brief account of the leading publishing houses in America, at the present time (1885).

APPLETON, D. & Co., of New York City, founded by Daniel A., who was born at Haverhill, Mass., Dec. 10, 1785; and who, after pursuing the dry-goods business and book-selling, in 1831, began his career as a publisher. In 1838 William H. Appleton, son of Daniel A., became a member of the firm, and in 1848, the father retired and John A., and Daniel S. A., became members. Daniel A. died in 1849. This house has rapidly grown to be one of the largest in the United States. Among multitudinous publications, its most pretentious work, has been Appleton's *New American Encyclopedia*, begun in 1857 and completed in 1863. The firm at present consists of William H., John A., Daniel S., and W. W. Appleton.

BARNES, A. S., & Co., in New York City, and founded by Alfred S. Barnes. Mr. Barnes began his business as a publisher at Hartford, Conn., in 1838; two years later removed to Philadelphia, Pa.; and, in 1845, came to New York. By his energy and enterprise, Mr. B. soon laid the foundation of an extensive business. Some of the best of American school-books, in all the departments of education, have been published by this well-known firm. Mr. A. S. Barnes still remains at the head of the house, but has associated with him several of his sons.

BELFORD, CLARKE, & Co., of Chicago, Ill., organized in 1880, with the following officers: A Belford, Pres.; J. Clarke, Sec'y; and M. A. Donohue, Treas. This house, although young, is one of the most enterprising in the West.

DODD, MEAD, & Co., established in the City of New York, in 1839, by W. W. Dodd. He continued in business for 31 years, during which time he issued some of the best known theological works in America. In 1870 he was succeeded by his son, Frank H. Dodd, and his nephew, Edward S. Mead, under the firm name of Dodd & Mead. Six years later, Mr. Bleecker Van Wagenen, was admitted to the firm, and these three gentlemen still carry on the business. Among other works, D. & M. have published the popular novels of E. P. Roe.

HARPER & BROTHERS, established at New York, in 1817, by James and John Harper, who were brothers. Their first publication was *Seneca's Morals*. Two other brothers, Joseph Wesley, and Fletcher, became members of the firm, the former in 1823, and the latter in 1825. These four brothers lived to see their business become one of the largest and most lucrative of its kind in the world, and died as follows: James, March 27, 1869; Joseph Wesley, Feb. 14, 1870; John, April 22, 1875; and Fletcher, May 29, 1877. The business is continued under the same firm name, by sons of its founders. Besides countless books of every kind, the Harpers publish several illustrated periodicals.

JOHNSON, A. J., & Co., established at New York, in 1854, by A. J. Johnson, who was born at Wallingford, Vt., in 1827, and who died in New York City in April 1884. The works of this house have been sold by subscription only, and have always been of the highest order. A. J. J. has been called the 'father of the subscription book business.' *Johnson's New Universal Encyclopædia*, which was planned by Horace Greeley shortly before his death, is a publication of this house, and has met with an enormous sale.

LIPPINCOTT, J. B., & Co., established at Philadelphia, in 1836, by J. B. Lippincott, under whose judicious management there rapidly sprung up one of the largest book-making concerns in the United States. This firm has published many of the standard works of our language, and has been second to none in enterprise. J. B. L. now has associated with him in the firm two sons, Walter and Craige, and J. B. Mitchell, J. Shoemaker, George Wood, R. P. Morton, and W. S. Washburn.

PORTER & COATES, organized at Philadelphia, in 1867, by George M. Coates, Robert Porter, and Henry T. Coates. The business of this house has grown with unparalleled rapidity, and there has been a corresponding increase of capital, making it today one of the strongest and best.

SCRIBNER'S, CHARLES, SONS, established by Charles Scribner, in 1846. Mr. Scribner in that year entered into a co-partnership with Isaac D. Baker, under the firm name of Baker & Scribner, and the business thus begun, has been continued down to the present day, essentially the same, although the name of the firm has been occasionally changed, as its membership has been affected by the death of old and the entering in of new members. This house has devoted its energies very largely to American works, and has produced many of the best works of our native authors. Charles Scribner, the founder of the firm, died in 1871.

Besides these there are other publishing houses in America, with large capital, and constantly increasing business, many of which are developing an energy which brings them into strong rivalship with the older firms.

PUB'NA, the chief town of the district of the same name, Bengal, British India, on the right bank of the Ichamutti, a channel which joins the Ganges and the Brahmaputra, 130 miles N.E. of Calcutta. Pop. (1872) 15,730. It conducts a considerable trade in jute and rice.—The *district* of P., which lies at the angle formed by the junction of the two great rivers above mentioned, has an area of 1966 sq. miles. Pop. (1872) 1,211,594, of whom 70 per cent. are Mohammedans. The staple crops are rich and jute. Besides the two great bordering rivers, the whole country is intersected with navigable watercourses. In 1876–77 the total exports were valued at £2,205,000, including jute £863,000, rice £142,000, oil-seeds £276,000; the imports were valued at £2,324,000, including piece goods £421,000, salt £360,000, sugar £126,000. The trade is conducted both by country boats and by steamers. The manufactures are gunny, indigo, and paper.

PÜCKLER-MUSKAU, HERMANN LUDWIG HEINRICH, FURST VON, was born of an ancient family at Muskau in Lausitz, October 30, 1785. After studying law at Leipsic (1800–1803), he entered the body-guard at Dresden, and subsequently traveled in Austria, France, and Italy, returning to Muskau to succeed his father in 1811. Here he lived in retirement until the war of 1813, when he entered the Russian service as major. He became adjutant to the Duke of Weimar, and a lieutenant-colonel. In 1815 he returned to private life, and soon after visited England, where he remained more than a year. After returning to Muskau he began to form his extensive and celebrated park-gardens, which he has himself described in his *Andeutungen über Landschaftsgärtnerei* (Stuttg. 1834). In 1817 he married the Countess of Pappenheim, but was separated from her in 1826. In 1822 he was elevated to princely rank by the king of Prussia, and in 1828 he again visited England, remaining there and in France for a year. Afterwards he traveled through Algeria and the N. of Africa, Greece, Egypt, and part of Asia. On his return he lived at Muskau, until he sold that property in 1845. He died at Branitz, February 4, 1871, without issue. As a writer, P. was first known by his *Briefe eines Verstorbenen* (4 vols. Mun. 1830, and Stuttg. 1831). This is a diary of travel in England, Wales, Ireland, France, Germany, and Holland, and contains vigorous painting of manners and customs. His other works are *Tutti frutti; aus den Papieren des Verstorbenen* (5 vols. Stuttg. 1834); *Jugendwanderungen* (Stuttg. 1835); *Semilasso's vorletzter Weltgang; Traum und Wachen; aus den Papieren des Verstorbenen* (3 vols. Stuttg. 1835); *Semilasso in Africa* (5 vols. Stuttg. 1836); *Der Vorläufer* (Stuttg. 1838); *Südöstlicher Bildersaal* (3 vols. Stuttg. 1840); *Aus Mehemed-Ali's Reich* (3 vols. Stuttg. 1844); *Die Rückkehr* (3 vols. Berl. 1846–48). P.'s literary remains (letters and diaries) have been edited by Ludmilla Assing-Grimelli (8 vols. Berl. 1874, *et seq.*), who has also written a biography of P. (Hamb. and Berl. 1872–74). See also Petzoldt's *Fürst H. von P.-M. in seinem Wirken in Muskau und Branitz, sowie in seiner Bedeutung für die bildende Gartenkunst Deutschlands* (Leips. 1874).

PUEBLO, in the county of the same name, Col., on the Arkansas River, 118 miles S. of Denver. It has 3 railroads, and is a supply point for the San Juan mining country, and a commercial center for the agricultural, stock, and mining sections of Southern Colorado and New Mexico. It is surrounded by an agricultural and stock-raising district; and extensive iron and steel works are here located. Pop. 8000.

PUEBLOS, a race or class of American Indians, living in New Mexico and Arizona. They are semi-civilized, and are divided into several tribes, which speak different languages. They have attained considerable skill in manufacturing and agriculture, the latter of which they successfully conduct by a system of irrigation. They number about 7000, and own property to the value of more than $500,000. Many of them have been converted to the Roman Catholic Church, but the majority adhere to the idolatrous worship of their ancestors.

PUGHE, William Owen, born at Llanfihangel-y-Pennant, in Merionethshire, August 7, 1759, at the age of seventeen removed to London, where he found a patron in Owen Jones. With him he edited the poems of Dafydd ap Gwilym (1789), and at his cost produced a Welsh and English Dictionary (2 vols. 1793–1803), a work, says Williams, 'ruined by hobby-horsisms, a horrid cacophony, and a barbarous orthography.' P. also wrote a *Cambrian Biography* (1803), translated into Welsh the *Paradise Lost* and other poems, and was editor of the *Cambrian Register* (1796–1818) and a Welsh magazine, *Y Greal*. He was a Fellow of the Society of Antiquaries, a D.C.L. of Oxford (1826), and one of Joanna Southcott's 'four and twenty elders.' In 1806 he returned to Wales, and died at Talyllyn, near Dolgelly, June 4, 1835.

PUGIN, Augustin, an architectural draughtsman, born in France in 1762, visited London after the Revolution, and was engaged for some time in the office of Nash the architect. He afterwards opened an architectural studio and school. P. published a number of works which did much to develop a widespread taste for medieval architecture in this century; *e. g.*, *Specimens of Gothic Architecture* (114 plates, 1821–23), *Architectural Illustrations of Normandy* (1825–28), &c. He died December 19, 1832. —Augustin Welby Northmore P., a distinguished architect, son of the preceding, born in London, March 1, 1812, was educated at Christ's Hospital. Possessing a decided genius but erratic temperament, he became a proficient in various kinds of artistic work, and led a roaming life till 1834, when he joined the Roman Catholic Church and became one of its most devoted adherents and ablest adorners. His treatise on *Gothic Furniture* and *Iron and Brass Work* appeared in 1835. Such works as *Contrasts* (1836), *True Principles of Pointed or Christian Architecture* (1841), *Apology for the Revival of Christian Architecture* (1843), were published at the time of the great Tractarian movement, and his eloquent advocacy of Gothic architecture caused his services to be eagerly sought throughout the country. He refused, however, to lend his ecclesiastical services except to those of his own communion. He designed a vast number of Roman Catholic churches and buildings, including five cathedrals. Among his secular designs, the internal mouldings, fittings, furniture, and decorations of the Houses of Parliment hold a high place. He published a *Glossary of Ecclesiastical Ornament* in 1844 and a work on *Floriated Ornaments* in 1849. He served as a juror in the Great Exhibition of 1851. His herculean labors and probably his religious ascetieism brought on an attack of mental aberration in 1852, and he died at Ramsgate, 14th September of that year. See *Recollections of A. W. N. P. and his father A. P.* by B. Ferrey (1861).—E. Welby P., eldest son of the preceding, born in 1834, succeeded to his father's practice, and is well known as the architect of St. Michael's Priory, Belmont; the church of St. Peter and Paul at York; the magnificent mansion of Scarsborough Hall, Lancashire, &c. For the erection of the church of Notre Dame de Dadezeille he received from the Pope the Order of St. Sylvestre. He died at Ramsgate, 5th June, 1875.

PULASKI, Casimer, Count, born in Lithuania, March 4, 1747. Compelled to flee from his own country by the failure of the revolution, in which he had been a leader, he met Franklin in Paris, and offered his services to the colonists, which were accepted. He came to America in 1777, distinguished himself at the battle of Brandywine, and was made a brigadier-general. At the siege of Savannah, he commanded the French and American cavalry, and was fatally wounded in an assault. He was carried on board U. S. vessel *Wasp*, and there died Oct. 11, 1780.

PULLMAN, a town of Cook Co., Ill., on the Illinois Central Railroad, 13 miles from Chicago. The Pullman car shops are located here. Pop. 7000.

PULO NIAS, the largest of a chain of islands lying off the W. coast of Sumatra. Area, 2751 sq. miles; pop. estimated (1878) at 500,000. The surface is mountainous, rising in the S. and S.W. to 2000 feet. The chief rivers are the Modjeija on the N., the Sohu and Idanoi on the E., and the Moroo and Nojo on the W. Earthquakes are frequent. The temperature ranges from 68° to 75° Fahr. The products are maize, sweet potatoes, sago, rice, and cocoa-nuts. The Dutch E. India Company in the 17th c., and the English in 1820, concluded commercial treaties with Nias chiefs, and in 1857 the whole island was taken possession of by the Dutch Government, who had, in 1878, only one fixed settlement therein—viz., at Gunong Sitoli on the E. coast. See Verbeek and Nagel in the *Jaarboek van het Münwezen in Ned. O. Indië* (1874 and 1876).

PUN'DIT (*pandit*), the Indian title for a learned Brahmin, especially one who makes some branch of Sanscrit learning his special study, and teaches it. Study and instruction form one common religious duty, and the same word is applied to the student and the teacher. The P. is highly respected; he is abundantly supported by charity or endowments, and demands no remuneration. Some of the students of the Veda are able to repeat the whole by heart, numbering more than 10,000 lines; others apply themselves especially to logic. P. has, in some cases, become a proper name.

PUR'CHAS, Samuel, born at Thaxted, Essex, England, 1577, was educated at St. John's College, Cambridge, and in 1604 was appointed vicar of Eastwood in Essex. This position he resigned to his brother, and proceeded to London with a view to literary work. Receiving the rectory of St. Martin's, Ludgate, and being also made chaplain to Archbishop Abbot, he gave his whole attention to the collection of works of travel, and in 1613 he produced a thick folio entitled *P. his Pilgrimage, or Relations of the World, and the Religions observed in all Ages, and Places discovered from the Creation unto this Present*. A greatly enlarged edition, with maps by Mercator and Hondius, appeared in 1625. More than 1300 authors were laid under contribution for this work. In 1616 the manuscripts of Hakluyt fell into the hands of P., and continuing Hakluyt's plan, P. in 1625 produced four folio volumes.—*Hakluytus Posthumus, or P. his Pilgrimes*. Vols. iii. and iv. relate to America, and contain the earliest narratives of English explorers of the W. P. is at pains to make it clear that the *Pilgrimage* is his own work, as to plan and language, while the *Pilgrimes* is simply compiled in the words of others. P. was buried in St. Martin's, Ludgate, 30th September 1626. Some say that he died in prison under debt contracted in the publication of his valuable books; but according to Anthony Wood, he died in his own house. P. also wrote *Microcosmus, or the History of Man* (1619), and *The Kings Tower and Triumphant Arch of London* (1623). He is a quaint, garrulous, metaphorical writer; and his immense stores of knowledge have been very useful to later authors.

PUSHTU, the vernacular name of the language spoken in Afghanistan, and by the border tribes of the Dera Jat within the Punjaub, British India. It was long supposed to be of Semitic origin, and thus to give a support to the cherished theory that the Afghans represent the lost tribes of Israel. But the labors of Dorn, Raverty, Trumpp, Bellew, &c., have now established that it belongs to the Indo-European family, being most closely allied to the Zend or Iranian branch, but having borrowed much from the Sanscrit. It forms a regular subject of examination for British officers at Lahore. The name has been plausibly connected with the Paktyes of Herodotus. See *Original Letters and Papers of the late Viscount Strangford upon Philological and Kindred Subjects* (Lond. 1878). For a list of P. proverbs, &c., see *Bannu, or Our Afghan Frontier*, by Mr. S. S. Thorburn, C. S. (Lond. 1876).

PUTNAM, a town of Windham Co., Conn., on the Quinnebaug River, 26 miles from Worcester. It has two railroads, and is engaged in manufacturing cotton, woollen, silk, boots, and shoes. Pop. 5827.

PUTNAM, Israel, an American patriot, born at Salem, Mass., Jan. 7, 1718. His early education was very limited, and in 1739 he removed to Connecticut and became a farmer. Shortly afterwards a she-wolf, that had been ravaging the flocks of the neighborhood, was pursued by the settlers, and driven into a cave. All efforts to dislodge her having failed, Putnam at midnight, with a torch in one hand and a musket in the other, was lowered into the cave, and just as she was about to spring upon him shot her dead. He participated in the French war, where he had some very narrow escapes from death. On one occasion, the Indian allies of the French had tied him to a tree, and were about to burn him, when he was saved by the interference of a French officer, named Molong. He manifested great bravery at Crown Point and Ticonderoga.

At the close of the war he returned to his farm in Connecticut. When the news of the battle of Lexington reached him, he was engaged in ploughing, but immediately turned his oxen loose, mounted his horse, and hastened to Cambridge. He was present at and took an important part in the battle of Bunker Hill. He was one of the four major-generals appointed by Gen. Washington, and served through the remainder of the war with distinction. Died at Brooklyn, Conn., May 19, 1790.

PUT'NEY, a town of England, in Surrey, 5¾ miles W.W.S. of the Waterloo terminus, on the S. bank of the Thames, which is here spanned by a wooden bridge 805 feet long. It has two churches, St. Mary's and St. John's (1859), almshouses, a convent, Jesuit's College, &c., and numerous villas have risen up round the Heath. Thomas Cromwell and Gibbon were natives

of P., which is now a great boating place, being the point from which the university boat-race starts. Pop. (1881) 13,221.

PUTT'ENHAM, GEORGE, born about 1530, educated at Oxford, distinguished himself at the court of Edward VI., by composing an eclogue entitled *Elpine*, traveled on the continent, and on his return became a gentleman-pensioner of Queen Elizabeth. P. mentions a dozen of his own works; but only two of these have reached us. *Partheniades*, a set of twenty little adulatory pieces, was offered to the Queen as a birthday gift in 1579. The other work extant is its author's best—*The Art of English Poesie, in Three Books; the first of Poets and Poesie, the second of Proportion, the third of Ornamente*. This book was published anonymously in 1589, but as early as 1605 was attributed to P. It is full of curious matter, and is of peculiar interest for its disquisition on shaped figures, as the lozenge, or rombus; the fuzie spindle, or romboides; the triangle, or tricquet; the square, the pilaster, the taper, or piramis, rondel, egg, &c. P. says an Eastern traveler informed him that the fashion of writing verses in these forms was brought from the courts of China and Tartary. The *Partheniades* and *Art of Poesie* were reprinted, with notice of the author, by Hazlewood in 1811. The *Art* also forms one of Arbor's excellent reprints (1869).

PYROLU'SITE is an iron-black mineral, crystallizing in small rectangular prisms, and sometimes occurring fibrous, radiated, massive, or remiform. It is the binoxide of manganese. It is extensively worked in Thuringia, Moravia, and Prussia, and is used for discharging the brown and green tints of glass. Usually associated with it is *Psilomelane*, which differs from P. in containing some barium or potassium, and is distinguished by its superior hardness. By some it is regarded as merely an impure variety of P.

PYTH'EAS of Massilia in Gaul, a celebrated Greek navigator, probably a contemporary of Alexander the Great, said to have voyaged 334 B.C. from his native city to Cantium (now Kent), and from thence to Thule, afterwards relating his adventures in his work *On the Ocean*. In this or another voyage P. coasted along the whole of Europe from Gadeira (Cadiz) to the 'Tanais' (for which he probably mistook the Elbe), and visited the 'Amberland,' which, according to Ukert, was the Cimbrian Peninsula, or Denmark. P. appears to have been the first to determine the latitude of a place by the sun. Certain fragments of his work called *Periplus* or *Periodos* have been collected and annotated by Arwedson (Upsala, 1824) and Schmekel (Mersebnrg, 1848). In modern times the voyages of P. have been discussed by many writers, as Adelung, D'Anville, Barth, Forster, Mannert, but especially Lelewel in his *Entdeckungen der Karthager und Griechen im Atlantischen Ocean* (Berl. 1831), and Straźéwicz in *P. de Marseille et la Géographie de Son temps* (Par. 1836; Ger. by Hoffman, Leips. 1838). See also Fuhr, *De Pythea Massiliensi* (Darmst. 1835); Redslob, *Thule: Die phönizischen Handelswege nach dem Norden* (Leips. 1855); Bessell, *Ueber P. von Massilien* (Gött, 1858); Ziegler, *Die Reise des P. nach Thule* (Dresden, 1861).

Q.

QUACKENBOS, GEORGE PAYN, LL.D., an eminent American educator, born at New York, N. Y., Sept. 4, 1826; graduated from Columbia College, in 1843; taught in North Carolina; subsequently removed to New York, and there established a school. He is the author of a series of text-books, embracing grammar, arithmetic, history, natural history, rhetoric, etc.

QUAG'LIO, a Munich family of Italian extraction, fourteen of whose members have distinguished themselves in the annals of art. Its founder, Giulio Q., born at Laino, on the Lago di Como, in 1601, studied painting under Tintoretto, and was ennobled by the Emperor Leopold I. His son and namesake (died 1720), painted some fine frescoes at Vienna and in Laibach Cathedral, and left a son (Giovanni-Maria 1700–65), who devoted himself to architecture at Milan, and filled the post of imperial engineer-in-chief. Giovanni's sons, Domenico (1723–60) and Lorenzo (1730–1804), were the one an historical painter, the other court-architect at Munich; and of Lorenzo's three sons, Giulio (1746–1801), Giuseppe (1747–1828), and Giovanni-Maria (1772–1813), the two first were court-architects, the last an architect, painter, and engineer. Giuseppe, again, had four sons—Angelo (1778–1815), a celebrated lithographer; Domenico (1786–1837), the reviver of architectural painting in Germany, and author of *Sammlung merkwürdiger Gebäude des Mittelalters in Deutschland* (2 vols. Karls.), *Ansichten merkwürdiger Gebäude in München* (2 vols. Mun. 1811), &c.; Lorenzo (1796–1869), a talented *genre* painter; and Simone (1795–1878) who was succeeded by his son Angelo (born 1829) in the office of Court scene-painter at Munich. Francesco (born 1844), a brother of the last, has produced some admirable *genre* and battle-pieces.

QUAN'TIC, in the higher algebra, is generally understood to be any rational integral homogeneous function of two or more variables, but includes also non-homogeneous functions which may be supposed to have resulted from substituting unity in place of one or more of the variables of a homogeneous function. Quantics are classified according to their dimensions. Thus, ax^2+by^2 is of two dimensions in the variables, and is called a *quadric;* and similarly we have *cubics, quartics, quintics*, &c., denoting quantics of the third, fourth, fifth, &c. degrees. Further, quantics are distinguished as *binary, ternary, quarternary*, &c., according as they contain two, three, four, &c. variables. Thus a ternary quintic is a rational integral and homogeneous function of the fifth degree in three variables. See Salmon's *Higher Algebra*, and the numerous memoirs of Cayley, Sylvester, and other analysts.

QUARLES, FRANCIS, was born in 1592 at Romford, England. He studied at Christ's College, Cambridge, and Lincoln's Inn, became cupbearer for a while to the Queen of Bohemia, and in 1621 went to Dublin, where he was appointed secretary to Bishop Usher. After several years he returned to England, was appointed chronologer to the City of London, and devoted himself to literary labors. His first published work was *A Feast for Wormes in a Poem on the History of Jonah*, with *Pentalogia, or the Quintessence of Meditation* (1620). In 1621 appeared *Hadassa, or the History of Queen Esther*, and soon after Q. published *Argalus and Parthenia*, founded on Sydney's *Arcadia*.

These poems were written in decasyllabic couplets. Next came *Job Militant, with Mediations Divine and Moral*, and *Sion's Elegies, Wept by Jeremie the Prophet* (1624). In 1625 there followed *An Alphabet of Elegies*, and *Sion's Sonnets, sung by Solomon the King, and Periphrased;* and a collection of his pieces, entitled *Divine Poems*, was printed in 1630. Two years later came *Divine Fancies, Digested into Epigrammes, Meditations and Observations*. The quaintest and most truly poetical of Q.'s works, the *Emblems, Divine and Moral*, was brought out side by side with the *Emblems* of Wither (1635; new ed. 1877). The *Emblems* follow a fashion traced back to the great Italian lawyer, Andrea Alciati, and seem specially inspired by the *Pia Desideria* of the Jesuit Herman Hugo. They are distinguished by fantastical expression, sometimes by pathos, often by bathos, and are best described as conceits. Q.'s next work was *Hieroglyphics* (1638). In 1641 he collected a number of short essays and aphorisms into a volume entitled *Enchiridion of Meditations*. This book is full of pithy maxims, often overstrained; every sentence contains an antithesis, like a nut with two kernels. In the Civil War, Q. espoused the cause of Charles I., and gave offence to the Parliament in *The Loyal Convert;* and having joined the king at Oxford, he lost all his property, even his books. He was twice married, and had eighteen children by his first wife. He died 8th September 1644, overwhelmed with troubles. After his death were published *Solomon's Recantation, a Paraphrase on Ecclesiastes; The Virgin Widow* (a feeble comedy); and the *Shepherd's Oracles*.

QUATREFAGES DE BRÉAU, JEAN LOUIS ARMAND DE, was born at Berthezenne, near Vallerangue, February 10, 1810. In 1833 he was appointed assistant professor of chemistry at Toulouse, and there he published two treatises, *Recherches d'Embryogénie sur les Limnées et les Planorbes* (1834), and *Recherches sur les Axolontes* (1835). This last work led to his appointment as professor of zoology at Toulouse in 1838. In 1840 he threw up his post, went to Paris, and there pursued his studies, contributing with pen to the *Revue des Deux Mondes*, and with pencil to the *Règne Animal Illustré*. In 1852 he was appointed professor of natural history at the Henri IV. Lyceum, and was elected member of the Academy of Sciences. Five years after, he renounced

the natural history chair at the Lycenm for that at the Museum. Q.'s popular works have nearly all passed through the *Revue des Deux Mondes* in serial form. The records of a scientific expedition, thus published, were collected under the title of *Souvenirs d'un Naturaliste* (2 vols. 1854), and translated into English (*Rambles of a Naturalist;* Bohn, 1857). Other contributions to the *Revue* specially worthy of mention are *Métamorphoses de l'Homme et des Animaux* (1855–56), and *L'Unité de l'Espèce Humaine* (1860–61). Q.'s most purely scientific articles were contributed to the *Annales des Sciences Naturelles* and the *Institut*. His various essays on *Les Mollusques Phlébentérés*, detailing the modifications of the digestive and circulatory systems of these animals, raised a discussion in which the greatest of European naturalists took part; and in the end Q. triumphed. Q. made many voyages in pursuit of his science, the most noted being that undertaken in company with Milne Edwards and Blanchard. They explored the coasts of Sicily between Trapani and Catania. Q.'s results were published under the title of *Recherches Anatomiques et Zoologiques faites pendant un Voyage en Sicile* (1855). The Academy of Sciences commissioned him to inquire into the diseases of silkworms, and in 1859 he produced *Études sur les Maladies Actuelles des Vers à Soie*, a work followed in 1860 by *Nouvelles Recherches sur les Maladies Actuelles des Vers à Soie*. In 1862 he published *Métamorphoses de l'Homme et des Animaux;* in 1869, *Histoire de l'Homme;* in 1870, *Charles Darwin;* in 1871, *La Race Prussienne;* in 1875, *Crania Ethica*.

QUATREMÈRE DE QUINCY, Antoine Chrysostome, was born at Paris, October 21, 1755. After finishing his education at the college of Louis-le-Grand, he was sent by his parents to study law, but a passion for art developed at school led him to neglect law for architecture and sculpture. In 1776 he went to Italy, and carefully examined the treasures of Rome and Naples. In 1785 appeared his *Mémoire sur cette Question; Quel fut l'État de l'Architecture chez les Egyptiens, et qu'est-ce que les Grecs en ont emprunté?* This performance was crowned by the Academy of Inscriptions, and led to the author's being engaged to write the *Dictionnaire d'Architecture* for Panckoucke's *Encyclopédie Méthodique* (1st vol. 1788), which was followed in 1790 by *Considérations sur les Arts du Dessin en France, suivies d'un Plan d'Académie ou d'École Publique et d'un Système d'Encouragement*. Q. took an active part in the Revolutionary movement, and was for a time imprisoned. In 1815 Q. was elected perpetual secretary and professor of archæology to the Académie des Beaux Arts, and was charged with the art department of the *Journal des Savants*. In that year he produced *Le Jupiter Olympien, ou l'Art de la Sculpture Antique*, and *Lettres écrites de Londres à Rome, sur les Marbres d'Elgin*. These letters were addressed to Canova. In 1824 Q. edited the letters of Poussin. Among his other works are, *Essai sur la Nature, le But et les Moyens de l'Imitation dans les Beaux Arts* (1823); *Histoire de la Vie et des Ouvrages de Raphael* (1824); *Histoire de la Vie et des Ouvrages des plus Célèbres Architectes du Onzième Siecle jusqu'à la fin du Dix-Huitième* (2 vols., 1830); and *Histoire de la Vie et des Ouvrages de Michel Ange Buonarotti* (1835). Q. died at Paris on the 28th of December 1849.

QUEEN'S COLLEGES, Ireland, established in 1845 to afford the highest education to all religious denominations, were opened in 1849 at Belfast, Cork, and Galway. In 1850 the Queen's University was founded at Dublin, with power to confer degrees on students attending these three colleges, and a month latter the whole institution was condemned by the Irish Catholic bishops at the Synod of Thurles, on account of its unsectarian character. A supplemental charter, granted in 1866, created much opposition, and was allowed to expire in 1868. Each college has several scholarships of from £40 to £20, and is governed by a president. In June 1878 there were 52 professors at the three colleges, and 886 students, of whom 230 were Catholics. A bill proposing to sectarianise Belfast in favor of the Presbyterian Church, with a view to ultimately making Cork and Galway Catholic colleges, was rejected in the House of Commons by a majority of 206, May 25, 1878.

QUESALTENAN'GO, capital of the province of Q., and the second city of Guatemala, in Central America, on the river Samala, 44 miles from the Pacific coast, and 65 miles W.N.W. of New Guatemala. It was founded by Alvarado in 1524 on the site of the ancient Felahuh, and is a well-built town. Q. manufactures cottons and woollens. Pop. 25,000, mostly Indians

QUEUE (Fr. 'a tail'), the tie of a wig.

QUICHUA, an Indian race inhabiting Peru, as well as parts of Ecuador, Bolivia, and the Argentine Republic. With the Aymarás the Q. Indians formed the bulk of the population of the ancient empire of the Incas, in which the Q. language was predominant. Cuzco, the Inca capital, continues to be the center of Q. influence. At the present day the Q. language, which contains twenty-six consonants and eight vowels, is spoken by a million and a half of people in Peru, and by half a million more in Bolivia, &c. The word Q. signifies 'temperate climate,' as opposed to *puna*, or 'cold climate,' and derives its origin from its being in the first instance used to designate the inhabitants of the temperate portions of Peru, as distinguished from those of the punas, or cold table-lands.

QUICK'LIME, pure oxide of calcium, is prepared by driving off by heat carbonic anhydride from marble, common limestone, or other carbonate of lime. It is a white caustic powder, which combines energetically with water to form *slaked* lime. Q. has many important uses, the chief of which are as an ingredient of mortars and as manure.

QUILLO'TA, a town in Chili, capital of a department of the same name. It is situated on the Aconcagua river and Valparaiso and Santiago Railway, 20 miles from the former town. Rich copper mines are worked in the vicinity. At the census of 1875 the pop. of the town was 11,347; of the department, 45,211.

QUINCY, a city of Norfolk Co., Mass., on Quincy Bay and the Old Colony Railroad, 8 miles from Boston. It is celebrated for its granite quarries, from which large quantities are shipped to all parts of the United States. Pop. 11,500.

QUINCY, Josiah, Jr., an American patriot, born at Boston, Mass., Feb. 23, 1744, and graduated from Harvard in 1763. He chose the legal profession as his calling, and located in his native city. He was one of the strongest opponents of the series of impositions perpetrated upon the colonies by England, and which led to the war of the Revolution. In 1774 he visited England, and died upon the return voyage, April 26, 1775.

QUINT, an organ stop sounding a fifth above the foundation stop, 5⅓ feet in length on the manuals, and 10⅔ feet on the pedal.

QUITMAN, John Anthony, born at Rhinebeck, N. Y., Sept. 1, 1799, became a member of the legal profession, after several years devoted to teaching, and settled at Natchez, Miss. He became actively engaged in politics, and in 1836 visited Texas, and assisted the people of that state in their war for independence against Mexico. He then returned to Natchez, but, upon the outbreak of the Mexican war, entered the U. S. army. He was present at Monterey, Vera Cruz, and Cerro Gordo, and for his gallant services, was made major-general, and presented with a sword by congress. Returning to Mississippi, he was, in 1850, elected governor of that state. Died at Natchez, in 1858.

QUIV'ER, a case for arrows slung from the shoulder or from the waist-belt. In ancient Egyptian paintings the Q. is represented strapped to the side of the chariot. Although leather arrow-cases were used in England during the Old English period, the name Q. (old Fr. *cuivre*) seems not to have come into use till the 17th c., and its origin is obscure.

R.

RAB'ENER, Gottlieb Wilhelm, a German satirist, was born at Wachau, near Leipsic, September 17, 1714. After studying at the College of Meissen, in 1734 he entered the University of Leipzig, where he devoted himself to the study of law. His special knowledge of financial matters led to his appointment in 1741 as inspector of customs for the Leipzig district, and to his being summoned to Dresden (1753), and nominated (1764) counselor of customs to the king. He died at Leipzig, March 22, 1771. From 1741 to 1744 R. made many contributions to the *Belustigungen des Verstandes und Witzes*, and in 1744, together with Gartner, Cramer, A. Schlegel, Schmid von Lübeck, Ebert, and Zachariae, established the *Bremer Beiträge*. R.'s contributions to these two journals make the first two vols. of his *Sammlung Satirischer Schriften* (Leips. 1751), to which he added a third vol. (*Satirische Briefe*) in 1752, and a fourth in 1755, and which went through ten editions prior to 1772. His *Freundschaftlichen Briefe* were edited with a life of the author by Weisse (Leips. 1772), who also issued a complete edition of P.'s works (6 vols. Leips. 1777; latest ed. by

Ortlepp, 4 vols. Stuttg. 1840). R. had great influence in his own time, and was an important factor in the literary development of Germany. To some extent he took Lucian as his model, but in genius he came far short of his great original.

RACALMU'TO, a town of Sicily, province of Girgenti, on an affluent of the Platani, 15 miles N.E. of Girgenti. It is of Saracenic origin, and was long under the Chiaramonte family, whose castle is 2½ miles distant. Hitherto a notorious haunt of brigands, it is rapidly improving, and is developing a trade in fruit, sulphur, gypsum, and saltpeter. Pop. (1874) 12,250.

RA'DIAL AR'TERY, the almost direct continuation of the *Brachial artery*, or main artery of the arm. It commences just below the bend of the elbow, and passes along the radial side of the forearm to the wrist, where it is felt as the pulse. The *ulnar artery* is larger than the radial, and is given off from the brachial artery close by the origin of the radial vessel. It also lies deeper in the forearm.

RA'DIANT EN'ERGY. The recognition of energy as a something which has as true an existence in the physical universe as matter, has resulted during the last thirty years in a rapid development in all branches of science. Energy cannot be regarded as a property merely of matter; indeed, the most plausible theory of the ultimate nature of matter, the vortex theory of Sir W. Thomson, suggests that matter, *as we know it*, is a form of energy. Laying aside such hypotheses, however, the physicist recognizes matter and energy as distinct, but yet so related that we know of the existence of either only by means of the other. We perceive an object solely by reason of certain transformations of energy which are inseparable from it. Energy is the active agent which works through matter; matter is in itself passive, and is that by which we recognize the workings of energy. It is now an accepted truth in physics that when energy passes from any one system of bodies to any other it must pass through a material medium—that, in other words, action at a distance is unphilosophical, because of necessity making other and less admissible assumptions than are required for action through a medium.

Light is understood to depend physically upon a certain undulatory motion executed in the ether. What is commonly called radiant heat differs from light only in the greater length of its wave-lengths, and to the same category belong the actinic rays, whose wave-lengths, though too short to affect our eyes, produce such miracles in photography. All these forms of energy are conveniently grouped under the name R. E. They are of the same nature and are subject to the same laws. They move in straight lines with the same velocity, they are reflected and refracted in precisely the same way, and they can all be polarized. It is thus evident that radiant heat resembles light more than that which we ordinarily understand as heat. Indeed, we have no reason to regard it as heat. All we can say is, that when a body receives this kind of radiation, certain effects are observed which are usually regarded as effects of heat, implying at most, however, a transformation of R. E. into heat.

RADIOM'ETER, a very delicate instrument, invented by William Crookes of London for showing certain remarkable phenomena of apparent repulsion and attraction discovered by him. In a very perfect vacuum four light vanes are suspended horizontally and radially, like the vanes of an anemometer, so as to be capable of free rotation round a vertical axis. Each disc or vane has its one side white and its other side black, so that when the system is rotating, all the discs are moving in the direction of similarly colored sides. When in the dark, the system is motionless; but when it is brought into the light, the vanes begin to rotate in a definite direction. Any source of light and heat brought near it acts so as to repel the blackened surface of the disc which is facing it. The true agent is radiant heat, which raises the temperature of the blackened surface higher than that of the white surface. The effect of heat upon the molecules of a gas is to make them go faster; and hence the molecules still present (for an absolute vacuum is not possible) rebound off the blackened surface with greater velocity than off the other, and the recoil forces the vanes round. The true explanation was arrived at independently by several physicists; and Stokes has done much to elucidate many curious and at first sight contradictory phenomena in connection with it.

RA'DIUS, one of the two bones existing in the forearm of man and other Vertebrate animals, and lying, when the arm is in the supine position, to the thumb-side of the limb. By the movements of the radius on the ulna and humerus, the forearm can be readily turned or rotated. The exact representative of the R. in fishes has not yet been determined. In birds the R. is the smaller of the two bones of the forearm, but in most other Vertebrates it is the more constantly developed. In the horse, for example, the R. is large, whilst the ulna is rudimentary. In the frog and camel, again, it attains a large development, the ulna, its companion bone, being fused with it.

RAFF, JOACHIM, a modern German composer, born at Lachen, Switzerland, May 27, 1822. He was devoted to literature and science in his youth, but about 1843 began to publish a number of fantasias, caprices, rondos, &c., for the pianoforte, and their success induced him to renounce school teaching for musical composition. Soon afterwards he produced the opera of *König Alfred* at Weimar without much success. He belongs to the Wagner school, and has glorified his master in his book *Die Wagnerfrage*. His pianoforte compositions number over 200, and he has also written songs and concerted pieces. His fame, however, rests principally on his symphonies, particularly those entitled *Leonore* and *Im Walde*, which are rich in fine effects of instrumentation and orchestral color.

RAFT (Dan. *raft*, 'a spar or pole') is the name given to an assemblage of pieces of timber fastened together to act as a float. When the R. is composed of timber sawn into marketable shape, and joined simply for convenience of transport down a river to the shipping port, it is called a *lumber* R. Rafts in some places are employed to carry freight; and in many cases of emergency at sea, poles and spars require to be lashed together for the purpose of saving life. In some large ships, precautions are taken against disaster in the provision of life-rafts of ingenious construction, based principally on the American tubular system. The American life-R. originally consisted of a collapsible material, such as india-rubber, which had to be inflated before launching; but now metal tubes have been adopted, two or three being connected by girders, between which air- and water-tight tanks for holding provisions are fitted. These tanks have screw taps at top and bottom, so that it is immaterial which side of the life-R. falls uppermost. Christie's and Roper's cellular life-rafts of metal and wood are recent important English additions to the means of saving life at sea. They are carried stretched across the deck, parallel to the captain's bridge, and they may be launched from either side of the ship.

RAIPUR, the chief town of the district of the same name, Central Provinces, British India, 180 miles E. of Nagpur. Pop. (1872) 19,116. It is an old town, with a massive fort and many tanks, gardens, and temples. It has now a large trade. In 1875–76 the exports, chiefly oil-seeds and lac, were valued at £89,000; the imports, piece-goods, rice, metal-ware, &c., at £106,000. The main street is 2 miles long, well laid out, and the houses are ornamented with wood carving.

RALES, sometimes called Ronchi or Rattles, are thoracic sounds of a morbid type evolved during the acts of respiration.

RÁMÁNUJA, the founder of a sect of Vishnuvite Hindus who are numerous at the present day in S. India. He was born near Madras in the middle of the 12th c. His teaching was founded upon the supremacy of Vishu over the other members of the Hindu Trinity, as the cause and creator of all things. In N. India the similar sect takes its name from Ramananda, said to have flourished at Benares in the 14th c. To Kabir, a pupil of Ramananda, may be traced the monotheism of the Sikhs. See Monier Williams' *Hinduism* (1877).

RAMLER, KARL WILHELM, a German lyrical poet, born at Kolberg, 15th February, 1725, studied at Halle, was from 1748 to 1790 a teacher in the Cadet School at Berlin, and from 1790 to 1796 director of the theater. He died 11th April, 1798. Of the poems of R. all that are now interesting are his imitation of antique metres, as his *Oden-ans dem Horaz* (Berl. 1769), which served as models to Voss and others. See his *Poetische Werke* by Göckingk (2 vols., Berl. 1800–1), and Heinsius, *Versuch einer Biographischen Skizze R.'s* (Berlin, 1798).

RAMSAY, EDWARD BANNERMAN BURNETT, was born at Aberdeen, 31st January, 1793. His father, Alexander, second son of Sir Thomas Burnett, Bart., of Leys, was Sheriff of Kincardineshire, where the family estates lay. Edward, when very young, was taken in hand by his uncle Sir Alexander R., who sent him to school in Yorkshire, at Harsley, near his own house. Harsley was the most retired village in the county. In its church the Bible lay in chains of Edward VI.'s period; no turnpike road passed through it; and all the letters of the villagers were written by Sir Alexander's gardener.

Sir Alexander died in 1806, leaving the Estates to Edward's father, who obtained a baronetcy from Fox. In 1815 Edward graduated at St. John's College, Cambridge, and next year he obtained the curacy of Rodden, Somersetshire. This charge he soon conjoined with that of Buckland Dinham. An account of his work among the Methodists of Buckland was written by Dr. Guthrie in the *Sunday Magazine* for January 1865. In 1823 he removed to Edinburgh, where he became first incumbent of St. George's Episcopal Chapel, next, incumbent of St. Paul's Church, Carrubber's Close (1826), in 1827 assistant minister of St. John's, and in 1846 Dean of the Diocese of Edinburgh. He was offered the Bishopric of New Brunswick, that of Glasgow, and the position of Coadjutor-Bishop of Edinburgh; but declined the pre-

ferment. His *Advent Sermons* appeared in 1850, *Diversities of Christian Character* in 1858, *Christian Life* and *Manual of Catechising* in 1859, *On the Canon Law of the Episcopal Church* in 1861, and *Christian Responsibility* in 1864. These represent the literary work he did as a Churchman. He published in 1827 a *Memoir of Sir J. E Smith*, in 1850 a *Memoir of Chalmers*, in 1862 *Genius and Works of Handel*, in 1866 *Preachers and Preaching*, in 1868 *Pulpit Table-Talk*, and in 1869 *The Art of Reading and Preaching Distinctly*. In 1857 appeared the work which has carried the best of Scotch humor over the world, *Reminiscences of Scottish Life and Character*. It had first taken the form of a little book of fifty pages, entitled *Some Changes in Social Life and Habits*. This kindly humorist, who occupied a unique and delightful position in Edinburgh society, died 27th December 1872. In 1873 appeared *Memorials of Dean R.*, by Rogers.

RANDALL, Samuel J., an American statesman, born at Philadelphia, Pa., in 1828, and became engaged in mercantile pursuits. He has been a member of Congress from 1863 down to the present time (1885), and has several times been chosen speaker of that body. He is a clear thinker, a brilliant debater, and is one of the recognized leaders of the Democratic party.

RAMSAY, William, youngest son of Sir W. Ramsay of Bamff, was born in 1806, and educated at the universities of Edinburgh and Glasgow. He graduated B.A. at Trinity College, Cambridge, in 1831, and two years before this had begun to act as Professor of Mathematics in Glasgow. In 1831 he resigned the chair of Mathematics for that of Humanity. He contributed largely to Dr. Smith's *Classical Dictionaries*, and published *Selections from Ovid and Tibullus* (new ed. 1859), *Manual of Roman Antiquities* (4th ed. 1859), a fine annotated edition of *Cicero pro Cluentio*, since adopted by the Clarendon Press (1869), and *Manual of Latin Prosody* (1859). R. died 12th February, 1865. R. was a ripe scholar, and poured forth his learning with a certain diffuse eloquence that enraptured students.

RAN'DOLPH, Thomas, an English poet, was born at Newnham, Northamptonshire, in 1605. Educated at Westminster School along with Mayne, he proceeded to Trinity College Cambridge, where he took the degree of M.A., and obtained a fellowship. Ben Jonson made a bosom friend of him. He wrote several lively dramas entitled *Aristippus, the Muses Looking-Glass* (1630), *The Conceited Pedlar*, *The Jealous Lovers* (1632), *Amyntas* (1638), and *Hey for Honesty*. Several of the songs scattered through these works—as much masques as set plays—are spirited and graceful. R. led a life of dissipation, and died 17th March 1635. His *Dramatic Works* were edited by W. C. Hazlitt in 1875.

RASP, a species of file having distinct abrading prominences formed by indentations of a pointed punch, instead of with a chisel, as is the case with a file. The R. is almost exclusively used for operating on wood, bone, and the softer metals.

RASPAIL, François-Vincent, a French chemist and politician, was born at Carpentras, January 29, 1794, where he received his education from a priest. He was sent to Avignon to complete his education, and in 1811–12 he delivered lectures on theology and philosophy, but declined to enter the Church. In 1816 he went to Paris, took various scholastic engagements, studied law and natural science, and between 1827 and 1830 made many important contributions to organic chemistry in the *Annales des Sciences Naturelles* and the *Bulletin des Sciences*. Into the Revolution of 1830 R. threw himself with great impetuosity on the democratic side and received a severe wound. He was then offered the administratorship of the Museum of Natural History, but declined it. In 1831, for a violent letter in *La Tribune*, he received fifteen months' imprisonment, and, with the exception of brief intervals, he continued in custody until 1836, because of his outspoken hatred of royalty. But his scientific studies were prosecuted with unabated fervor. In 1843 he began to develop his theory of disease, and to advocate the antiseptic virtues of camphor. He even prosecuted a lucrative practice, until he was stopped on the ground of illegality. He was one of the leaders of the Revolution of 1848, and exercised a great influence by his writings in *L'Ami du Peuple* and his speeches in the clubs. In 1849, however, for advocating the abolition of the Presidency in offensive language, he was imprisoned for five years, during which time he was twice elected to the Assembly. In 1854 he retired to Belgium, and continued his devotion to science until 1869, when he was elected to the Corps Législatif, where he associated himself with Communism in its most extreme enunciation. After the fall of the Empire he became the idol of democratic Lyon, which returned him regularly as its member. The aged demagogue died at Paris January 10, 1878, leaving a reputation for consistency and earnestness which, however, bore no fruit to his party on account of the impracticability of his views.

RASSE (*Viverra mallacensis*), a species of Carnivorous quadrupeds, inhabiting India and other parts of E. Asia, and allied to the civet. It is about 3 feet in length, is of a general greyish-brown hue, variegated with longitudinal rows of black spots. The tail is long and marked by black rings. Like the civet, the R. secretes an odoriferous substance, which is in high repute amongst the Javanese, by whom it is named 'Dedes.'

RAV'ENSBURG, a town of Würtemberg, in the fertile Schussenthal, 11 miles N. of Friedrichshafen on the Bodensee by rail. It has one Protestant and two Catholic churches, a medieval rathhaus, a lyceum (1809), a realschule, and a wealthy hospital. There are cotton, woollen, hemp, and flax manufactures; paper, oil, and grain mills. Pop. (1875) 10,034.

RÁVÍ, one of the five rivers of the Punjaub, identified with the Hydrastes of the Greeks, and still called Trastee in certain parts of its course. It rises among the Himalayas, and flows S.W. past the city of Lahore, till its junction with the Chenaub: total length, about 450 miles. At Madhapore, where it debouches on the plains, a large canal system takes off to irrigate the sandy desert of the Bari Doab, which lies between the R. and Bias rivers. The total cost has been £2,000,000 sterling, and the net profit is £50,000 per annum. The main canal is 212 miles long, and there are 692 miles of distributaries. The number of acres irrigated in 1872–73 was 228,000; the rate for water varies from 12s. to 8s. per acre.

RAWLINS, John A., an American general, born at East Galena, Ill., Feb. 13, 1831. Owing to the poverty of his father, he did not attend school until he was 20, and four years later was admitted to the bar in his native state, and began the practice of law at Galena. He rapidly rose to success in his profession, and although a pronounced Democrat, at the outbreak of the Civil War, became a strong supporter of the government. He accepted a position on the staff of Gen. Grant, and was with him in all his battles and campaigns up to the close of the war. In 1865 he was made brigadier-general U. S. A., and was afterwards brevetted major-general. Upon the election of Grant to the Presidency, he was appointed Secretary of War. Died at Washington, D. C., Sept. 6, 1869.

RÁWUL PINDI, the chief town of the district and division of the same name, in the Punjaub, British India, on the Grand Trunk Road, 160 miles N.W. of Lahore. Pop. (1868) 19,228, with an additional 6581 in the cantonments, which lie S. of the town. R. has a considerable trade in country produce; and since 1860 the largest horse-fair in N.W. India has been held here, under Government patronage.—The *district* of R., which lies among the spurs of the Himalayas between the rivers Indus and Jhilum, has an area of 6216 sq. miles; pop. (1868) 711,256. It contains the ruins of Taxila city, visited by Alexander; Attock, where the Indus has been always crossed, and the sanitarium of Murri. The crops are wheat, millet, and barley. The camels, mules, donkeys, and horses of the district are celebrated.

RAYMOND, Henry Jarvis, LL.D., a prominent American politician and journalist, born at Lima, N. Y., Jan. 24, 1820, and graduated from the University of Vermont in 1840. He became assistant-editor of the New York *Tribune* in 1841, office editor of the *Courier and Enquirer* in 1848, and on Sept. 15, 1851, editor of the New York *Times*, which, under his management, soon became one of the leading journals of the country. Mr. Raymond was one of the founders of the Republican party, and up to the time of his death, was one of its most active and earnest supporters. Died suddenly, from apoplexy, in New York, June 18, 1869. He published *The Life and Public Services of Abraham Lincoln*.

READ, Thomas Buchanan, an American poet, born at Chester, Pa., March 12, 1822. He studied sculpture in Cincinnati, O., and afterwards locating in New York, devoted his time to painting, in which he was moderately successful. He subsequently removed to Philadelphia, and in 1850 went to Italy, where he resided until 1872, when he returned to the U. S. He published numerous poems, the most popular of which is *Sheridan's Ride*. Died in New York, May 11, 1872.

REAL' SCHOOLS (Ger. *realschulen*), in Germany, are secondary schools giving a general *practical* training, and are thus distinguished from gymnasia, which lay the foundation of a general *philosophical and liberal* education. A. H. Francke, at the Halle Orphanage, made the first attempt to place 'Realia' on a level with classical studies. His method was carried out by Semler in his 'Mathematical and Mechanical Real School' at Halle, between 1706 and 1740, and Semler's assistant Hecker founded at Berlin in 1747 the 'Economico-Mathematical Real School,' which was favored by Friedrich the Great, and named by him the 'Royal Real School.' The ascendancy of Philanthropinism, with its worship of bare utility, checked the movement for a time, but in 1822 Spilleke's reconstruction of the Real School at Berlin laid a firm basis for the modern system. The subjects of instruction in R. S. are mathematics, the natural sciences, and modern languages.

RECEPTAC'ULITES, a curious fossil organism of doubtful nature. It is referred by most authorities to the *Spongida* or Sponges, but some maintain its affinities with the Foraminifera, or the corals. The fossil remains of R. occur in Lower and Upper Silurian strata. They are of cylindrical, ovoid, and discoid shape. The bodies are hollow, and have an aperture on their upper surface. Below, a thickened portion seems to indicate the original *nucleus* or beginning of the organism, the walls of which exhibit an outer and inner layer, with a spicula layer between. The inner layer is pierced by numerous apertures.

RED AD'MIRAL BUTTERFLY (*Vanessa Atalanta*), a well-known species of Butterflies, of a glossy black color above, the front wings being marked with a band of red which passes across the wings to their hinder margin. The hinder wings have a red border, and the under parts are yellowish. The R.A.B. occurs in England, Scotland, on the Continent, and in N. America. The larvæ feed on nettles, and are dark green in color, the sides being marked with a yellowish band.

RED CORAL (*Corallium rubrum*), a well-known species of *Sclerobasic Corals*, found in the Mediterranean Sea, and valued on account of the red hue and for the lustre it is capable of showing after being highly polished. As in all other sclerobasic corals, the R. C. has the living parts external to the coral, the latter forming a hard central axis. In the living bark the *coral-polypes* are found imbedded. Each polype has the eight fringed tentacles characteristic of the order *Alcyonaria*, or that including the familiar 'Dead-Man's-Finger' polype (*Alcyonaria digitatum*) of the British coasts. The R. C. is of slow growth, and strict laws have been framed for the regulation of the fishery. The animal nature of the R. C. was discovered by Jean André de Peysonnel, a French naturalist, whose discovery was rejected by the French Academy of Sciences, but afterwards fully confirmed by independent research.

REDFIELD, Isaac Fletcher, LL.D., born at Weathersfield, Vt., April 10, 1804, graduated from Dartmouth College, and became a lawyer, practising first in his native state, and subsequently in Boston. He published *Law of Railways; Law of Wills; Law of Carriers;* and *Leading American Cases*. Died in 1876.

RED'GRAVE, Richard, R.A., the son of a manufacturer, was born at London, 30th April 1804, and received his earliest art instruction as a designer in his father's factory. He became a student at the Royal Academy in 1826, and his first success as a painter was a picture exhibited at the British Institution, 'Gulliver on the Farmer's Table,' bought for the purpose of engraving. He acquired a high reputation for his genre painting, happy specimens of which are 'The Wedding Morning' (1844) and 'Country Cousins' (1848); and was subsequently even more successful in landscape subjects, such as 'The Woodland Mirror' (1852) and 'Old English Homestead' (1854). During the latter years of the Government School of Design he was headmaster, and subsequently Inspector-General of Art-Schools, an office which he resigned in 1875, after about thirty years' service, receiving a pension of £750 a year. Subsequently, together with Mr. Cole he formed the Museum of Ornamental Art at Marlborough House, now the Museum of Art at South Kensington. Since 1858 he has been surveyor of Crown pictures, and has prepared a catalogue of such works. He is also favorably known as the author of *An Elementary Manual of Colors* (1863) and *A Century of Painters of the English School* (1866), the latter in conjunction with his brother, Samuel R., who died 20th March 1876, and whose valuable *Descriptive Catalogue of the Historical Collection of Water-Color Paintings in the South Kensington Museum*, with a preface on the history of this branch of art, appeared in 1877.

RED JACKET, a famous chief of the Seneca Indians, born in Central New York, about 1752. During the American revolution, he rendered valuable services to the English, and towards the close of his life became a confirmed inebriate. Died on the Seneca reservation, in 1830. His life has been written by Stone (1867).

REDOWAK, a Bohemian dance in triple time, somewhat resembling a polka.

RED WING, in Goodhue Co., Minn., on the Mississippi River, about 41 miles from St. Paul. It has two railroads; is a local wheat market, and one of the leading manufacturing cities of the state. Pop. 6500.

REED, Edward James, C.B., M.P., naval constructor, was born at Sheerness, England, September 20, 1820, and educated at the School of Mathematics and Naval Construction, Portsmouth. He gained practical experience in shipbuilding in Sheerness Dockyard, after which he edited the *Mechanic's Magazine*, and became secretary to the Institute of Naval Architects. In 1859 he drew attention to the room for economy of time and cost in the building of ironclads, and he was appointed Chief Constructor of the Navy in 1863. His views regarding turret ships not meeting with acceptance, he resigned this appointment in July 1870. He was returned to Parliament for Pembroke as a Liberal in February 1874. In 1877 he proposed without success the appointment of a Secretary of State for the Navy. Mr. R.'s services as a designer have been largely made use of by the British and many foreign Governments, from whom he has received numerous orders of distinction. He has written largely on naval and other subjects. *Our Ironclad Ships* (1869); *Our Naval Coast Defences* (1871); *Letters from Russia* (1875), &c.

REED, Joseph, an American patriot, born at Trenton, N. J., in 1741. He studied law, and began the practice of that profession in his native place, but afterwards removed to Philadelphia. At the outbreak of the Revolution, he entered the Continental army, and served as aid-de-camp to Washington. Died at Philadelphia, March 5, 1785.

RENO, Jesse L., an American general, born in Virginia, in 1823, and graduated from West Point, in 1846. He served with distinction in the Mexican war, and after its close, was professor of mathematics at West Point. In 1861 he was made brigadier-general of volunteers, and, after participating in several of the battles of the civil war, was killed at South Mountain, Sept. 14, 1862.

REES, Abraham, born at Llanbrynmair, Montgomeryshire, Wales, in 1743, was educated for the Presbyterian ministry at Caermarthen and Coward's Academy, Hoxton. He was appointed mathematical tutor in that institution (1762), three years later was ordained to the pastorate of a Southwark congregation, and in 1786 accepted the chair of natural science in a newly-founded college at Hackney, which he held till 1795. He was a member of the Royal Society and a D.D. of Edinburgh at the time of his death, June 9, 1825. R.'s success as editor of the second edition of *Chambers's Cyclopædia* (4 vols. 1776–85), which he entirely recast, emboldened him to publish his own far larger *New Cyclopædia* (45 vols. Lond. 1802–20), and he was also for some years Dr. Kippis' coadjutor in the *Monthly Review*, and author of *Practical Sermons* (1809), various social and political treatises, &c.

REEVE, Clara, an English novelist, born in England, in 1738, was the daughter of a clergyman with whom she read through Rapin's *History of England*, the Greek and Roman histories, and Plutarch's *Lives*, while a mere child. In 1762 she displayed her learning by translating from the Latin Barclay's fine old romance of *Argenis*, under the title of *The Phœnix*. Five years afterwards appeared *The Champion of Virtue*, which in the second edition changed its name to *The Old English Baron*. The authoress in the preface informs us that the romance is 'the literary offspring of the *Castle of Otranto*.' It uses much of the supernatual machinery Walpole and Mrs. Radcliffe were so fond of, but is much more verbose and feeble. Her other books, quite forgotten, are:—*The Two Mentors* (1783); *The Progress of Romance* (1785); *The Exile* (1788); *The School for Widows* (1791); *Plans of Education* (1792); *Memoirs of Sir Roger de Clarendon* (1793); *Destination* (1799); and *Edwin, King of Northumberland* (1802). Miss R. died at Ipswich, 3d December 1803. See Sir Walter Scott's *Biographical Memoirs* (1852).

RE'GAL, or RIGOLE', a small portable organ formerly much in use, fitted usually with one, but sometimes with a double row of pipes. Its principal function was to support treble voices.

REGALE'CUS, a genus of *Teleostean* fishes, belonging to the family *Trachypteridæ*, and including the curious tape-fish (*Regalecus Banskii*), so named from its long thin shape. The body is much compressed in this genus; the ventral fins are long and attenuated, and the dorsal fin is spiny.

REGNIER, Mathurin, the creator of classical satire in French literature, was born at Chartres, December 21, 1573. He was the nephew of the poet Philippe Desportes, under whose auspices he first cultivated poetry. In 1593, he accompanied Cardinal Joyense to Rome, returning after a stay of eight years, disappointed in his hopes of advancement—a result which was perhaps due to the irregularities of his life. He visited Rome once more in the train of Béthune, ambassador of Henri IV., and seems to have availed himself of his opportunities to make a careful study of Italian poetry. In 1609 he became canon of the church of Notre Dame in Chartres, and from this period he was able, without anxiety, to cultivate his poetical tastes, and to abandon himself 'à la bonne loi naturelle.' He enjoyed the friendship of some of the most distinguished men of his time, and was known among his friends as 'le bon R.' He died at Rouen, October 22, 1613. Editions of his works are numerous. The chief are those of Paris (1608), Leyden (1652), Amsterdam (1729), Paris (1780, 1808, 1819), the best are those by M. Viollet le Duc (Paris, 1822, reproduced 1853), and Barthélemy (Paris, 1862), and Lacour (1867). See Sainte-Beuve, *Tableau de la poésie Française au Seizième Siècle*.

REGUAR'DANT, a heraldic epithet applied to an animal with its head turned backwards.

REID, Mayne, a distinguished traveler and author, born in Ireland in 1818. In 1838 he came to America, and traveled ex-

tensively in the western part of the U. S., and afterwards took up his residence in Philadelphia, Pa., and devoted himself to literature. He served with great bravery in the Mexican war, and was wounded at Chapultepec. He has published numerous works of romance and adventure, which have had large sales. Among his works are the following, the title in most instances being suggestive of the character of the work: *The Cast-aways, The Rifle Rangers, The Marooners, The Scalp-Hunters, Osceola, The White Chief*, and *The Quadroon*. Died Oct. 22, 1883.

REID, WHITELAW, an American editor, born at Xenia, O., Oct. 27, 1837, and graduated from Miami University in 1856. He was for a time Superintendent of Schools at Charleston, S. C., was connected with the Xenia *News* and Cincinnati *Gazette*, and in 1869 became connected with the editorial staff of the New York *Tribune*, then under the management of Horace Greeley. When Mr. Greeley, in 1872, was nominated for the Presidency by the Liberal-Republican and Democratic parties, Mr. Reid became editor-in-chief of the *Tribune*, which position he still holds (1885). He has always been actively identified with the Republican party, and has been one of its strongest supporters.

RE'I INTERVEN'TUS, a term of Roman law denoting the doing, or refraining from doing, some act, on the faith of a bargain or promise; in consequence of which act the law holds that neither party can draw back. To give R. I. this effect, it must flow from the contract or promise, and must be known to the party against whom it is pleaded.

REINKENS, HUBERT JOSEPH, the first of the 'Old Catholic' bishops, was born at Burtscheid, near Aachen, 1st March 1821. After working for three years in a spinning-mill, he entered the university of Bonn (1844), was ordained priest (1848), and held the chair of ecclesiastical history at Breslau (1857–74). A pamphlet published on the occasion of the jubilee of his university (1861) had brought him into conflict with his superiors, and shortly after the promulgation of the Infallibility Dogma (1870) he appeared as a leader of the *soi-disant* 'Old Catholics.' His deposition from the professorship by Bishop Förster (1871) remained unrecognized by the Prussian government, but was followed up by excommunication. Thrust out of one Church, R. proceeded with the formation of another, of which he was consecrated bishop, August 11, 1873. As such he has been recognized by Prussia, Baden, and Hessen, though not by Bavaria, and as such he has addressed a pastoral to the 'Old Catholic Church' in Germany (1875). He is author of *De Clemente Presbytero Alexandrino* (1851), *Hilarius von Poitiers* (1864), *Martin von Tours* (1866), *Aristoteles über Kunst besonders über Tragödie* (1870), *Ueber Päpstliche Unfehlbarkeit* (1871), *Luise Hensel und ihre Lieder* (1877), &c. See *The New Reformation, a Narrative of the Old Catholic Movement* (Lond. 1875).

REMI'GIUS, ST., the apostle of Gaul, was born in 437, at Cerny in Laonnais, and raised in his twenty-second year to the archbishopric of Rheims. His labors were sealed by the baptism of Hlodwig in 496, and ere his death in 533 he saw almost the whole of his vast diocese converted to Christianity.—Another ST. R., archbishop of Lyon from 852, opposed Hincmar in the strife engendered by the monk Goltschalk, and prevailed on the Synod of Valence (855) to recognize as orthodox the teaching of a twofold predestination. He died Oct. 28, 875.

RENO, MARCUS A., an American officer, born in Illinois, in 1835, and graduated from West Point in 1857. He served with the army of the Potomac during the civil war, being present at Antietam, Cedar Creek, and other important battles. In 1868 he was made major U. S. cavalry.

REP (probably a corruption of *rib*), a woollen fabric so woven as to present a ribbed appearance transversely. It is used for ladies' dresses. Any stuff exhibiting this feature is said to be *repped*.

REPROBA'TION is the name given to a doctrine alleged to be involved in the Calvinistic doctrine of Election, but repudiated by Calvinists in the sense sought to be given to it. The word R. does not occur in the *Confession of Faith*, but the following language seems sufficiently explicit: 'By the decree of God, for the manifestation of his glory, some men and angels are predestinated unto everlasting life, and others foreordained to everlasting death' (chap. iii. sec. 3). Yet in sec. 7 of the same chapter it is further stated that it hath pleased God 'for the glory of his sovereign power over his creatures, to pass by, and to ordain them (the non-elect) to dishonor and wrath *for their sin*, to the praise of his glorious justice.' The phrase 'for their sin' is held to introduce the moral element that clears the doctrine of the character ascribed to it by its adversaries.

RESACA DE LA PALMA, an important battle, fought at a ravine of the same name, near Matamoras, between a Mexican army under Gen. Arista, and a U. S. army under Gen. Taylor, May 9, 1846, in which the latter won a decided victory.

RESORCIN, is a colorless crystalline compound obtained by fusing galbanum with potassium hydrate, dissolving the fused product in water, neutralizing with sulphuric acid, and mixing the clear filtered solution with ether. The R. is taken up by the ether, which is afterwards driven off by distillation. R. acted on by sulphuric acid yields a fine purple red coloring matter, which, with several other dyes derived from R., is used in dyeing and calico-printing. R. is closely allied to orcin, and its composition is represented by the formula $C_6H_6O_2$.

RETZ, JEAN FRANÇOIS PAUL DE GONDI, CARDINAL DE, was born at Montmirail, France, October 1614. His father was general of the galleys, and his uncle was Archbishop of Paris. Destined for the Church, in which an early developed aptitude for diplomacy seemed to promise him promotion, he was educated by Vincent de Paul, who had to wink at a good many of his pupil's follies. Up to the age of eighteen the young divine was known only as a successful gallant, though he was small and ill-formed; but in 1622 he published the *Conjuration de Fiesque*, a book which caused Richelieu to remark, '*Voilà un dangereux esprit.*' At twenty he preached before the court, and making a name at the Sorbonne as a theological debater, he was introduced to the notice of Louis XIII., who on his deathbed appointed him coadjutor to his uncle, the Archbishop of Paris. For seven years he was the implacable adversary of Mazarin, to thwart whom he set at defiance the authority of the crown, and obstinately refusing to resign his ecclesiastical position, became the most energetic and unscrupulous of the Frondeurs. On Mazarin's fall, he was selected as Minister by the Queen-regent, Anne of Austria, and after much plotting, received the cardinal's hat in 1651. Mazarin, on his return to power in the following year, had him imprisoned on a charge of conspiracy, but he escaped to Spain, and thence to Italy. During this exile he worked hard in the cause of Charles II. On the death of his enemy Mazarin (1661) he returned to Paris, but Louis XIV., having declared that he should never regain the archbishopric, he was forced to resign, gaining instead the abbacy of Saint Denis and several other benefices, with leave to retire to Commercy. He then sold his estates and paid off his heavy debts, of which he had once arrogantly said, when reproached with their number, that Cæsar, at his age, had six times as many. During his retirement he composed his inimitable *Mémoires*, in which the society he moved in down to 1655 is faithfully portrayed. Than these, even in French literature, there exist no memoirs more perfect in literary grace, or more valuable for historic truth. De R. died at Paris, August 24, 1679. The *Mémoires* were first published in 1717; the best editions are those of Champollion-Figeac (4 vols. 1859), and Feillet and Gourdalt (8 vols. Par. Hachette & Co. 1874–77). See also Léonce Curnier, *Le Cardinal de R. et son Temps* (2 vols. 1862); Topin, *Le Cardinal de R., son Génie et ses Écrits* (1872); Grazier, *Les Dernières Années du Cardinal de R.* (1876), and Chantelauze, *Le Cardinal de R. et l'Affaire du Chapeau* (2 vols. 8vo. 1878). The last work is the first instalment of an elaborate biography of the coadjutor for which M. Chantelauze has been collecting materials for sixteen years. The correspondence of De R. with the Abbé Charrier, discovered by M. Chantelauze, occupies the second volume, and is followed by letters of Louis XIV., Mazarin, the Comte de Brienne, Scarron, &c., all relating to the negotiations so indefatigably prosecuted at Rome for the purpose of obtaining a cardinal's hat for the coadjutor.

REUMONT, ALFRED VON, born at Aachen, August 15, 1808, studied at Bonn and Heidelberg, and, after filling various diplomatic posts at Florence, Constantinople, and the Papal Court, was successively Prussian Minister at Florence, Modena, and Parma, from 1851 till 1860, when he retired into private life. He has since resided at Bonn and Rome, and in 1876 received the freedom of the city of Florence. R. is author of valuable works on Italian history. *Beiträge zur Italienischen Geschichte* (6 vols. Berl. 1853–57), *Geschichte der Stadt Rom* (3 vols. Berl. 1867–70), *Lorenzo de Medici il Magnifico* (2 vols. Leip. 1874; Eng. trans. 1876), *Geschichte Toscanas seit dem Untergange des Florentinischen Freistaat* (2 vols. Gotha. 1876-77), &c. See his *Biographische Denkblätter, nach Persönlichen Erinnerungen* (Leip. 1878).

REVELGUNGE', a town in the district of Sarun, Bengal, British India, at the junction of the Gogra with the Ganges, on the left bank of both rivers, 31 miles N.W. of Patna. The old name was Godna; but in 1788 Mr. Revell, Collector of Customs, founded a bazaar which has since become the greatest river mart for oil-seeds in India. It is the station where commodities from the N.W. Provinces and Oude are transhipped. In 1876–77 the exports were valued at £471,000, chiefly oil-seeds; the imports at £563,000, including grain, salt, and piece-goods. A great fair and religious gathering is held here twice a year. Pop. (1872) 13,415.

REVERE, PAUL, an American patriot, born at Boston, Mass., Jan. 1, 1735. He was a strenuous opponent of British tyranny, and on the night of April 18, 1775, secretly left Boston, and rode towards Concord every where arousing the people, by his announce-

ment of the British expedition of the following day, and thus enabling them to prepare for the battle of Lexington. This service has been immortalized in Longfellow's poem, *The Midnight Ride of Paul Revere*. He continued to render effective service to the Continental cause until its success had been accomplished. Died at Boston, May 10, 1818.

REVOL'VING FUR'NACE. Furnaces to which a motion of rotation is communicated have been introduced with marked success in some chemical manufactures, and a measure of success has also attended the introduction of a rotary furnace in the laborious operation of puddling in the malleable iron manufacture. The rotation of the furnace keeps the charge it contains in constant motion, exposes it uniformly to the heat, and saves a great amount of disagreeable manual labor. The soda ash produced is not only made at much less cost, but it is also of finer quality than that made in a reverbatory furnace. The apparatus is applicable to many chemical processes in which reverberatory furnaces are at present used. Of R. F. employed in the iron manufacture, that invented by Danks for mechanical puddling has met with much attention, and Dr. C. W. Siemens' rotary furnace for making malleable iron direct from the ore is an invention which may yet be productive of great changes in the iron manufacture.

REY'NOLDS, John, D.D., born at Pinho in Devonshire, England, in 1549, studied at Merton College, Oxford. In 1563 he was made Fellow of Corpus Christi, where he lectured on Aristotle, till 1586, when he was elected reader of the theological lecture founded by Sir Francis Walsingham. In 1593 he became Dean of Lincoln, but resigned this office and refused a bishopric on being chosen President of Corpus Christi. He was the leader of the Puritan party, and was profoundly read in Hebrew and theology. At the Hampton Court conferences of 1603, he suggested and strongly urged that a new translation of the Bible should be made, a work in which he took a prominent part, the weekly meetings of the translators being held at his chambers. He died at Oxford in 1607. Besides sermons, controversial treatises, academical discourses, &c., he wrote an elaborate work against the reception of the Apocrypha into the Old Testament Canon, *Censura Librorum Apocryphorum Veteris Testamenti* (Oppenheim, 2 vols. 1611).

REYNOLDS, John F., an American officer, born in Pennsylvania in 1820, and graduated from West Point in 1841. He served with distinction during the Mexican war, and was promoted for gallantry at Monterey and Buena Vista. During the civil war he participated in the battles of Mechanicsville, Gaines' Mill, and Glendale. At the last of these he was taken prisoner, but was shortly afterwards exchanged. In 1862 he was made major-general of volunteers. He was engaged at Fredericksburg, Chancellorsville, and at Gettysburg was shot, and died a few moments afterwards.

RHEYDT, a town in Rhenish Prussia, on the left bank of the Niers, an affluent of the Maas, 17 miles W.S.W. of Dusseldorf by rail. It manufactures silk, velvets, yarn, hosiery, shawls, linens, leather, soap, glue, paper, and vinegar. Pop. (1875) 15,857.

RHINE'HART, William H., an American sculptor, born in Frederick Co., Md. He learned the trade of marble-cutting in Baltimore, but early developed a taste for sculpture, and when 30 years of age, visited Europe to prosecute his studies in that line of art. In 1858 he located in Rome, and rapidly attained prominence and success. The following are among his most famous works: *Angel of the Resurrection of Jesus*, *Woman of Samaria*, *Love Reconciled with Death*, and *Clytie*. The last was regarded by Rhinehart as the masterpiece of his life. Died at Rome, Oct. 28, 1874.

RHIZOCRI'NUS, a genus of *Crinoids* or Lily Stars, represented by the *R. Lofotensis*, observed by Sars of Christiania in 1867 in the North Sea off the Loffoden Isles. The interest attaching to this form arises from its forming the existing representative of an interesting fossil family (*Apiocrinidæ*) of 'Pear encrinites;' the group, prior to the discovery of R., having been regarded as extinct. R. is permanently rooted to the sea-bed, and has a flexible jointed stem, destitute of branches save at its root-extremity. The arms are furnished with *pinnules* or branches, and the *calyx* or body-cup is well developed.

RHIZOPHORA'CEÆ, an order of polypetalous dicotyledons, consisting of tropical trees or shrubs with opposite entire leaves, and axillary flowers either single or in clusters. The stamens are sometimes twice as numerous as the petals. The ovary has two or more cells, and the fruit has few seeds. The order includes some fourteen genera variously found in the continents of Asia, Africa, and America.

RHO'DEZ, the chief town of the department Aveyron, France, on the steep N. bank of the river Aveyron, 80 miles N.E. of Toulouse, with which it is directly connected by rail. Its cathedral is one of the finest Gothic structures in the S. of France, dating from the 13th and 14th centuries, having a lofty tower and magnificent stained glass windows. R. has several other interesting buildings, and is rich in Roman remains. Its manufactures are woollens, serges, leather, paper, playing-cards, &c., and its trade is chiefly in cattle, horses, and cheese (*fromages du Cantal*). Pop. (1872) 12,111. Anciently *Segodunum*, the chief town of the Celtic *Ruteni*, R. was in the Middle Ages, as *Rutena*, capital of the *Pagus Rutenicus*, and later, that of the principality of Rovergne (*Comitatus Rodensis*). After varying fortune, it passed by marriage to Henri III. in 1526.

RHÖNGEBIR'GE, a group of volcanic hills, part of the German Mittelgebirge, to the S.W. of Thüringerwald, between the valleys of the Fulda and Werra. The principal heights are the Milseburg (2813 feet), the Pferdskopf (3100), the Wasserkuppe (3074), and the Kreuzberg (3042). Much of the group is well-wooded, and the plateau of Vorderrhön, in the N., is in part cultivated.

RHYL, a watering-place of N. Wales, in Flintshire, 16 miles E. of Conway by rail, has a large and handsome church designed in First Pointed style by the late Sir Gilbert Scott (1861), a Romanesque Catholic church (1864), a townhall (1876) comprising board-offices, meat, fish, and vegetable markets, an aquarium and winter garden (1877), and a promenade pier, 2000 feet long, constructed in 1867 at a cost of £17,000. There are three English and one Welsh weekly newspapers, and steamers ply daily between R. and Liverpool. Pop. (1871) 4229.

RICH, Edmund, born at Abingdon, in Berkshire, England, towards the close of the 12th c., was sent at the age of twelve to a school at Oxford, and thence with his brother Robert proceeded to the University of Paris. Summoned home by the last sickness of his saintlike mother, he hired a hall at Oxford, and lectured there for several years, being one of the chief introducers of Aristotle to the English schools, and counting Grosseteste among his pupils. When a boy at school, he had already vowed himself to celibacy, and with quaint devotion plighted troth to an image of the Blessed Virgin in an Oxford church; now one night in a dream his mother bade him study the mystic symbol of the Trinity in place of Euclid's diagrams, and Edmund accordingly took orders, becoming treasurer of Salisbury Cathdral (*circa* 1220). In 1227 he preached the sixth crusade, when miracles attested a holiness that seven years later caused his elevation to the see of Canterbury.

As primate he strove to follow in the steps of his great foregoer, Langton, upholding the national party in opposition to Henry's foreign hirelings, lay and ecclesiastical. But though at the Council of Gloucester, in the month succeeding his consecration, he sternly rebuked the king for his murder of the Earl Marshal, Richard of Pembroke, and effected the temporary downfall of Roches and Rivaulx, he found himself thwarted at every turn by these and other favorites, foremost among them the legate Otho le Blanc; and from Rome, where he sought redress in 1238, he returned with a heavy heart. Two years later he left England for France, and, worn out by extreme asceticism, died at the priory of Soissy, near Provins, November 19, 1240. He was canonized in 1249 as St. Edmund of Pontigny, the place of his burial, whither in September 1874 four hundred English pilgrims repaired to pay their devotions at his shrine. See vol. iii. of Hook's *Lives of the Archbishops of Canterbury* (1863).

RICH'ARDS, Brin'ley, an English composer, was born in Carmarthen in 1819. He obtained the King's Scholarship at the Royal Academy of Music in 1835, and again in 1837, and subsequently became a professor in that institution. R. has written a large number of concertos, tarantelles, studies, &c., for the pianoforte, and some hundreds of songs, including 'God Bless the Prince of Wales,' which has become a sort of supplementary national anthem. He is also celebrated as a pianist.

RICH'ARDSON, Benjamin Ward, M.D., F.R.C.S., a distinguished physician and scientist, was born at Somerly, Leicestershire, October 31, 1828, and graduated at St. Andrews in 1854. He undertook the editorship of the *Journal of Health* in 1855, and in the following year gained the Astley-Cooper prize for a treatise on the coagulation of the blood, and the Fothergillian gold medal for an essay on diseases of the fœtus. He is the originator of several novel and original medical processes, such as the use of ether spray for local pain, and methyline bichloride as a general anæsthetic, and is one of the ablest and most successful experimenters in his profession.

His writings include *Clinical Essays* (1862, &c.), *For and Against Tobacco* (1865), *Alcohol, its Action and Use* (6 lectures, 1869), *Diseases of Modern Life* (1876; 4th ed. 1877), and *Hygeia, a City of Health* (1876). The last-named work made a great impression on the public mind.

RICH'ARDSON, Charles, LL.D., born in England, July 1775, abandoned the study of law for that of lingnistics, and in 1815 produced his *Illustrations of English Philology*. Intrusted with the lexicographical portion of the *Encyclopædia Metropolitana* (1818), he afterwards published the results of his labors separately

as a *New Dictionary of the English Language* (2 vols. 1835–37; new ed. 1863). R. was also author of a treatise *On the Study of Language; an Exposition of Tooke's Diversions of Purley* (1854), and a frequent contributor to the *Gentleman's* and other magazines. He died at Feltham, in Middlesex, October 6, 1865.

RICH HILL, in Bates Co., Mo. Coal mining and zinc smelting are carried on extensively, and there is a Holly system of water works. Pop. 5000.

RICHMOND, in Madison Co., Ky., 140 miles E. of Louisville. It is the center of the celebrated Blue-Grass region. Large quantities of fine stock are raised and shipped to southern and eastern markets. Pop. 3000.

RICHMOND COLLEGE, an educational institution, located at Richmond, Va., and under the control of the Baptists. It was founded as a theological seminary in 1830, and was developed into a college in 1844. It has suitable buildings, and a small endowment.

RICH'MOND, Legh, was born at Liverpool, England, 29th January 1772, studied at Trinity College, Cambridge, and in 1805 obtained the rectory of Turvey, Bedfordshire, where he died, 8th May 1827. He wrote several religious works, once widely read and much admired. The chief are *The Fathers of the Church*, and a volume of tales entitled *Annals of the Poor* (new ed. with Memoir, 1877). Some of these—*e.g.*, *The Dairyman's Daughter* and *The Young Cottager*—are not yet quite forgotten.

RICK (Old Eng. *hreac*, 'a small heap'), in husbandry, is a piled structure of hay or corn-sheaves, having an oblong plan and a top with sloping sides, which are usually covered with thatching. During the process of heaping, a tarpaulin, called a R.-cloth, is suspended from standards over the R. to protect it from rain.

RICKETTS, James B., an American general, born in New York, in 1816, and graduated from West Point in 1839. He participated in the Mexican war, and saw considerable service on the frontier. After the first battle of Bull Run (1861), he was made brigadier-general of volunteers. He was engaged at Chantilly, South Mountain, Antietam, the battles of the Wilderness, Monocacy, Opequan, Fisher's Hill, and Cedar Creek. For his gallantry he was promoted major-general.

RIES, Ferdinand, an able composer and pianist, was born in Germany, 29th November 1784. He studied at Vienna under Beethoven from 1801 to 1804, after which he achieved a great reputation as a pianist in the many countries he visited professionally. During a long residence in England (1813–24) his services as a teacher and performer were in immense demand. He composed the operas *Die Räuberbraut* (1829) and *Liska* (first produced as *The Sorceress* at the Adelphi, London, 1831), six orchestral symphonies, several overtures, a cantata, *Der Sieg des Glaubens*, nine pianoforte concerts, and many excellent pianoforte works, violin quartets, &c. He died at Frankfurt-am-Main, 13th January 1838. See Fétis, *Biogr. univ. des Musiciens* (new ed. 1878).

RIE'SI, a town of Sicily, province of Caltanisetta, 16 miles N.W. of Terranova, has large chemical works, and a trade in agricultural produce. Pop. (1874) 11,548.

RIETSCH'EL, Ernst, a famous German sculptor, born at Pulsnitz, 15th December 1804, studied at the Art Academy of Dresden, and later under Rauch in Berlin, was appointed in 1832 Art Professor in the former city, and died 21st February 1861. He had a marvelous power of combining ideality with fidelity to Nature. His masterpiece is the 'Luther Monument' at Worms; other notable works are a Pietà (Potsdam), a statue of Lessing (Brunswick), statues of Goethe and Schiller (Weimar), the relievo decorations of the Berlin opera-house, and the Dresden museum. See Oppermann's *Ernst R.* (Leips. 1863).

RIGADOON' (Fr. *rigodon*), an old merry dance in triple time performed by a man and woman, somewhat in the style of a jig.

RIOBAM'BA, a town in the S. American Republic of Ecuador, 84 miles N.E. of Guayaquil, on a plain 9600 feet above the sea-level. Pop. about 16,000. The original town of R. stood at the foot of Chimborazo, 9 miles from the site of the present town, but was destroyed by an earthquake in 1797.

RIPIE'NO (Ital. *full*), an occasional, or filling-up part in the orchestra, added when necessary to strengthen the principal or obligato instruments.

RIP'LEY, George, LL.D., an American author, born at Greenfield, Mass., October 3, 1802, educated at Harvard and Cambridge Divinity School, was a Unitarian pastor at Boston from 1828 to 1831, afterwards resided for several years in Europe, and became thoroughly acquainted with French and German literature. His chief works are *Discourses on the Philosophy of Religion* (1839); *Letters to Andrews Norton on the Latest Form of Infidelity* (1840); and *Specimens of Foreign Standard Literature* (14 vols. Boston, 1838–42). He assisted in conducting the *Dial* (1840–41); contributed to magazines, especially the *Christian Examiner*; promoted the Brook Farm Socialist experiment (1844–46); aided in editing the *Harbinger*, a Fourierite organ (1844–48); became literary editor of the New York *Tribune* (1849); brought out along with Bayard Taylor *A Handbook of Literature and the Fine Arts* (1852); and was joint editor with C. A. Dana of Appleton's *New American Cyclopædia* (New York, 16 vols. 1858–63). This was his great life-work. A new edition, made under his care, appeared in 1873–76. Died in New York City, July 4, 1880.

RISH'ANGER, William de, an English chronicler, born in 1250, became a Benedictine monk of Saint Alban's, and was appointed historiographer to Henry III. He was alive in 1322. His *Chronicle*, edited by J. O. Halliwell, was printed for the Camden Society in 1840. R. also wrote the *Gesta Edwardi Primi*, some fragmentary annals, and part of the history attributed to Walsingham. All his writings are valuable for the history of Scotland at the period of its conquest by Edward I., Scotland itself not possessing at that time any chroniclers.

RITSON, Joseph, an English antiquary, was born at Stockton in Durham, 2d October 1752, settled in London as a conveyancer, and died 3d September 1803. He was a competent scholar, but an insolent critic, and his opinions in literature were fatally perverted by pride and malignity. Yet some of his works have a permanent value. The chief are *A Collection of English Songs* (3 vols.), *The English Anthology* (3 vols.), *Robin Hood, a Collection of Ballads* (2 vols.), and *A Collection of Scotch Songs* (2 vols.).

ROANOKE COLLEGE, an educational institution of the Lutheran Church, at Salem, Va. Its principal feature is the importance attached to metaphysical studies. A large percentage of its students enter the Christian ministry.

ROB'ERTSON, Thomas William, a brilliant modern dramatist, was born at Spalding, in Lincolnshire, England, 9th Jan. 1829. He was born, as it were, on the stage; in his own phrase, 'was nursed on rose-pink and cradled in properties.' His father and mother both earned some theatrical reputation, and his sister, Madge R. (now Mrs. Kendal), subsequently became one of the brightest ornaments of the famed Haymarket company. R. himself failed as an actor in the provinces, and settled in London as a journalist in 1860. After much literary drudgery, he became dramatic critic to the *Illustrated Times*, and a contributor to the best of the lighter periodicals. Meantime he had written and translated many plays, but it was not till after many delays and disappointments that he achieved his first triumph as a dramatist on the production of *Society* at the Prince of Wales' Theater in 1865. This success he followed up with *Ours* in 1866, *Caste* in 1867, *Play* in 1868, *School* in 1869, and *M.P.* in 1870. R. died in London, 3d Feb. 1871.

ROB'INSON, Henry Crabb, F.S.A., born at Bury-St.-Edmund's, Suffolk, England, May 13, 1775, and after being articled to a lawyer at Colchester and in London, studied at Jena and other German universities (1800–5). Admitted to the 'Weimar circle,' he made the acquaintance of Goethe, Schiller, Wieland, Herder, and Madame de Staël; was *Times* correspondent in Spain during the first two years of the Peninsular War (1808–9); and on returning to London became a regular contributor, being thus brought into contact with many of the leading writers of his day. He was called to the bar (1813), and having acquired a fortune on the Norfolk circuit, retired in 1828 to private life and the society of Wordsworth, Lamb, Coleridge, Landor, and their compeers. A dissenter and a Liberal, he was one of the earliest members of the Athenæum Club, and a founder of University College, London, as also of the Flaxman Gallery. He died in London, February 5, 1867, leaving behind him a delightful Diary, which has been edited by Dr. Sadler (3 vols. 1869).

ROB'INSON, Sir Hercules George Robert, born in England, in 1824; after studying at Sandhurst, received a commission in the 87th Foot, but retired, and held various Civil Service appointments, and was a member of the Irish Poor-Law Board (1846–53). He was next successively appointed President of Montserrat (1854), Lieutenant-Governor of St. Christopher's (1855), and Governor of Hong-Kong (1859), of Ceylon (1865), and of New South Wales (1872). Having already been knighted in 1859, he was advanced to the rank of G.C.M.G. in 1875 for his services in connection with the annexation of the Fiji Islands.

ROCHAMBEAU, Jean Baptiste Donatien de Vimeur, Comte de, a French marshal, was the son of the governor of Vendôme, and was born there, 1st July 1725. Entering the army in 1742, he took part in the campaigns of Bohemia, Bavaria, and the Rhine. For his services at the siege of Namur he was made a colonel (1747). He also brilliantly distinguished himself at the siege of Maestricht. For his bravery in the expedition to Minorca he received the cross of St. Louis (1756), and was raised to the rank of brigadier. He took part in the Seven Years' War, became maréchal-de-camp and inspector of cavalry in 1761. In 1780 he came to America to assist the American colonists with an auxiliary force of 6000 men, and had a great share in the arrange-

ments that forced Lord Cornwallis to capitulate with his whole force at Yorktown, in Virginia, 19th October, 1781. On his return to France he was made governor of Picardy. In 1790 he accepted the command of the army of the North, and in 1791 was made a marshal of France. In 1791 he resigned his command, withdrew to his country estate, narrowly escaped execution by the Terrorists, received the Cross of the Legion of Honor from Napoleon, and died at Thoré, 10th May 1807. See *Memoires de R.* by Luce de Lancival (Par. 1809).

ROCHE'FORT, Henri, otherwise Le Comte Victor-Henri de Rochefort-Luçay, a French journalist and politician of the Red Republican school, was born at Paris on the 30th of January 1830, and was the son of a Legitimist Marquis, who was also a noted comic dramatist. After studying medicine for some time, R. took to literature, and, after working for some years as a *chroniqueur* on minor journals, and a contributor to comic papers, such as the *Charivari*, he became one of the principal members of the staff of *L'Evénement* and *Le Figaro*. Between 1856 and 1866, he wrote some eighteen or twenty comedies and vaudevilles, generally in collaboration with other dramatists. In 1868 the bitterness of his satirical articles in the *Figaro* upon the Imperial *régime* caused several prosecutions to be instituted against that paper. On this account he withdrew from its staff, and began the publication of a weekly pamphlet under the name of *La Lanterne*. More than 80,000 copies were sold on the day of its first publication (1st June 1868), and its circulation as a whole averaged about 120,000 weekly. It was suppressed by the Government after the eleventh number, and prosecutions were instituted against R., who fled to Brussels, where he continued the publication of *La Lanterne*, and among other things, fought his fourth *duel de journaliste*. In 1869 he returned Paris, having been elected to the Chamber of Deputies by the First Circumscription of Paris, after being defeated by M. Jules Favre in the Seventh. He now started a journal called *La Marseillaise*, in which he continued his attacks upon the Empire. It was while attempting to arrange a duel between R. and Prince Pierre Bonaparte that M. Victor Noir, a writer in *La Marseillaise*, was shot dead by the Prince in his own salon. Early in 1870 the journal was seized, and a fresh prosecution instituted against R. by the authority of the Chamber. On the 22d of January he was fined 3000 francs and sentenced to six months' imprisonment. The overthrow of the Empire on the 4th of September released him from the Sainte-Pélagie, and he became a member of the Provisional Government, but resigned on the 1st of November. In December he re-established *La Lanterne*, and in February 1871 changed its name to *Le Mot d'Ordre*. Elected in February to the National Assembly, he refused to sit, and by his writings promoted the cause of the Commune. After its fall he was arrested, and sentenced to fifteen years' transportation. He was taken to New Caledonia in 1873, but in March 1874 he made his escape to Newcastle, New South Wales, whence he returned to Europe by way of America. He settled first at Brussels and then at Geneva, in both of which places he continued the publication of *La Lanterne*. In 1876 he became a regular contributor to the newspapers *Les Droits de l'Homme* and *Le Radical*, published in Paris.

ROCHESTER, University of, an educational institution of the Baptists, at Rochester, N. Y., organized in 1850. In 1876 it was possessed of property to the extent of more than half a million of dollars. This amount is now largely increased.

ROCHESTER, a town of Adams Co., Neb., 96 miles W. of Lincoln. It has three railroads; is a good shipping point; is surrounded by an agricultural district; and is engaged in manufacturing. Pop. 4500.

ROCHESTER, in Olmstead Co., Minn., on the Winona & St. Peter Railroad, 50 miles from Winona. It is surrounded by an agricultural district, and is the center of an active trade. Pop. 5113.

ROCHESTER, in Strafford Co., N. H. It is 10 miles N. of Dover, and is extensively engaged in manufacturing. Pop. 5785.

ROCKLAND, a town of Plymouth Co., Mass., on the Old Colony Railroad, 18 miles from Boston. It is one of the most prominent shoe-manufacturing towns in the state. Pop. 4553.

ROCKVILLE, in Tolland Co., Conn., 16 miles from Hartford. It is principally engaged in the manufacture of woollen and silk goods. Pop. 6500.

RODGERS, John, an American naval officer, born in Maryland, in 1771, and entered the navy in 1798. In 1799 he was made captain, for his gallantry at the capture of the French vessel *L'Insurgente*, and in 1805 succeeded Com. Barrow in command of the squadron, then operating against Tripoli. During the war of 1812, he rendered valuable services to the American cause. Died at Philadelphia, Pa., Aug. 1, 1838.

ROE, Edward Payson, an American author, born in New York, in 1838, graduated from William's College, and entered the ministry of the Presbyterian church. He was for a time pastor of a church at Highland Falls, but has devoted most of his energies to literary work, making his home at Cornwall-on-the Hudson. He has written *Barriers Burnt Away; Opening of a Chestnut Burr; From Jest to Earnest*, etc. His works have proved exceedingly popular, and are notable for the pure sentiment which pervades them.

ROE, Sir Thomas, was born at Low-Leyton, in Essex, England, about 1580. After studying at Magdalen College, Oxford, he entered the court of James I., and was knighted in 1604. In 1609 he sailed for 300 miles up the Amazon, and was next sent as envoy to the Great Mogul, Shah Jehan, at whose court in Delhi he resided from 1614 to 1618. He entered the House of Commons as member for Cirencester in 1620, and again in 1640 as member for the University of Oxford. In 1621 he was sent as ambassador to Constantinople, and on his return he presented many Oriental manuscripts, which he had collected, to the Bodleian Library. The Alexandrian MS. of the Greek Bible which he obtained is now in the British Museum. In 1629 R. was successful in negotiating a peace between Poland and Sweden, and it is believed the intervention of Gustavus Adolphus in the Thirty Years' War was due to his advice. In 1641 he was English ambassador at the Diet of Ratisbon, and on his return he was made Chancellor of the Garter and a privy counselor. He died November 6, 1644. His works are *A True and Faithful Relation of what hath lately happened in Constantinople, concerning the Death of Sultan Osman and the setting up of Mustapha, his uncle* (Lond. 1622); and a *Journal of Voyages to the East Indies, Turkey, Egypt, Palestine, and Persia*, published first in French (1663), and in English in the same volume with Della Valle's *Travels* (1664).

ROE'BLING, John A., a distinguished engineer, born at Mulhausen, Prussia, June 12, 1806, and graduated from the Royal Polytechnic School, Berlin, with the degree of C E. He came to America in 1831, and since then has planned and executed some of the most remarkable suspension bridges in the U. S. The greatest monument to his engineering skill, is the Brooklyn bridge, spanning the East River, and connecting the cities of Brooklyn and New York. (See Bridge in Am. Supp.). While directing this structure, he injured his foot, an amputation was performed, and lockjaw followed, from which he died, in Brooklyn, July 22, 1869. The work was continued and completed under the supervision of his son Washington Roebling.

ROGER OF WENDOVER, an English chronicler of the 13th c., was a monk of St. Albans, became precentor of the Abbey, and afterwards prior of Belvoir, from which office he was deposed about 1219. He afterwards returned to St. Albans, where he died, it is thought about 1237. His *Flores Historiarum* is a history of the world from its creation in two books, the first coming down to the birth of Christ, and the second to the nineteenth year of Henry III.'s reign. Although not without value for the whole period of English history, partly because he has gathered his materials from sources that have since perished, by far the most important part is that which treats of his own times. Here he is an original author, and writes in a bold, manly, and impartial style. The work has been edited for the English Historical Society by the Rev. H. O. Coxe (1841–44), of whose text there is an English translation by Giles in Bohn's *Antiquarian Library*.

ROGERS, John, the first of the 'Marian martyrs,' born at Deritend, a suburb of Birmingham, England, in 1505, was for several years chaplain to the Merchant Adventurers at Antwerp, and pastor of a Dutch congregation at Wittenberg, Saxony, where he turned Protestant. He became acquainted with Tyndale and Coverdale, and using the former's MSS. he prepared a revised edition of the English Bible, based on Coverdale, which he published under the name of Thomas Matthew. Returning to England, he accepted office in the Church, and in 1553 was cited before the Privy Council to answer for a sermon which he had preached at St. Paul's Cross on the Sunday after Queen Mary's entry into London, denouncing Romanism, and urging the people to hold to the Reformation principles. After a long imprisonment, he was tried for heresy before Gardiner, and condemned to be burnt at the stake at Smithfield, a sentence executed on February 4, 1555. His life has been written by Colonel Joseph L. Chester (1861).

ROGG'EVELD MOUNTAINS, a range in the western portion of Cape Colony, with an average height of 5000 feet. From a distance it resembles an immense wall, and throughout its length of nearly 200 miles there are only one or two available passes.

ROHLFS, Gerhard, an African traveler, was born at Vegesack, near Bremen, 14th April 1832. He fought as a volunteer in the Schleswig-Holstein struggle of 1849, subsequently studied medicine at Heidelberg, Göttingen, and Würzburg, and after traveling through Austria, Italy, and Switzerland, went to Algeria (1861), where he served in the foreign legion of the French army, and

acquired such a command of Arabic that he subsequently ventured to travel through the interior in a Mohammedan guise. He explored various parts of Morocco and the Soudan, crossed the African continent from the Mediterranean to Lagos, in Guinea, accompanied the English expedition against Abyssinia (1867), and made two notable journeys through the Libyan desert, the second in 1873, in which he was accompanied by Jordan the astronomer, Zittel the mineralogist, Ascherson the botanist, and Remelé the photographer.

ROHTUCK, the chief town of the district of the same name, in the Punjaub, British India, 42 miles N.W. of Delhi. There is a manufacture of turbans interwoven with gold and silver thread, and of fine cotton cloth. Pop. (1868) 14,153.—The *district* of R. has an area of 1811 sq. miles. Pop. (1868) 536,959. It is partly irrigated by the W. Jumna Canal. The crops are millets, wheat, gram, and barley. The breed of cattle is famous. Jhujjur is a considerable town, in a tract which was forfeited after the Mutiny of 1857, when the whole district was for a time lost to the British.

ROLLESTON, George, M.D., F.R.S., born at Maltby, Yorkshire, England, July 30, 1829, was educated at the Grammar School of Gainsborough and Sheffield Collegiate School; and, proceeding to Pembroke College, Oxford, was elected fellow (1851). Having studied medicine at St. Bartholomew's, London, and served as assistant-physician in the British Civil Hospital at Smyrna during the Crimean War (1855–56), he became physician to the Ratcliffe Infirmary, Oxford (1857), Lineacre Professor of Anatomy and Physiology (1866), and a fellow of Merton (1872). R. is author of an able treatise on *Forms of Animal Life* (1870), besides a *Report on Smyrna* (1856), the Harveian oration for 1873, &c. He has also contributed a treatise on craniology to W. Greenwell's *British Barrows* (1877).

ROMANCE', or ROMAN'ZA, a little song with a love story, or a melody imitative thereof. The word is derived from the songs of the troubadours having been sung in the R. languages.

ROME, a town of Floyd Co., Ga., on the Coosa River. It has fine railroad facilities, and is surrounded by an agricultural district. It is important as a trade center and a cotton depôt. Pop. 5000.

ROM'NEY, George, a famous portrait painter, was born at Dalton-in-Furness, Lancashire, England, 15th December 1734. He was brought up to his father's business of cabinetmaking, but at the age of nineteen was placed with Steele, a painter at Kendal, with whom he remained for five years. In 1756 he married, and after practising at York as a portrait painter, removed to London in 1762. Rapidly attracting public attention, and making many influential friendships, he became in the course of a few years the successful rival as a portrait painter of Reynolds and Gainsborough. In 1773 he visited Italy, and returning two years later, continued to work in London and at Hamstead till 1799, when he retired to Kendal in broken health to join the wife whom he had only visited twice in thirty-seven years. He died at Kendal, 15th November 1802. In his later years he gained a high reputation as a painter of historical subjects. Several of his works are engraved in Boydell's *Shakspeare*.

He never exhibited at the Royal Academy or sought academic honors. Lacking the delicacy of Reynolds and the charming vivacity of Gainsborough, and ranking below either as a colorist, R. yet surpasses both in intense dramatic feeling and a passionate sense of female beauty. See the elaborate Life by the poet Hayley (1809); a briefer one by the Rev. John R., son of the painter (1830); and *English Art under George III.*, by Sidney Colvin, in the *Fortnightly Review* for March 1874.

ROON, Albrecht Theodor Emil, Graf von, a celebrated Prussian general and military reformer, was born at the family seat of Pleusberg, near Kolberg in Pommern, 3d April, 1803, entered the cadet school of Kulm in 1816, became lieutenant of infantry in 1821, studied at the Berlin Kriegsschule 1824–27, was appointed teacher of cadets in 1828, member of the general staff topographical survey in 1833, and teacher in the Berlin Kriegsschule in 1835. As chief of the staff of the Eighth Army Corps, he took part in quelling the revolt of Baden in 1849, and after rising step by step to the chief command of the 14th Division was made Minister of War in 1859, an office which he held from 1861 in conjunction with that of Minister of Marine. During the struggle between the Government and the majority of the Diet (1861–66) he carried out his plan of army reorganization in the face of strenuous opposition. After the war of 1866, which demonstrated his ability in organization, he received the Cross of the Black Eagle, and after the French campaign of 1870–71 was rewarded with the rank of Graf. He resigned the office of Minister of Marine in 1871, and on the unexpected resignation by Bismarck of the presidency of the cabinet after the triumph of passing the Districts Organization Bill (1872), the office devolved on him as senior Minister of State. It is generally supposed that he merely held the premiership as a *locum tenens* till Bismarck was reinstated with increased authority and prestige, at the head of a larger Liberal majority, 11th November 1873. He is the author of various works on military subjects, of which the principal are *Grundzüge der Erd-, Völker-und Staatenkunde* (3d ed. 3 vols. 1847–55), *Militär. Länderbeschreibung von Europa* (1858), and *Anfangsgründe* (12th ed. 1868).

ROSARIO, a town in the Argentine Republic, 170 miles W. of Buenos Ayres, on the right bank of the river Paraná. Being the entrepôt for a large region, the trade of R. is very extensive. The chief exports are wool, hides, bones, dried beef, maize, and wheat together with copper and silver from the mines of Catamarca and San Luis. R. is the center of railway lines, one of which will eventually connect it with Valparaiso on the Pacific. Pop. (1877) 25,000.

RO'SARY, a number of beads strung together, used in devotional exercises by Hindus, Buddhists, Mohammedans, and Roman Catholics. The beads are of various materials, stone, coral, amber, wood, seeds, and ivory being employed. The R. probably had its origin in India, where it has been used for upwards of 2000 years. The R. of the Hindus and the Buddhists consists of 108 beads, which when used by Vaishnavas and Buddhists, are always made of the smooth wood or seeds of the Toolasee plant (*Ocymum sanctum*). The beads of the Saivas consist of the rugged berries of the Rudracha tree (*Elæocarpus tuberculatus*). The Mohammedan R., or *tusbeeh*, is made up of 100 beads in honor of the same number of names of the Deity. The Lady Psalter of the Roman Catholics contains three groups of fifty-five beads each, or fifteen decades, in honor of the five glorious, five joyous, and five sorrowful events of Our Lord's life, death, and resurrection.

ROSE'CRANS, William S., an American general, born at Kingston, O., Sept. 6, 1819, and graduated from West Point in 1842. In 1854 he resigned from the army, and, locating in Cincinnati, O., engaged in business pursuits. At the outbreak of the civil war, he entered the Union service, and served for some time on the staff of Gen. McClellan. In 1861 he was made brigadier-general U. S. A., and in 1862 was made major-general of volunteers. He commanded a brigade at Rich Mountain, and the Army of the Mississippi at the battles of Inka (Sept. 19, 1862) and Corinth (Oct. 3–4, 1862). He was subsequently placed in command of the Army of the Cumberland, fought the battle of Murfreesboro' (Dec. 31, 1862—Jan. 3, 1863), and was defeated at Chickamauga (Sept. 19–20, 1863), after which he was removed to Missouri, where he repelled the invasion of Sterling Price (see Price, Sterling, Am. Supp.). After the war he removed to California where he engaged in farming upon an extensive scale. He is now (1884) a member of Congress from California.

ROSS, Alexander, was born at Aberdeen, Scotland, in 1590, educated for the Church, became chaplain to Charles I., and master of the Free School of Southampton. He died in 1654. R., who had managed to gather a good deal of money in his lifetime, left, among numerous other benefactions, £200 to the town council of Aberdeen to found bursaries, and £50 to the Bodleian library. He wrote about thirty works in prose and verse, all of which are entirely forgotten, and such unquestionably would have been the fate of Alexander himself, in spite of his charities, had it not been for the couplet in Hudibras:

> 'There was an ancient sage philosopher,
> And he had read *Alexander Ross* over.'

ROSS, Alexander, a Scottish poet, born in the parish of Kincardine-O'Neil, Aberdeenshire, 13th April 1699, studied at Marischal College, and was successively parish teacher at Aboyne, Laurencekirk, and Lochlee, where he died 20th May 1784. His *Helenore, or the Fortunate Shepherdess, a Pastorale Tale in the Scottish Dialect, to which are added a few Songs by the Author*, was published at Aberdeen in 1768. The volume at once gave R. a place by the side of Ramsay, as a master of the native Doric, and time has not robbed his verses of their charm. *Helenore* has still her ardent admirers, while the simplicity, blythe-heartedness, and racy vigor of the songs, give unabated pleasure. The very titles of some recall delightful memories; *Woo'd and Married and a'; The Rock and the Wee Pickle Tow;* and *To the Begging we will go.* To the 5th edition of the *The Fortunate Shepherdess* their is prefixed a memoir of the poet by his grandson, the Rev. Alexander Thomson, minister of Lintrathen, Forfarshire. The best edition is that by Dr. Longmuir (1866), containing a sketch of R.'s unedited works.

ROSS, Ludwig, a German philologer and archæologist, was born of a Scottish family, at the paternal estate of Horst, in Holstein, 22d July, 1806, and studied at Kiel and Leipsic. In 1832 he set out to travel in Greece, and two years later was made conservator of antiquities at Athens. He held a professorship of archæology in the University of Athens from 1837 till the revolution of September 1843, and in 1845 was appointed to a similar chair at Halle. By intense devotion to study he greatly impaired

his health, and perished by his own act, 6th August, 1859. His chief works are *Inscriptiones ineditæ* (3 parts, 1834–45), *Demen von Attika nach Inschriften* (1846), *Handbuch der Archäologie der Kunst* (1841), *Reisen auf den Griech. Inseln des Ægäischen Meeres* (4 vols. 1840–52), *Italer und Gräken* (1858), *Hellenika* (2 vols 1846).

ROSSIE'NY, a town of the government of Kovno, in European Russia, stands on the Dubissa, 88 miles N.W. of Kovno. It was formerly capital of the Polish province of Samogitia. Pop. (1870) 10,700.

ROS'WITHA (properly *Hrôthsuith*, from the Old High Ger. *Hruodsuind;* Latinized *Hrotsvitha* and *Hroswitha*), a German poetess, born 935 A.D. of a noble Saxon family, became a nun at Gandersheim about 980, and died there about the beginning of the 11th c. She wrote six comedies in Latin after Terence, a poem in Latin hexameters on the deeds of Otto the Great, eight 'legends,' &c. Her works were first published by Konrad Celtis (Nürn. 1501); the last critical edition is that by K. A. Barack (Nurnb. 1852). Their genuineness has been challenged by Aschbach (1867), and vindicated by Köpke (1869) in his *Ottonische Studien.* There is a French translation of the 'Comedies' by Magnin, with an admirable introduction (Par. 1845). The best edition of the poem on Otto is that by Pertz in the *Monumenta Germania Historica.* See also the Essays by Hoffmann and G. Freytag (Brest, 1839), and by Dorer (Aarau, 1857).

ROTT'LERA, is a genus of about 20 species of shrubs or small trees belonging to *Euphorbiaceæ*, found in tropical Asia and Australia. By Müller the species are placed under *Mallotus.* From the surface of the fruit of *R. tinctoria* a red mealy powder is obtained, known in India as Kalama, Kapila podi, or Wurrus, which is used as a purgative, an anthelmintic, and sometimes in cutaneous diseases. It is also largely used as a dye-stuff for silk —red, rose-pink, and orange being obtained from it, and, by additional processes, blue, black, and green. The bark serves for tanning, and the leaves and fruit are applied externally with honey against the bite of poisonous animals. The name R. is in commemoration of Dr. Rottler, an eminent missionary for nearly fifty years in India, and a good botanist.

ROUS, or ROUSE, FRANCIS, was born at Halton, Cornwall, in 1579, and educated in Oxford at Broadgate Hall, near Pembroke College. He represented Truro in several Parliaments during the reigns of James and Charles I. In 1640 he sat in the Long Parliament; and in 1643 was made a member of the Westminster Assembly, and Provost of Eton College. He was unfit for this post, and the Royalists nicknamed him 'the old illiterate Jew of Eton.' In 1645 the Commons ordered the publication of his metrical version of the Psalms, a work which forms the basis of the modern Presbyterian Psalter. R. was made a privy councilor, and entered the House of Lords in 1657. He died at Acton, near London, 7th January, 1659.

ROW, JOHN, a Scottish reformer, was born near Stirling about 1525; studied at St. Andrews Univerity, where he devoted himself to civil and canon law. In 1550 his reputation as a pleader was such that the Scottish clergy sent him to Rome as their agent and representative there. While in Italy R. took the degree of Doctor of Laws at the University of Padua. Returning to Scotland in 1558, he began to examine the doctrines of the Reformers, and in 1559 abandoned Catholicism. In April 1560 he was one of six ministers appointed to compile a *Confession of Faith* and the *First Book of Discipline;* became minister of Perth in July, and took part in the first General Assembly of the Reformed Church of Scotland which met at Edinburgh, December 20, 1560. He was conspicuous in all the ecclesiastical transactions of the time, and held the office of moderator four times. He also took part in compiling the *Second Book of Discipline.* R. died at Perth, October 16, 1580. By his marriage with Margaret Bethune, daughter of the Laird of Balfour, in Fife, he had eight sons, one of whom, also named JOHN (born 1568, died 1646), was the author of a *Historie of the Kirk of Scotland*, extending from the year 1558 to August 1637, and continued by *his* son to July 1639. This valuable work was printed for the 'Wodrow Society,' and also for the Maitland Club.

ROWLOCK (pron. *rullock*), is the name applied to a contrivance on the wale of a boat, to hold the oar in rowing. It consists of two vertical pegs of wood or iron, or of a pivoted iron hook or stirrup, or simply of a notch cut in the wale.

RSHEV, a town of the government of Tver, in European Russia, stands on the Volga 80 miles S.W. of the town of Tver. It has nine churches, and carries on a considerable trade in fish, linen, and hemp-seed. Pop. (1870) 18,732.

RU'BINSTEIN, ANTON, a modern composer and pianist, was born at Wechwotynetz, near Jassy, Russia, November 30, 1829. He played at a concert at Moscow at the age of nine, and was sent a year afterwards to Paris, where he studied for a year and a half. R. settled in St. Petersburg in 1848, where he wrote *Dmitri Donski*, his first opera, produced in 1852. He founded the conservatory of music at St. Petersburg, of which he was for nine years director. For many years he has been known as one of the most powerful and brilliant of pianists. He visited America in 1875. R. has composed over 100 separate works, including operas, cantatas, symphonies, string quartets, and numerous pianoforte compositions and songs. Among them are the operas *Die Kinder der Haide* (Vienna, 1861), *The Demon* (St. Petersburg, 1875), *Die Maccabaer* (Berlin, 1875), *Feramors* (*Lallah Rookh*) and *Nero*, the oratorio *Paradise Lost*, and the *Ocean* and *Dramatic* symphonies. In his words, as in his performances, he has two separate styles, one full of savage energy and strength, the other possessing an infinite charm of tenderness and sensibility. His younger brother NICHOLAS enjoys a high reputation in Russia as a pianist and composer.

RUHM'KORFF, HEINRICH DANIEL, a philosophical mechanician, was born at Hanover in 1803. In 1819 he went to Paris and was porter in Chevalier's laboratory. In 1839 he started business as a scientific manufacturer, and 1844 constructed an improved and convenient thermoelectric battery. After a lengthened series of experiments in magneto-electricity, he brought out his induction coil or inductorium in 1851, hence known as the R. coil. At the Paris Exhibition of 1858 he was awarded a prize of 5500 francs for his collection of scientific apparatus, and in 1863 he obtained a grant of 50,000 francs from Napoleon III. for his improvements in the galvanic battery. He died December 21, 1877.

RUTE'BEUF, a famous trouvère of the 13th c. Almost nothing is known of his history. From his writings we learn that he had no other profession than that of *rimeur;* while a phrase in his *Dit de l'Erberie* leads to the conclusion that he was a native of Champagne. R., however, was no common minstrel or jongleur. If misery forced him to beg he addressed himself to the King and to the most illustrious personages of France. That he suffered from poverty is not wonderful. By his own admission he was idle, debauched, evil-tongued, and addicted to gambling. The fifty-six pieces which R. has left are mostly short; they comprise satirical or devotional *dits*, historic songs, hymns, plaints, in which he celebrates the memory of his dead benefactors or mourns over public calamities, *tensons*, a small number of *fabliaux*, two legends, some allegorical trifles, and a drama. R. is a very unequal writer; he is rude and full of affectations, but there is withal so much verve, originality, and energy in his poems—so much, in a word, of genuine inspiration—that modern criticism has assigned him a foremost place in the ranks of the trouvères. Satire is his true element. In this respect he foreshadows the characteristic feature of later French literature, and may be regarded as a medieval Voltaire or La Fontaine. Princes, popes, prelates, barons, burgesses, advocates, even serfs, are in turn the butt of his ridicule; but it is against the religious orders that he darts his keenest and most pungent epigrams. Perhaps the finest of his fabliaux is *Charlot le Juif.* One of his pieces, entitled *Mort ou la Repentance R.*, has given rise to the conjecture that this merciless mocker of priests closed his career in the cloister, seeking there the repose denied him in the world. See A. Jubinal, *Œuvres Complètes de R.* (2 vols. Par. 1838–39).

RUTGERS COLLEGE, chartered in 1770 as Queen's College, located at New Brunswick, N. J., and controlled by the Reformed (Dutch) Church. It has classical, scientific, and theological departments, is well endowed and has a fine library, an astronomical observatory, and an excellent corps of instructors.

RUTH'ERFORD, SAMUEL, a Scotch divine, born about 1600 in the parish of Crailing, Roxburghshire, studied at Edinburgh, was chosen professor of classical literature in 1623, but soon turned his attention to theology, and in 1627 was settled as parish minister of Anwoth in Kirkcudbrightshire. In 1636 he published at Amsterdam an elaborate work in Latin on the Arminian controversy, entitled *Exercitationes Apologeticæ pro Divina Gratia.* For this he was deposed in 1636, and ordered to confine himself to the city of Aberdeen, then a stronghold of Episcopacy. Here he wrote most of those Letters (first published in 1664) which have given him so great a celebrity. R. took part in the famous Glasgow Assembly of 1638, and was soon after appointed professor of divinity at St. Andrews. He went in 1643 as one of the Scotch Commissioners to the Westminster Assembly, issued his famous *Lex Rex* in 1644 against the doctrine of absolute monarchy, became Principal of St. Andrews in 1649, and was twice offered a chair of divinity in Holland in 1651. He died March 19, 1661. R. wrote numerous other works both in Latin and English. He was a man of great piety and intellectual fervor.

RUTLEDGE, EDWARD, an American patriot, born at Charleston, S. C., Nov. 23, 1749, and began the practice of law in his native city in 1773. He was an active promoter of the Revolution, a signer of the Declaration of Independence, and one of the committee that drew up the first Articles of Confederation. After the war he was U.S. Senator (1794), and governor of South Carolina (1798). Died at Charleston, S. C., Jan. 23, 1800.

RUTLEDGE, John, an American patriot, born at Charleston, S. C., in 1739, studied law in England, and settled in his native city. He was a member of the Continental Congress (1774–75), and throughout the war of the American revolution was one of the staunchest and most trusted supporters of the colonial cause. He was made a justice of the U. S. supreme court (1789), chief-justice of South Carolina (1791), and chief-justice of the United States (1795). The last appointment, however, failed to be confirmed by the senate. Died at Charleston, S. C., July 23, 1800.

RUTNAGHERRY (*Ratnágirí*), the chief town of the district of the same name in the Bombay Presidency, British India, on the shore of the Arabian Sea, 150 miles S. of Bombay. Pop. (1872) 10,614.—The *district* of R., which lies between the E. Ghauts and the Arabian Sea, N. of the Portuguese territory of Goa, has an area of 3789 sq. miles; pop. (1872) 1,019,136. The crops are rice and other grains, betel, and cocoa-nuts. R. suffered, though not severely, from the famine of 1877.

RUVIGA'DO, a town in the United States of Colombia, province of Antigua, at a height of 8900 feet above the sea. It has a considerable trade. Pop. 10,000.

RY'MER, Thomas, born in Yorkshire, England, 1639, was educated at the grammar-school of Northallerton, entered Sydney-Sussex College, Cambridge, and was called to the bar at Gray's Inn, 1666. He was appointed historiographer to the king when Shadwell died in 1692, and was employed on a scheme of Montagne and Lord Somers for the collection of state papers relating to transactions between England and the States. In 1703, the first volume of this work appeared under the title of *Fœdera, Conventiones et cujuscunque generis Acta Publica inter Reges Angliæ et alios Principes.* Seventeen volumes of the *Fœdera* were edited by R., and three more by Sanderson. It was reprinted at the Hague in 10 vols. (1739). R. died in poverty, December 14, 1714.

S.

SABELL'A, a genus of marine worms or *Annelida*, belonging to the order *Tubicola*, in which the animals form tubes of various materials to inclose their bodies. The tube formed by S. is of membranous or leathery consistence. It is buried in the sand, only the gills appearing above the surface. The 'blood' or pseudo-hæmal fluid in S. is of an olive-green color.

SACCHI'NI, Antonio Maria Gasparo, one of the most popular of the older Italian operatic composers, was born July 23, 1734. His works include 38 operas, 5 oratorios, and much church and instrumental music. At the time of his death, October 7, 1786, he was the idol of the Parisian public. Though his compositions are now almost obsolete, his free and happy style and rich instrumentation had a powerful effect upon his art, and live in the works of many of his successors. See Fétis, *Biogr. Univ. des Musiciens* (new ed. 1878).

SACK'VILLE, Viscount, an English soldier and statesman of the reigns of George II. and III., was the third son of the first Duke of Dorset. He was born on January 26, 1716, and entered the army under the title of Lord George S. At Dettingen (1743) and Fontenoy (1745) he served with credit, and obtained the rank of colonel at Culloden (1746). He subsequently became a privy-councilor, and was secretary for Ireland in 1751. At the Battle of Minden (1759) he was in command of the allied cavalry, and, refusing either from cowardice or jealousy to obey the order to charge given him by Prince Ferdinand of Brunswick, he saved the French army from annihilation. On this charge he was tried by court-martial, and adjudged incapable of serving thereafter in any military capacity. George II. struck his name off the list of privy-councilors, and for eight years he lived in retirement and disgrace. In 1770 he inherited the property of Lady Elizabeth Germain, and assumed her name. The cloud under which his questionable conduct had placed him gradually dissolved, and having been noted for his opposition to the claims of the American colonists, he became in 1775 Secretary for the Colonies in Lord North's ministry, and carried on the American War, with what success is well known. He retired from office in 1782, and was created V. S. and Baron Bolebrook. He died on August 26, 1785, and his eldest son afterwards became Duke of Dorset.

SAD'LEIR, Sir Ralph, was born at Hackney, Middlesex, England, in 1507. In his eleventh year he attracted the notice of Henry VIII., by whom he was afterwards employed in the dissolution of the religious houses, and rewarded from their spoils. From 1537 to 1542 he made several journeys to Scotland upon diplomatic business, first to strengthen the English interest at the northern court, twice thereafter to persuade James V. to cast off the supremacy of the Pope, and again to bring about the proposed match between Edward, Prince of Wales, and the infant Mary, afterwards Mary Queen of Scots. Upon the accession of Mary Tudor to the English throne, he retired to his estate near Hackney. Elizabeth called him to the Privy Council, and appointed him keeper of Queen Mary in the Castle of Tutbury. After the execution of the unfortunate queen, he was sent to pacify King James. He died at Standon, Hertfordshire, 30th March, 1587. His *State Papers and Letters* (1809) were prefaced by his memoir by Sir Walter Scott. See *A Memoir of the Life and Times of the Right Hon. Sir R. S., compiled from State Papers by his Descendant, Major F. Sadleir Stoney* (1877).

SADOLE'TO, Jacopo, a celebrated Italian humanist, was born at Modena, July 14, 1477. He was ordained a priest in 1502, and appointed apostolic secretary by Leo X. in 1513, and by Clement VII. in 1523. Nominated Bishop of Carpentras in 1517, and Cardinal by Paul III. in 1536, he died at Rome, October 18, 1547. S. was much esteemed in his own age for his sincere piety and his love of learning, while his moderation and desire for the reform of the Church from within, led to his employment in various negotiations between Karl V., François I., and the Popes. Of his works, which are distinguished for the clearness and Ciceronian dignity of their style, the chief are—*De Liberis recte Instituendis* (Paris and Venice, 1533, often reprinted; French trans. by Charpenne, Paris, 1855); *In Pauli Epistolam ad Romanos* (Venice, 1536); *Hortensius, sive de Laudibus Philosophiæ* (Lyon, 1538); *Epistola ad Senatum Populumque Genevensem* (Strasb. 1539; French trans., with a reply from Calvin, Geneva, 1540); *Poemata* (Leipz. 1548); *Philosophiæ Consolationes et Meditationes in Adversis* (Frankf., 1577). By his *Epistolarum Libri xvii.* (Lyon, 1550; 5 vols. Rome, 1759–67) alone he is now remembered. See Joly, *Etude sur S.* (Caen, 1857).

SAD'OWA, a village near Königgrätz in Bohemia, after which the French name the great battle fought there, 3d July, 1866.

SAGINAW, a city of Michigan, on the river of the same name, and capital of Saginaw Co. It is 18 miles from the mouth of the Saginaw, which at that point is navigable for vessels of largest size. It is situated in the midst of a fertile farming country, has large manufacturing interests, fine public schools, and a pop. of about 16,000.

SA'GUENAY, a river of Canada, tributary of the St. Lawrence, which it joins 120 miles below Quebec. The Chomouchuan, or main branch of the S., rises in the Laurentian mountains, and flows first E. then S.E. for 215 miles, when it enters Lake St. John. Here it receives the Mistassini, 180 miles long, the Paribonsa, 165 miles long, and the Metebetchuan, 110 miles long. On issuing from the lake it forms numerous rapids, and gradually widens till it attains a breadth of 2 miles, after which it again narrows and proceeds to the St. Lawrence through a deep gorge whose cliffs are often more than 1500 feet high. The S. drains an area of 23,700 sq. miles, which, being mostly mountainous and densely wooded, discharges a very large volume of water. Its great depth, sometimes above 100 fathoms, renders it navigable for 110 miles, and much timber is shipped from its banks.

SAINT-AMOUR, Guillaume de, a famous doctor of the Sorbonne of the 13th c., was born at St. Amour in Franche-Comté. He was an active member of the Church, went to Rome to plead for the independent rights of the University of Paris, and wrote vigorously against the mendicant orders. He incurred the wrath of the Pope and of St. Thomas, but was popular with the French people. He died 13th September 1272. His works, the chief of which is *De Periculis Novissimorum Temporum*, were printed at Constance in 1622.

ST. CHARLES, a town of Missouri, on the Missouri River, 20 miles above its mouth, and 19 miles by rail from St. Louis. It

has thirteen churches, four newspapers, and ten schools. The Missouri is here crossed by an iron railway bridge 2 miles in length, with its approaches; erected at a cost of $2,000,000. S. C. has extensive flour and starch mills, and breweries. Pop. 5570.

SAINT-CYR, Laurent Gouvion, Marquis de, Marshal of France, was born at Toul, 13th April 1764. In 1792 he joined the French army as a volunteer, and rose rapidly during the campaigns on the Rhine and in Germany between that year and 1797. In 1794 he became a general of division, and in 1798 he received the command of the French troops in Rome. He subsequently distinguished himself in the German and Italian campaigns, and in the Peninsular War. He was not among the eighteen marshals created by Napoleon on his ascending the throne in 1804, but received his baton during the Russian campaign of 1812, when he gained a brilliant victory over Prince Wittgenstein at Polozk. In the disastrous Saxon campaign of 1813 he twice defended Dresden with much gallantry. On the news of his final capitulation being announced to Napoleon, a general standing by remarked, 'We have lost another 30,000 men.' 'Worse than that,' replied the Emperor, 'we have lost Saint-Cyr!' On the Restoration he was created a peer of France, and remaining faithful to the royalist party in 1815, was appointed Minister of War at the close of the Hundred Days. This office he resigned in a few months, but was reappointed in 1817, and introduced several important reforms. In 1821 he retired from public life, and devoted himself to agriculture and to the composition of historical works. He died at Hyères, 10th March, 1830.

SAINT LOU'IS, the capital of the French possessions in Senegambia, is situated on a sandy island, 2500 yards long, 5 miles from the mouth of the river Senegal. It is fortified, and has a considerable trade, but is dirty and poorly built. Pop. (1875) 15,748, of whom only a very small number are whites.

SAINT'ON-DOL'BY, Madame Charlotte Helen, an English contralto singer, was born in London in 1821, and was educated at the Royal Academy of Music, where she became King's Scholar in 1836. On leaving that institution she proved herself one of the most accomplished and cultivated of native artists, and immediately took high rank as a concert and oratorio singer. Mendelssohn formed an appreciative opinion of her powers, engaged her at the Gewandhaus concerts at Leipsic in 1846–47, and wrote the contralto part in *Elijah* for her. Till her retirement in 1870 she enjoyed a great and deserved popularity.

SAINT-PAUL, a town in the island of Réunion. Its pop. at the census of 1876 was 26,979.

SA'LA, George Augustus Henry, an English journalist of Italian parentage, was born in London in 1828. He early began to write for Dickens' *Household Words*, contributed the Hogarth papers to the *Cornhill Magazine*, was correspondent of the *Daily Telegraph* (1863–64) during part of the Civil War in the United States, and in the Franco-German War of 1870–71, founded and first edited *Temple Bar*, and recorded the 'Echoes of the Week' in the *Illustrated London News*. Of his many humorous stories and sketches, all characterized by ceaseless vivacity, the best are, perhaps, *Twice Round the Clock* (1859), *Accepted Addresses* (1863), and *Adventures of Captain Dangerous* (1863).

SALAMANCA, in Cattaraugus Co., N. Y. It is an important railroad center, and has extensive lumber mills and other manufacturing interests. It carries on a large trade with the surrounding country. Pop. 3498.

SALE, Sir Robert Henry, a distinguished English general, was born in 1792, and entered the army at the age of thirteen. He led the storming party against the stockades at Kemendeen, near Rangoon, in the first Burmese war of 1825, and also was conspicuous at the storming of Ghuzni, in the Afghan war of 1839. When the British force was destroyed at Cabul, he fortified himself at Jellalabad, where 'the illustrious garrison' held out from 12th November 1841 to 7th April 1842, when relieved by General Pollock. S. was killed at the battle of Mudki 18th December 1845. See Greig, *S.'s Brigade in Afghanistan*.

SALE'MI (Arab. 'place of delight'), a town of Sicily, province of Trapani, 48½ miles S.W. of Palermo, with a considerable trade in wine and oil. It is commanded by a ruined castle of Arabo-Byzantine architecture. Pop. (1874) 14,096.

SA'LIAN PRIESTS (Lat. *salii*, 'the leapers' or 'dancers'), a college of twelve priests, instituted by Numa, at the close of whose reign an *ancile* or shield fell from heaven and warded off a pestilence. Lest this shield should be stolen, Numa had other eleven made exactly the same, and appointed the S. P. to keep them. They were priests of Mars Gradivus, and celebrated his festival annually on 1st March, with great dancing and singing, after which they partook of a sumptuous feast in the temple of Mars on the Palatine. Tullus Hostilius is credited with the foundation of another college of Salii, but this less famous body was probably distinguished from the other chiefly by being chosen from a different tribe. The S. were always patricians.

SALISBURY, a town of Essex Co., Mass., on the Merrimac River and the Eastern Railroad. It is extensively engaged in the manufacture of woollen goods and carriages. Pop. 4079.

SALISBURY, Robert Arthur Talbot Gascoigne Cecil, Marquis of, K.G., eldest surviving son of the second marquis, comes of the family founded by William Cecil, Lord Burleigh, whose son Robert became Earl of Salisbury in 1605, the marquisate being added in 1789. S. was born at Hatfield, England, 13th February 1830, was educated at Eton and Oxford, and entered the House of Commons as member for Stamford in the Conservative interest in 1853. He sat until 1868, at first under the title of Lord Robert Cecil, and after the death of his elder brother as Viscount Cranbourne. In July 1866 he became Secretary of State for India under Lord Derby, but resigned on March 2, 1867, owing to a difference of opinion with regard to the Reform Bill. In 1868 he succeeded to the marquisate on the death of his father, and in 1869 he was elected Chancellor of the University of Oxford. He became Secretary of State for India when Mr. Disraeli took office in 1874, and represented England in the Conference of Constantinople in December and January 1876–77. On the retirement of Lord Derby from the cabinet on March 28, 1878, he became Secretary of State for Foreign Affairs, and signalized his accession to office by a circular on the Eastern Question, which convinced Europe that England intended to re-assert its influence as a great European power. Along with Lords Beaconsfield and Odo Russell he represented England in the Berlin Congress of June and July 1878. On his return he was invested by her Majesty with the Order of the Garter.

SALL'EE, or SLA, an Atlantic port of Morocco, at the mouth of the river Bu-Regreb, on the N. bank, the town of Rabat being built on the S. bank opposite. A bar renders the entrance to the port frequently unsafe. S. was formerly notorious as the headquarters of Moorish piracy, whence issued the dreaded 'Sallee rovers,' and so recently as 1851 both S. and Rabat were severely bombarded by the French for piratical conduct. S. has manufactures of carpets for home use; and exports wool, beans, and maize. Pop. about 12,000.

SALM-SALM, Felix, Prince, born in Austria, in 1828, came to America at the outbreak of the civil war, and entered the Union army. He rose to the rank of brigadier-general, and at the conclusion of that struggle went to Mexico, and entered the service of the Emperor Maximilian. After the overthrow and execution of Maximilian he returned to Europe, entered the Prussian service, and was killed at the battle of Gravelotte, in 1870.

SALVI'NI, TOMMASO, a distinguished Italian actor, born at Milan in 1829. His precocity procured his admission, at the age of fourteen, into a good dramatic company, where he received lessons from Modena. He was subsequently engaged in the royal company at Naples, and he played for six years in Domeniconi's company by the side of Adelaide Ristori. He afterwards retired for a time from the stage, during which he carefully studied the classic drama. He was a leading performer in the *fêtes* at Florence on Dante's sixth centenary in 1865. He subsequently undertook a lengthened tour through Italy, Spain, Portugal, and S. America, and in 1872–73 he visited the United States and again in 1880. His appearance at Drury Lane in 1875 in three of his most famous characters, 'Hamlet,' 'Othello,' and 'The Gladiator' in Soumet's tragedy, produced a furore of admiration. He appeared again in London in 1876. S. is a scholarly and cultivated man, of great ability as a comedian, of genius as a tragedian. He has a fine presence, a handsome and expressive face, and a noble bearing. His voice is magnificent in quality, and his elocution perfect. His excessive physical force, unequalled on the modern stage, sometimes mars his tragic style, by investing it with a certain savagery, while it unfits him for the illustration of pathos, tenderness, and the inner workings of the soul.

SALWEEN', a considerable river of Asia, supposed to rise in the Chinese province of Yunnan. It debouches into the sea in British Burmah, after a total course, almost due S., of 750 miles; area of drainage basin, 62,700 sq. miles. The city of Moulmein has grown up at its mouth, shortly above which it is joined by the Gyne and Attaran rivers. Immense quantities of timber, chiefly teak, are conveyed down the stream; but the banks in British territory are said to be becoming denuded of large trees.

SAN CHRIST'OBAL (formerly *Ciudad Real*), capital of the state of Chiapas, Mexico, on the river Tabasquillo, 450 miles S. of the city of Mexico. It was founded in 1528, and was the seat of a bishopric, first called by the benevolent Las Casas, whence it is sometimes called *Ciudad de las Casas*. It has manufactures of pottery, and of woollen and cotton stuffs, and is the center of a cattle-raising district. Estimated pop. (1877) 12,000.

SANC'TUS (in sacred music), a principal movement in the Mass of the Church of Rome; the 'Holy, Holy, Holy,' sung in the Communion Service of the Church of England.

SAND, the fine débris of crushed or water-worn rocks. As a rule it consists chiefly of quartz, often along with various coloring matters. Shell-sand frequently consists to a very large extent of broken fragments of the shells of molluscs, or of the entire shells of smaller species, along with foraminifera, sponge-spicules, &c. Coral-sand, in tropical countries, is formed of the detritus of coral-reefs. Magnetic sand contains magnetic oxide of iron.

SANDEMAN, ROBERT, the founder of a religious sect, known as Sandemanians, born at Perth, Scotland, 1718, and was educated at Edinburgh. In 1762 he established this sect in London. Among its peculiar features were a weekly love feast, eaten on Sunday, and the kiss of brotherhood. He came to America in 1764, and settled at Danbury, Conn. Died at Danbury, April 2, 1771. The sect still has a few adherents.

SAND'HURST, a city of Victoria, on the Melbourne and Echuca Railway, 101 miles N.N.W. of the former place. It is the center of the important Bendigo goldfield, and has also manufacturers of iron and pottery. The houses and public buildings are of stone and brick, and many of them are very handsome. The streets are well paved and lighted with gas, and the water supply is ample. S. returns two members to the colonial Parliament. Pop. (1881) 28,167.

SAN DIEGO, a city and seaport of Southern California. It is surrounded by a fine fruit-growing country, and has quite an extensive commerce. It was settled in 1769, and now has a population of 3100.

SANDY HOOK, a low, sandy peninsula, at the entrance to New York Bay. Near its extremity are the Navesink Lights, by which incoming vessels recognize the vicinity of New York.

SANDYS, EDWIN, a distinguished English prelate, was born at Hawkshead, Lancashire, in 1519. He was educated at St. John's College, Cambridge, where he adopted the tenets of the Reformers. In 1547 he was elected master of St. Catharine's Hall, and in 1553 vice-chancellor of the university. At the instance of the Duke of Northumberland he preached a sermon in favor of Lady Jane Grey, and was consequently imprisoned, but was soon released and fled to the continent, where he wandered from place to place in great misery until the accession of Elizabeth. He then returned to England, and was consecrated to the sees of Worcester (1559) and London (1570), becoming in 1576 Archbishop of York. He died at Southwell on the 10th of July 1588. He had charge of the Books of Samuel, Kings, and Chronicles in the translation (1565) known as the 'Bishops' Bible.' His second son, SIR EDWIN S. (1561–1629), endowed a philosophy lectureship at Oxford, and his youngest son, GEORGE S. (1577–1643), was well known as an Eastern traveler, and as the translator of Ovid's *Metamorphoses* (published 1632). See the Rev. R. Hooper's *Poetical Works of G. S., now first Collected, with Introduction and Notes* (2 vols. 1872).

SAN FERNAN'DO, a town of Spain, province of Cadiz, on the Isla de Leon. It is joined to the mainland by a bridge of boats, the Puente Sanzo, and has a marine school and observatory. The Calle Real, above 1 mile in length, is its finest street. Salt, which is abundantly found on the strand, is largely exported. Pop. 15,300.

SAN'GHA ('society'), the name of the monastic order or congregation of mendicants founded by Gautama Buddha, which exists to the present day as the nucleus of the Buddhist religion wherever that religion is professed.

SAN JACINTO, BATTLE OF, the final battle in the war waged for the independence of Texas, fought near the junction of the San Jacinto River and Buffalo Bayou, April 21, 1836. The Mexican army was commanded by Gen. Santa Anna, and that of Texas by Gen. Houston. After a desperate, but brief struggle, the former were routed, and Santa Anna was taken prisoner. The forces engaged were small, and the losses were slight, but the battle was decisive, and gave independence to the Republic of Texas.

SANKEY, IRA DAVID, an American evangelist, who has labored extensively with Moody, born at Edinburgh, Pa. His pathetic singing of gospel hymns has proved very effective with the masses.

SAN LU'IS, a province and town of the Argentine Republic. The town, commonly known as S. L. de la Punta, is situated 445 miles W.N.W. of Buenos Ayres, and has a pop. of about 8000; the pop. of the province (1869) was 53,294.

SANNYÁSÍ, properly a Hindu of the fourth order, who has renounced the world and lives by mendicancy. But the term is now applied to all sorts of religious beggars, especially to devotees of Siva, who correspond to the Mohammedan fakirs. They wander about the country, or are collected in convents. At the end of the last century they became a terror in Bengal, forming armed bands and ravaging the country.

SAN'TA ANN'A, a town in the republic of San Salvador, on the Pacific coast of Central America, 32 miles N.W. of San Salvador city. Pop. 12,000.

SANTA BARBARA, a town of Santa Barbara Co., Cal., 362 miles S.E. of San Francisco, situated near the coast, on the Santa Barbara Channel, and possessed of an excellent harbor. It is engaged in agriculture, stock-raising, and fruit-growing; and is celebrated as a health and pleasure resort. Pop. 3550.

SANTA CRUZ, a town of Santa Cruz Co., Cal., on the North side of Monterey Bay, 86 miles from San Francisco. It is engaged in agriculture, stock-raising, fruit-growing, dairying and in manufacturing leather, lumber, powder and lime. It is a favorite summer resort and is visited annually by 20,000 people. Pop. 4200.

SAN'TA FÉ, a province and town of the Argentine Republic. 1. The *province* is bounded on the N. by the Gran Chaco, on the E. by the river Parana, on the S. by the province of Buenos Ayres, and on the W. by the provinces of Cordova and Santiago. Its area is 43,700 sq. miles, and its pop. about 100,000. In 1876 it possessed 39 colonies, or special settlements of foreign immigrants, who numbered 23,500, and cultivated large crops of wheat, besides rearing sheep and cattle in great numbers. The largest town in the province is Rosario. 2. The *town* of S. F. is situated on the navigable river Salado, 12 miles above its confluence with the Parana, and has a considerable transit trade. Pop. 15,000.

SÁNTIPUR', a town in the district of Nuddea, Bengal, British India, on the left bank of the Bhagirutti, 56 miles N. of Calcutta. It contained a large cloth factory in the commercial days of the E. India Company, and is still inhabited by many weavers. It is also celebrated for its Sanscrit pundits and an annual religious fair. Pop. (1872) 28,635.

SAN'TORIN (anc. *Thera*), the southernmost island of the Cyclades, 32 miles S. of Naxos, has an area of 65 sq. miles and a pop. of about 15,000. Of late years an active volcano has broken out in the island. There was a violent eruption in April 1870, and in the same year the capital of the island, also called S., was destroyed by an earthquake. In 1866 a new volcanic island of considerable extent, known as *Aphroessa*, was thrown up in its neighborhood. Remains of very ancient buildings have recently been excavated.

SAO SALVADOR', AMBASSE', or BAN'ZA CON'GO, the principal town of Congo, on a plateau 1500 feet above the sea-level, and 120 miles inland from the mouth of the Congo river. In the 15th and 16th centuries, under Portuguese influence it attained great prosperity, and had Christian kings, a cathedral, and Jesuits' College. With the removal of these and the decline of Portuguese power, the town has relapsed almost into its original condition. Its present pop. is estimated at 20,000.

SARATOGA, BATTLE OF, an engagement of the American revolution, near Saratoga, N. Y. The Americans were under the command of Gen. Gates, and the English under Burgoyne, and the conflict resulted in the surrender of the latter, with his entire army of about 6000 men. This victory was of great importance to the Continental cause, disposing, as it did, of an invasion, planned on a large scale, and portentous of evil to the struggling colonies.

SAR'GENT is the name of more than one American family of talent and accomplishment. The first person of note bearing the name was WINTHROP S., born at Gloucester, Mass., 1st May 1753. He served with distinction in the War of Independence, was appointed by Congress surveyor-general of the North-West Territory (1786), was adjutant-general of St. Clair's expedition (1791) against the Miami Indians, took part in Wayne's expedition (1794–95), and was governor of Mississippi Territory in 1790 and in 1801. He was a member of the American Academy of Arts and Sciences, and of the Philosophical Society, and assisted Dr. B. S. Smith in preparing his *Papers relative to certain American Antiquities* (1796). He died 3d June 1820. His grandson, WINTHROP S., born at Philadelphia, September 23, 1825, was a lawyer by profession, but is best known as a scholar, antiquarian, and littérateur. He edited from original MSS., with an introductory memoir, *The History of Braddock's Expedition against Fort Duquesne* (1855), and several reprints of curious Revolutionary tracts. He left incomplete at his death (at Paris, May 18, 1870) a *Catalogue Raisonné* of books relating to America.—LUCIUS MANLIUS S., born at Boston, Mass., 25th June 1786, studied at Harvard, and devoted himself to the advocacy of social reforms, particularly temperance, for which he lectured and wrote copiously. He died at West Roxbury, 2d June 1867. See J. H. Sheppard's *Reminiscences of L. M. S.*—EPES S., born at Gloucester, Mass., 27th September 1812, was educated at Harvard, took to journalism, and was successively on the editorial staff of the *Daily Advertiser*, the Boston *Atlas*, the New York *Mirror*, and the *New Monthly Magazine*. About 1847 he settled at Roxbury, near Boston, and for several years edited the Boston *Transcript*. S. was a very miscellaneous and prolific writer. Died in 1880.—JOHN OSBORNE S., brother

of the preceding, born at Gloucester, Mass., in 1810, studied at Harvard, passed for the bar, and practised several years at Boston, sat in the Massachusetts Legislature 1835–36, but has mainly devoted himself to political journalism. He has written several pamphlets on legal and political questions, but his most important contribution to literature is his essay, *Improvements in Steam Navigation and the Arts of Naval Warfare* (1844), containing a biographical sketch of John Ericsson.

SARTO'RIUS, Georg, Freiherr von Waltershausen, a German historian, was born at Kassel, 25th August 1765, and died 24th August 1828. His most important work is *Geschichte des Hanseatischen Bundes* (3 vols. Gött. 1802–8), to which his *Urkundliche Geschichte des Ursprungs der Deutschen Hansa bis zum 13. Jahrh.*, edited by Lappenberg (2 vols. Hamb. 1830), forms a valuable addition.—Wolfgang von Waltershausen S., son of the preceding, and a distinguished geologist, was born at Göttingen, December 17, 1809. Subsequently to 1833, when he completed his university course, he made several journeys in the interests of science, and was, in 1847, appointed professor of geology and mineralogy in the university of his native town. In 1859 he traveled in Russia, and in 1864 went for the third time to Sicily, where also he resided 1869–70. He died at Göttingen, October 16, 1876.

SASSERAM' (Sahsram), a town in the district of Shahabad, Bengal, British India, situated beneath the Kymnr hills, 72 miles S E. of Benares, and 60 S. of Arrah. Pop. (1872) 21,023. It was the birthplace of the Afghan Emperor Shere Shah, who expelled the Mogul Humayun, the father of Akbar, from Delhi in 1539. It contains the tomb of Shere Shah's father, and also of Shere Shah himself; the latter is a handsome structure, erected on an island in an artificial lake. There is still a large Mohammedan population at S. The exports are valued at £6000, the imports at £20,000.

SATSUMA WARE, a fine kind of pottery or semi-porcelain made in Japan, having a felspathic glaze of a light straw color, the surface of which is covered with a net-work of fine cracks. Red and green colors and dulled gold are employed for decorating S.W., a favorite ornament being the chrysanthemum, and pheasants and other fowls are also frequently introduced. Fine old S.W. is highly esteemed by collectors.

SÁTTÁRA, the chief town of the district of the same name, in the Bombay Presidency, British India, situated in the highlands of the Deccan, 115 miles S.E. of Bombay, and 55 S. of Poonah. Pop. (1872) 24,484. It lies in a hollow commanded by a very strong fort, which was captured by the British in 1818.—The *district* of S., which is bounded W. by the Western Ghauts, has an area of 5378 sq. miles. Pop. (1872) 1,116,050. This tract was ethnologically the cradle of the Mahratta race; and the great Sivaji established himself at the fort of S. about 1660. Here his descendants maintained themselves, though with diminished powers, as the nominal leaders of the Mahratta confederacy until 1848. In that year the last Rajah died without issue; and his deathbed adoption was set aside by Lord Dalhousie, the Governor-General of India, in accordance with the then accepted doctrine of lapse. The chief crops are millets, rice, cotton, wheat, sugar-cane, and tobacco. The only manufacture is cotton-weaving. S. suffered severely during the famine of 1877, especially in loss of cattle.

SAUROP'SIDA, one of the primary groups of *Vertebrate* animals represented by reptiles and birds. The two classes are closely connected by structural affinities. *Lungs* constitute the sole breathing organs of the group, no gills being developed. The exoskeleton consists of scales or feathers. The bodies of the vertebra are alwas well ossified. The skull is joined to the vertebral column by a single *condyle* or articulating process, whilst two such condyles occur in mammalia. The *lower jaw* of S. is compound, each half consisting of several pieces. The lower jaw is further articulated to the skull by means of a special bone, the *quadrate bone*, which in mammalia is represented by the *malleus* of the ear. The 'ankle-joint' of S. is 'situated not between the tibia and astragalus, as in all mammalia, but between the proximal and distal divisions of the tarsus' (Huxley). The *digestive system* of S. ends in a *cloaca* chamber common to the efferent ducts of the urinary, digestive, and generative systems. A four-chambered heart exists in some S. (crocodilia and birds), other S. possessing a three-chambered heart only. No complete *diaphragm* separates the thoracic from the abdominal cavity. The *Wolffian bodies* of the embryo S. are replaced by true *kidneys*, as in mammalia, and the *cerebral hemispheres* are never united by a *corpus callosum* or connecting band of nervous tissue. An *amnion* and *allantois* are developed in the embryo, but no *mammary glands* are developed in the S. In their *reproduction* the S. are invariably oviparous, or egg-producing. Some few are ovo-*viviparous*, *i. e.*, retain the eggs within their bodies until the young are hatched.

SAUTERNE' is the name of a class of French white wines produced in the Gironde district. The grapes from which S. is made are allowed to become dead ripe before they are collected. The principal growths of S. are Barsacs, Santernes, and Bommes, and the Château Yquem S. is one of the finest wines grown in France. Recently a sparkling S. has been introduced, prepared according to the Champagne method.

SAV'AGE, James, LL.D., historian and politician, was born at Boston, Massachusetts, July 13, 1784. Graduating at Harvard in 1803, he commenced his law studies in 1807, and subsequently sat in both houses of the Massachusetts legislature, besides filling several municipal posts at Boston. He was for some years the president of the Massachusetts Historical Society, editing several volumes of their *Collections*, and publishing from the original manuscript Wynthrop's *History of New England* (1825–26). He also edited Paley's *Works* (5 vols. 1828), contributed various articles historical and political to the *North American Review* and the *New England Magazine*, and wrote a number of pamphlets. His most important work is a *Genealogical Dictionary of the First Settlers of New England, showing Three Generation of those who came before May*, 1692 (4 vols. 1862–64), a work which, though deficient in plan and execution, is of great value and displays much research. S. died at Boston, March 8, 1873.

SAV'ILE, Sir Henry, was born at Over Bradley, near Halifax, Yorkshire, England, November 30, 1549. He studied at Brasenose College, Oxford, and afterwards at Merton College, where he graduated in 1570, and was elected fellow. In 1578 he made a tour on the Continent, and on his return became Greek and mathematical tutor to Queen Elizabeth. In 1596 he was chosen provost of Eton, and in 1604 was knighted by James I. He was warden of Merton College from 1585 to his death, which took place February 19, 1622. His fortune he devoted to the advancement of learning, founding in 1619 two professorships (in geometry and astronomy) at Oxford, known as the Savilian professorships.

SAXE, John Godfrey, LL.D., an American poet, born at Highgate, Vt., June 2, 1816, and graduated from Middlebury College in 1839. He practiced law, was for a time engaged at editorial work, and then removed to Brooklyn. He published several volumes of humorous poems, which have had an exceedingly large sale.

SAY, Thomas, an American naturalist, was born at Philadelphia, July 27, 1787. He began life as a druggist but subsequently devoted himself to natural history, and was zoologist to several American exploring expeditions between the years 1818 and 1823. In 1825 he joined Maclure and Owen in their socialistic experiment at New Harmony, Indiana, where he died, October 10, 1834. His *Complete Writings on the Conchology of the United States* were published at New York in 1858, and his *Complete Writings on the Entomology of the United States*, with a Memoir by George Ord, in 1859.

SAYRE, Lewis Austin, M.D., a distinguished American surgeon, born at Madison, N. J., Feb. 29, 1820, and graduated from the University of Transylvania in 1837. He pursued his medical studies in New York, began to practice there, and rapidly gained distinction in his profession. He was professor of orthopedic surgery in Bellevue Hospital Medical College, and made a specialty of the treatment of deformity.

SCA'LAR, a mathematical term invented by Sir W. R. Hamilton, including all quantities essentially non-directional. All numbers and the ordinary symbols of algebra and analysis which are subject to the same laws as these are scalars.

SCALA'RIA, a well-known genus of *Gasteropodous* Mollusca, including the Wentletraps, of which the most famous species is the Precious Wentletrap or Royal Staircase (*S. pretiosa*), a good specimen of which, in the days of conchological pursuits, fetched as much as $250. This species is found in tropical seas. The common S. or Wentletrap (*S. communis*) is plentiful on the British coasts. The shells in S. are tubular, spiral and turreted in shape. The foot is short, and in the true Wentletraps the whorls or turns of the shell are distinct. In some of the *Scalariæ* there is a gland secreting a purple color like that obtained from the famous purple whelk of Tyre.

SCARUS, a genus of Teleostean fishes, including those species which browse on coral-polypes, and which are named 'Parrot fishes.' They are allied to the *Labridæ* or *Wrasses*, and their jaws are incrusted with numerous minute teeth.

SCHAFF, Philip, LL.D., was born at Coir, Switzerland, Jan. 1, 1819. He studied at Coir, Stuttgart, Tübingen, Halle, and Berlin, where he graduated B.D., and subsequently (1842–44) lectured in the university on exegesis and church history. In 1844 he was called to America as professor in the theological hall of the German Reformed Church at Mercersburg, Pa. In 1863 he removed to New York, and in 1870 became professor of sacred

literature in the Union Theological Seminary in that city. He is a member of various historical and literary societies in Europe and America, is an active promoter of the Evangelical Alliance, and president of the American Bible Revision Committee.

SCHARN'HORST, Gerhard Johann David von, a Prussian general, was born at Hämelsee, in Hanover, Nov. 12, 1756. He entered the Hanoverian army in 1776, was made teacher in an artillery-school (1782), and served against France as chief of a battery in 1793. In 1801 he entered the Prussian service, and became director of the military academy of Berlin. Raised to the staff in 1804, and subsequently to the rank of a general, he was present at the battles of Auerstädt and Eylau. After the Peace of Tilsit in 1807, he was placed at the head of the administration of Prussian military affairs. Together with Gneisenau he skillfully evaded the provision in the Treaty of Paris (1808), limiting the Prussian army to 42,000 men, and by training fresh bodies of men in relays, raised the number actually to 271,000. He accompanied Blücher as chief of the staff in the campaign of 1813. On May 2, 1813, he was wounded at Grossgörschen, and died June 28 of the same year at Prague when on his way to Vienna to persuade Austria to join the allies against Napoleon.

SCHERN, Alexander, J. B., born in Germany, in 1826, educated at Bonn and Tübingen, and came to America, in 1851, where he has since been engaged in teaching and literary work. He is a scholar of large information, and has attained high reputation as a writer for various encyclopædias.

SCHMER'LING, Anton, Ritter von, an Australian statesman, was born at Vienna, 23d August 1805. After a complete study of law he entered the service of the state in 1829, and was in 1846 appointed 'Appellationsrath' at Vienna. A prominent opponent of the policy of Metternich, S. was sent to Frankfurt in April 1848 as Austrian agent, became president of the 'Bundestag' (19th May), and from the 15th July to the 15th December was foreign minister under the 'Reichsverweser.' After this he was appointed Austrian plenipotentiary at Frankfurt, and continued to be the parliamentary leader of the 'Great German Party,' till, finding his efforts unavailing, he withdrew in April 1849 and returned to Vienna. From July of the latter year S. was Austrian Minister of Justice, but in January 1851 he resigned office, being unwilling to accept a reactionary policy, and became President of the Senate. On the 13th December 1860 he was re-appointed minister, to direct the changes consequent on the 'diploma' of the 20th October. The constitution of February 1861 was mainly his work. Failing, however, to establish the complete constitutional unity he aimed at, S. resigned on the 27th July 1865, and became first president of the supreme court at Vienna. In 1867 he was appointed life member of the Upper House.

SCHMITZ, Leonhard, an industrious German philologist, was born at Eupen, near Aachen, in 1807, studied at Bonn under Niebuhr and Welcker, and after some experience in teaching went to England. He was rector of the Edinburgh High School from 1845 to 1866, when he became principal of the London International College—a post which he held till 1874, when he was appointed classical examiner to London University. He has translated Niebuhr's Lectures (8 vols. 1844–53), and Zumpt's *Latin Grammar*, edited the *Classical Museum* (1844–50), contributed to Smith's Classical Dictionaries and to the *Encyclopædia Britannica*, and written several school histories.

SCHNEIDER, Eugene, a distinguished French manufacturer and politician, born at Nancy, in April 1805. His parents were poor, and S. betook himself to business at an early age. In 1830 he was entrusted with the management of the Bazeilles foundries, and some years later, along with his elder brother, became manager of the engineering works at Creuzot. Under S. these works ultimately attained a vast expansion, employing not fewer than 12,000 hands, and producing most of the government arms, and of the locomotives and steam-engines in use on the French railways. S. entered political life in 1845, was elected in 1852 a Bonapartist candidate to the Chamber of Deputies, of which he became one of the vice-presidents. From 1867 to 1870 he was regularly named president by the Emperor at the opening of each session, and discharged his difficult duties with energy and tact. S. died November 30, 1875. A monument erected to him at Creuzot was subscribed for by 25,000 persons, and unveiled in January 1876.

SCHNEIDER, Hortense Catharine, a French actress, born at Bordeaux about 1835, played at the age of fifteen in *Michel et Christine* at the Athénée of her native city. In 1856 she made a successful début at Paris in *Le Chien de Garde* at the Théatre des Variétés. Her popularity was increased by her performances at the Théâtre du Palais Royal after 1858, and finally she excited a furore by her acting in *La Belle Hélène* (1864) and *La Grande Duchesse de Gérolstein* (1867). In 1868 Mme. S. appeared on the London stage and was immensely popular. In 1869 she rejoined the Opera-Bouffe at Paris.

SCHÖFFER, Peter, born at Gernsheim, near Darmstadt, between 1420 and 1430, studied at the University of Paris, where he was a copyist in 1449. In 1450 he removed to Mainz, where he became the son-in-law of Johann Faust. According to a passage in Trithemn's *Chronicon Monasterii Hirsaugensis* (2d ed., 2 vols., St. Gall, 1690), written on the authority of S.'s grandson, S. 'perfected the art of printing, by devising an easier mode of casting types.' This is generally believed to have been the invention of the punch and matrix, in which Lambinet says, 'is the essence of the art of Printing.' S. died in 1502. In 1836 a monument was erected to him at Gernsheim. See A. Bernard, *Histoire de l'Imprimerie en Europe*.

SCHOFIELD, John M., an American soldier of distinction, was born in Chautauqua county, New York, September 29, 1831. He was educated at the West Point Military Academy, in which he was professor of natural philosophy from 1855 to 1860. At the outbreak of the Civil War he held a similar position in the Washington University, St. Louis. As major-general of volunteers and afterwards brigadier-general in the regular army, he served under Sherman in his Georgian campaign, and under Thomas in Tennessee. In 1865 he held an independent command in N. Carolina, where he gained the battle of Kinston. He was Secretary of War in 1868–69, when he was promoted to be major-general. After holding military commands in Missouri and on the Pacific coast, he became superintendent of the West Point Military Academy in 1876.

SCHOUW, Joachim Frederik, a famous Danish botanist, was born at Copenhagen, 7th February 1789. In 1808 he commenced the study of law. After a tour in Norway (1812) with the botanist Chr. Smith, he entered the state-service as a chancery clerk in 1813, became Professor of Botany at Copenhagen in 1820, and in 1841 director of the Botanic Garden. He died 28th April 1852.

SCHURZ, Carl, an American statesman, was born, 2d March 1829, at Liblar, near Köln, and educated at Bonn. He was involved along with Professor Kinkel in the revolutionary outbreaks in Germany in 1848–49; was imprisoned and escaped to Switzerland; but returned under an assumed name to Berlin and assisted Kinkel to escape from Spandau in 1850. He then went to Paris and London, and in 1852 married and emigrated to America. Here he soon became prominent as leader of the German element in the Republican party. In 1858 he made his first speech in English, and attracted much attention by a series of lectures in New England in 1859–60. President Lincoln appointed him United States minister to Spain in 1861, but he resigned the same year and returned to Ameriea to take a prominent part in the war, rising to the rank of major-general on the Union side. In 1866 he visited the Southern States as Special Commissioner, and published a masterly report on their condition. After editing successively the *Detroit Post* and the *Westliche Post* at St. Louis, he was elected United States Senator for Missouri from 1869 to 1875. He was among the supporters of Horace Greeley for the Presidency in 1872, and in 1875 actively supported the candidature of President Hayes. Twelve of his principal English speeches were published at Philadelphia in one volume (1865). In 1884 he opposed James G. Blaine, and supported Grover Cleveland, the Democratic candidate for the presidency.

SCHUYL'ER, Philip, an American general and statesman, was born of a wealthy family at Albany, 20th November, 1733. He held some minor military command under the colonial government of New York, and on the outbreak of the Revolutionary War was appointed major-general and placed in command of the northern department. The failure of an expedition against Canada, and the insinuations it called forth, led him in 1777 to demand a court of inquiry, which entirely acquitted him of blame. But the events which preceded the battle of Saratago in 1777 again raised complaints against him, and before the battle was fought he was superseded by General Gates, though he remained with the army. Another court of inquiry again freed him from all blame, but he resigned his military commands. From 1778 to 1781 he was a member of Congress, and in 1789 he was appointed United States senator for New York. He died at Albany, Nov. 18, 1804. See his *Life and Times*, by B. J. Lossing (2 vols. 1860–62; new ed. 1872).

SCHWAB, Gustav, a modern German poet, born at Stuttgart, June 19, 1792, studied at Tübingen (1809–14), traveled through N. Germany, associating at Berlin with Fouqué and Franz Horn, and in 1817 became professor of ancient literature in the Upper Gymnasium at Stuttgart, in 1837 pastor at Somaringen, and in 1842 at St. Leonhardskirche in Stuttgart. Here he died November 4, 1850. His poems, first appearing in periodicals and almanacs, were collected in two vols. at Stuttgart (1828–29), and a *Neue Auswahl* was published in 1838 (4th ed. 1851). His ballads and romances are by far his best poems; in them he approaches nearer

to Uhland than any other poet of the Swabian school. See S.'s biography by Klüpfel (3d ed. 1861).

SCHWEG'LER, Albert, a member of the Tübingen school of German theology, was born at Michelbach in Würtemberg, Germany, February 10, 1819. After studying at Tübingen (1836–40), he became in 1842 parish vicar at Bebenhausen, but resigned his charge in 1843, when he became a *privat-docent* in philosophy and classical philology at Tübingen. He received in 1848 the extra-professorship of Roman Literature and Antiquities, and still later that of Ancient History. He died January 5, 1857. *Die Geschichte des Philosophie*, his best-known work (Stuttg. 1848; new ed. 1857), has been translated into English by Professor J. H. Seelye of Amherst (New York, 1856).

SCHWEIN'FÜRT GREEN (Ger. *Wienergrün*), aceto-arsenite of copper, is a velvety green pigment, more brilliant, lighter, and less affected by damp than Scheele's Green, as a substitute for which it is employed. It was discovered at Schweinfürt in 1814, and is prepared by fusing arsenious acid and acetate of copper. It is used in Paris for tinting fabrics for artificial flower-making, is known in commerce as *Paris Green, English Green, Emerald Green, &c.*

SCHWER'IN, Kurt Christoph, Graf von, a distinguished general of Friedrich the Great, was born in Swedish Pommern, October 16, 1684. After studying at Leyden, Griefswald, and Rostock, he entered the Dutch service as ensign in 1700. In 1704 he fought under Marlborough and Prince Eugene, became captain in 1705, and next year entered the service of the Grand Duke von Mecklenburg. In 1711 he was despatched on a secret mission to Karl XII. at Bender, and in 1719 settled favorably for the Duke his quarrel with the nobility, after defeating their army at Waltmühlen. In 1720 he entered the service of Prussia, acted as governor of Peiz, and in 1740 was ennobled by Friedrich II., appointed field-marshal, and raised to the command of the right wing in the first Silesian War. He contributed greatly to the victory at Mollwitz in 1741, and on the conclusion of the peace was appointed governor of the forts Neisse and Brieg. On the outbreak of the second Silesian War he invaded Bohemia, and directed the siege of Prag, which fell September 16, 1744. In 1756, on the outbreak of the Seven Years' War, he took the command of the third Prussian army, and prevented the junction of Generals Piccolomini and Browne, but fell in the storming of the Austrian camp before Prag, May 6, 1757. S. was the most popular general in the Seven Years' War. A marble monument was erected by the king to his memory in the Wilhelmsplatz in Berlin, and his name is still commemorated in the popular songs of Germany. See *Leben des Grafen von S.* (Berl. 1790).

SCLEROLASIC CORAL (from Gr. *skleros*, 'hard,' and basis, a 'base'), the name given to corals, of which the Red coral (*Corallium rubrum*), the *Isis* or Mare's-tail coral, the Gorgonias, &c., are good examples, and in which the living polypes are situated on the *outside* of the coral substance. These polypes, as a rule, belong to the order *Alcyonaria* of the *Cœlenterate* group, and have eight fringed tentacles. The S. C. varies in composition. It may be hard and limy, as in Red coral, or horny as in Gorgonias, or partly limy and partly horny as in Isis. Although the S. C. is situated within the animal tissues which form it, it is in reality placed *external* to the bodies of the animals which coat it. The S. C. is formed by the *bases* or lower portions of the polypes, and is not secreted by their internal parts as in the opposite or *sclerodermic* coral. The latter is secreted within the bodies of the polypes; it exists outside the living parts, and exhibits distinct cups or *calyces* in which the soft parts are protected. These cups are wanting in the S. C. The *Sclerodermic forms* are the reef-building corals.

SCOLE'CIDA, an important division of the animal kingdom, including those animals known as parasitic worms, but which are removed by their structure from the true worms or *Annelida*. The exact zoological position of the S. is still a matter of dispute. By many zoologists they are placed as one of the two divisions of the sub-kingdom *Echinozoa* or *Annuloida;* while others regard the S. as more properly forming a section of the lower Annulosa under the heading *Vermes* or worms. The characters of the S. are derived from the usual absence of lime in their integument, and from the possession of a *water-vascular system*. The nervous system consists of one or two ganglia, closely situated together. In this heterogeneous group are included the *Platyelmia* or flat worms; the *Nematelmia*, or round worms; and the *Rotifera* or wheel animalcules. The *Platyelmia* includes the *Tænida* (tapeworms); *Trematoda* (Flukes) and *Imbellaria*. The *Nematelmia* are represented by the *Nematoda; Gardiacea* (see *Gordius*); and *Acanthocephala* or 'thorn-headed' worms.

SCOR'PION-FISH, or SEA SCORPION, the name given to Teleostean fishes belonging to the *Triglidæ* or Gurnards. The red S.-F. (*Scorpæna scrota*) is found on the British coasts, and in the Mediterranean Seas, where the spotted S.-F. (*S. porcus*) also occurs. The average length is from 12 to 18 inches.

SCOTT, Sir George Gilbert, R.A., F.S.A., was born in 1811 at Gawcott, Buckinghamshire, of which village his father was perpetual curate. Placed in his seventeenth year with an architect, Mr. Edmeston, he commenced practice on his own account in partnership with a fellow-student, Mr. W. B. Moffatt, and in 1841 designed the work that first brought him prominently into notice, the Martyr's Memorial, Oxford. A year later he gained the competition for rebuilding the great Nikolaikirche at Hamburg; in 1848 was chosen to design a cathedral for St. John's, Newfoundland, and in 1854 undertook the restoration of Doncaster parish church, while as architect to the Dean and Chapter of Westminster since 1849, he erected the gate-house and restored the chapterhouse of the Abbey. He was elected A.R.A (1855), R.A. (1861), and President of the Institute of British Architects (1873); amongst his works during this period being the Foreign Office (in the execution of which design he was unfortunately hampered by Government), the chapels of Exeter College, Oxford, and St. John's College, Cambridge, Glasgow University buildings, the Albert Memorial, Hyde Park (which gained him the honor of knighthood, 1872), and the Albert Chapel, Windsor, besides the restoration of cathedrals and churches through England's length and breadth. According to a list in the *Builder* (6th April 1878), S. built or restored, since 1847, 26 cathedrals, 9 abbey and 2 priory churches, 1 minster, 474 churches, 26 schools, 5 almshouses, 23 parsonages, 57 monumental works, 10 college chapels and 16 colleges, 27 public buildings, 42 mansions, &c. He died at Courtfield House, S. Kensington, 27th March 1878, being at the time engaged on the restoration of the cathedral of St. Alban's, and the erection of St. Mary's Cathedral, Edinburgh.

SCOTT, Thomas, D.D., the Biblical commentator, was born at Baytoft, near Spilsby, Lancashire, England, February 16, 1747. By hard private study he qualified himself for the ministry of the Church of England, and was ordained in 1772. In 1780 he became curate of Olney, where he made the acquaintance of Cowper. In 1785 he was appointed chaplain of the Lock Hospital, and in 1801 vicar of Aston Sandford, Buckinghamshire, where he died April 16, 1821. He was a strong Calvinist, and wrote, among other works, a *Vindication of the Divine Inspiration of the Scriptures*, a reply to Tom Paine. His reputation, however, rests upon his popular *Family Bible with Notes* (1796), which has been frequently reprinted both in England and the United States.

SCRIV'ENER, Frederick Henry Ambrose, LL.D., born at Bermondsey, England, 29th September 1813, passed from St. Olave's Grammar School, Southwark, to Trinity College, Cambridge, where he gained a scholarship (1834), graduating B.A. (1835), and M.A. (1838). After holding an under-mastership at Sherborne, and the curacy of Sandford Orcbas, he became in 1846 head-master of Falmouth School and incumbent of Penwerris, and in 1861 was presented to the rectory of Gerrans, Cornwall. A member of the Company of Revision of the New Testament since 1870, he received in 1872 a pension from Government, and from the University of St. Andrews the honorary degree of LL.D.

SCUDDER, Horace Elisha, an American author, born at Boston, Mass., in 1838, and educated at Williams College. He has resided at New York and Boston, and has written much for the press, besides numerous works for young people. He is the author of the well-known Bodley Series.

SEA'BURY, Samuel, D.D., the first American bishop of the P. E. Church, born at Groton, Conn., Nov. 30, 1729, and graduated from Yale College in 1748. He was ordained in London in 1753, presided over several churches in America, and during the war of the Revolution was a royalist. In 1784 he went to England, and was consecrated Bishop of Connecticut, at Aberdeen, in that year. Died at New London, Conn., Feb. 25, 1796.

SEA-DRAGON, a name given to various Teleostean fishes, such as the *Pegasus draco* belonging to the *Lophobranchii;* and to the Dragonets (*Callionymus*), allied to the Gobies. They occur in the seas of the E. Archipelago. The Pegasus is a fish whose wide breast and large pectoral fins have suggested the name S.-D. *P. natans* is another species, with smaller fins.

SEAL-ENGRAVING. The engraving of seals, when they are cut in hard agate stones, is performed with the same implements and by like processes used in cutting cameos and intaglios in similar stones. The larger official and other seals which are cut in steel, &c., are prepared after the manner of dies.

SEA-SURGEON, a *Teleostean* fish—the *Acanthurus chirurgus* of naturalists—found in the Atlantic Ocean and Caribbean Sea, and deriving its name from the lancet-shaped spine on each side of the body, and at its tail-extremity. The length is from 12 to 18 inches. The color is a brown of varying shades.

SEATTLE, in King Co., Washington Territory, at the head of Elliott's Bay and the mouth of the Duwamish River. It is the terminus of the Columbia & Puget Sound Railroad. Lumbering, agriculture, and coal miningare the principal pursuits. Pop. 8000.

SEA-WOLF (*Anarrhichas lupus*), a species of Teleostean fishes allied to the Blennies. It may attain a length of from 4 to 7 or 8 feet. The color is a brownish grey above, with brown stripes, and white below. In its habits this fish is fierce and predatory. It has a formidable array of teeth, and is said to attack the fishermen on being taken in their nets. The S. W. occurs on the British coasts, in the Mediterranean Sea, and in southern waters.

SEBA'CEOUS GLANDS. the name given to the minute sacs lodged in the lower layer of the *dermis*, or true skin. Each consists of a sac-like extremity from which a little duct leads, opening either on the surface of the skin or into the *follicles* of the hairs. The S. G. are most numerous in the face and scalp, but they exist in large numbers in the skin surrounding the nose, mouth, anus, ears, &c. None occur in the palms of the hands and soles of the feet. The sac-like extremity consists of from five to twenty little divisions. The largest S. G. are those of the eyelids, otherwise named *Meibomian glands*. The function of these glands is that of secreting *sebaceous matter*, a secretion of use in keeping the skin moist, and which also contributes to the nourishment of the hairs.

SECCHI, Angelo, an Italian astronomer and meteorologist, was born at Reggio, June 29, 1818, and entered the order of the Jesuits in 1833. After holding for some years the chair of physics in Georgetown College, Washington, D. C., he returned to Italy, and in 1850 became professor of physics in the Collegio Romano at Rome. When the papal states were finally taken out of the hands of the Church, S. was offered the chair of astronomy in the new Roman University, which he accepted, but was ultimately compelled to resign in obedience to the command of the chief of the Jesuits; and even the efforts of the king to effect a compromise, so as to give S. ample opportunity for the carrying out of his astronomical researches, were unsuccessful. He devoted himself chiefly to the study of the sun's surface, and materially added to our knowledge of its constitution by his spectroscopic observations. S. was one of the observers of the total eclipses of 1860 and 1870; and in 1867 received the great French prize of 100,000 francs for his labors. He died February 26, 1878. His chief work, *Le Soleil* (Par. 1870; Ger. 1872), details the latest solar discoveries. His numerous memoirs upon subjects in the various branches of physics and meteorology attest his scientific grasp of mind and his rare industry. In 1878 there appeared a German translation of his work on the Fixed Stars, and his *Meteorologia Romana*. published by the Italian Government.

SECESSION, Doctrine of, an American political theory, that any state had the right, at any time, to withdraw from the Union, as it existed under the Constitution. This theory was strongly advocated by John C. Calhoun, and many of the statesmen of the South. The question was brought to a test by the civil war, and its result has decided that no state can secede from the Union at its own pleasure.

SECUNDRA or SEKUNDER, a village in the district of Agra, N.W. Provinces, British India, 7 miles from Agra, named after the Pathan Emperor, Secundra Lodi. It is celebrated for the magnificent tomb of Akbar the Great, still in good preservation. The building is surrounded by a garden, and consists of a series of sandstone terraces, supporting a marble mausoleum. The architecture appears to be a combination of the Saracenic and Hindu styles. Close by is the tomb of Munni Begum, the Portuguese wife of Akbar. The building was for many years the headquarters of the Church Missionary Society, and afforded shelter to 300 orphans in the famine of 1838.

SEDALIA, a town of Missouri, in a high prairie country, within 3 miles of a tributary of the Missouri, and 40 miles S. of the main stream. It is the point of intersection of three railway lines, and is by rail 189 miles W. of St. Louis, and 100 E. of Kansas City. It has large railway works, flour-mills, iron-foundries, woollen-mills, &c., 2 daily newspapers, and a street-railway (since 1876). There are rich coal-mines in the vicinity. S. was only founded in 1860, and in 1870 had a pop. of 4560, and in 1877 of 10,000. Present pop. 12 000.

SEDG'WICK, Adam, LL.D., F.R.S., one of the fathers of geology, was born at Dent, Yorkshire, England, in January 1786. He entered Trinity College, Cambridge, and graduated in 1808 as fifth wrangler. In 1810 he was elected Fellow in his college, of which at his death he was senior member. In 1818 he succeeded Hailstone as Woodwardian professor of geology at Cambridge, was elected a Fellow of the Royal Society the succeeding year, aided in founding the Cambridge Philosophical Society about the same time, and subsequently became a Fellow of the Geological Society of London, of which he was President in the years 1829–31. In 1827 he made a geological tour in Scotland; and two years later accompanied Murchison through Germany, Austria, and Switzerland. With Murchison he subsequently was involved in a bitter controversy regarding the use of the terms Cambrian and Silurian. To the end of his long life he occupied a leading position amongst geologists, devoting his great energies to the elucidation of Palæozoic formations, and by his lectures, which he delivered during fifty years, forming a band of enthusiastic disciples. He was an active member of the British Association, and a keen opponent of the Evolution theories advanced by Darwin, Spencer, and others. A Liberal in politics, he took a hearty interest in all questions of University reform, and published a valuable essay, entitled *Discourse on the Studies of the University of Cambridge* (1834; 5th ed. 1850). S. died at Cambridge, January 25, 1873.

SEDGWICK, John, an American general, born at Cornwall, Conn., Sept. 13, 1813, and graduated from West Point in 1837. He served in the Mexican War, and was present at the siege of Vera Cruz, and the battles of Cerro Gordo, Churubusco, Molino del Rey, Chapultepec, and at the capture of the City of Mexico. For his gallantry, he was promoted to the rank of major. In 1861 he was made brigadier-general U. S. volunteers, and participated in the battles of Yorktown, Fair Oaks, Savage Station, and Glendale. In 1862 he was major-general U. S. volunteers. At Antietam, he was wounded three times, was present at Fredericsburg, participated in the battles of the Wilderness, and was shot and killed at Spottsylvania.

SED'LEY, Sir Charles, born at Aylesford, Kent, England, in 1639, educated at Oxford, became a court wit after the Restoration. He was a great favorite with Charles II., his recommendations being that he had no morals, did not ask favors, and had a knack for turning loose thoughts into dulcet verse. As he grew older, serious business obtained attention from him, and in Parliament he uniformly opposed the unconstitutional policy of James II. That monarch dishonored S.'s daughter by making her a countess; and S. was in consequence of this disgrace one of the chief promoters of the Revolution. He died August 20, 1701. His amatory poems—translations from the classics, parliamentary speeches, and plays—the best are *The Mulberry Garden* (1668), *Antony and Cleopatra* (1677)—may be found in his collected works (2 vols. 1722).

SEE'LEY, John Robert, an English historical and theological writer, and the son of a well-known publisher, was born in London in 1834. He was educated at the City of London School, and graduated B.A. at Christ's College, Cambridge, in 1857, when he was bracketed Senior Classic, and obtained the Senior Chancellor's medal. In the following year he was elected a fellow of his college, where he lectured for some two and a half years, and after holding the appointment of classical assistant to his old school, was chosen professor of Latin in University College, London, in 1863.

On the recommendation of Mr. Gladstone he was appointed in 1869 to succeed Charles Kingsley in the chair of modern history at Cambridge. His principal work, *Ecce Homo, or the Life and Work of Jesus Christ*, was published anonymously in 1866, and had reached a 13th edition in 1876. So far as it is argumentative, it attempts to eliminate the divine element, and to emphasize and elevate the humanity of Christ; but though vulnerable as a dogmatic thesis, it has obtained a permanent place in literature as a masterly piece of portraiture, radiant in color and touched with the tenderness of love. *Ecce Homo* startled the orthodox world by the earnest tone of its discidence, and called forth numerous replies, chief of which was that of Mr. Gladstone.

SEELY, Julius Hawley, S.T.D., LL.D., an American educator and writer, born at Bethel, Conn., Sept. 14, 1824, and graduated from Amherst College in 1849. He entered the ministry of the Reformed (Dutch) Church, and was for a time pastor of a church in Schenectady, N. Y. In 1858 he became professor of mental and moral philosophy in Amherst College, and in 1876 was made president of that institution, which position he still holds (1884).

SELMA, in Dallas Co., Ala., on the Alabama River, 300 miles from its mouth. It is surrounded by a cotton-growing district; is the center of a trade in cotton, lumber, iron, and coal; and is the terminus of six railroads. Pop. 7529.

SEL'WYN, George Augustus, D.D., born at Hampstead, England, in the summer of 1809, proceeded from Eton to St. John's College, Cambridge, where he distinguished himself as well by rowing seven in the first University Boat Race (1829), as by graduating second classic (1831). Elected fellow of his college, he resided at Eton as tutor to Lord Powis's son and curate of Windsor until 1841, when he accepted the newly-founded bishopric of New Zealand 'at a moment's notice,' says Mr. Gladstone, 'upon the call of duty tearing up the singularly deep roots which his life had struck into the soil of England.' Six-and-twenty years, broken by a single visit to England (1854), were spent in

frequent journeyings afoot and perilous cruises by sea, in warmly espousing the cause of the Maori remnant and building up a flourishing church on apostolic models. When in 1867 he again revisited England to attend the Lambeth Conference, he left behind him six suffragan bishops and seventeen native clergy, and with a good heart as Bishop of Lichfield could turn from Southern cannibals to minister to English navvies, bargees, and prisoners. He returned, however, to New Zealand in 1868, to set things in order for his successor, and was present at the General Convention of the American Church at Baltimore (1871) and New York (1874). In England he established diocesan synods, instituted a system of theological examinations, and lived in his own cathedral city, where he died 11th April 1878.

SEMI-ARIANS were the party in the Church in the 4th c. who desired to hold a middle course between Sabellianism, which converted the distinction between the persons in the Godhead into one of modes, and Arianism, which subordinated the Son to the Father so far as to make the former a creature of the latter. This was indeed what the Athanasian party desired to do, but the S.-A. considered that the expression *homoousios* ('of the same substance'), which had been adopted in the Nicene Creed (325) to express the relation of the Son to the Father, came dangerously near Sabellianism, and hence they adopted the phrase *homoiovsios* ('of similar substance'). The party was so strong that the Nicene Creed was only finally adopted as the doctrine of the Church at the Council of Constantinople (381).

SENACA FALLS, a town of Seneca Co., N. Y., on the Seneca River and the N. Y. Central Railroad, 43 miles from Syracuse. It has fine water power, which is employed in manufacturing agricultural implements, fire-engines, and other articles. Pop. 5880.

SERAJGUNGE, a town in the district of Pubna, Bengal, British India, on the right bank of the Brahmaputra river (or Jamuna as it is here called), 153 miles N.E. of Calcutta. Pop. (1872) 18,375. The houses are six miles from the low water channel of the river, separated by a sandy plain, and the river landing-places shift every flood-season. S. was founded about the beginning of the century, and is now the chief river-mart in Bengal, having risen with the growth of the jute trade. It collects jute, rice, oilseeds, tobacco, &c., from all the neighboring districts for despatch to Calcutta, and distributes piece-goods, salt, sugar, iron, hardware, &c. The trade is entirely water-borne. The steamers of the E. Bengal Railway Company carry away about 50,000 tons of jute annually, and native boats nearly twice as much.

SE'RES (anc. *Siris*, or *Sirrhæ;* Mid. Ages, *Serrhæ*), a town of European Turkey, in the vilayet of Saloniki, on a tributary of the Strymon or Karassu, 45 miles N.E. of Saloniki, lies in a wide and fertile plain containing upwards of 300 villages, is the seat of a kaimakam and a Greek archbishop, and is the most important trading town in the interior of Macedonia. S. has a castle, numerous mosques, Greek churches, baths, benevolent institutions, manufactures woollen and cotton goods, gourdshaped water-flasks, and exports cotton, rice, tobacco, and grain. Pop. 30,000.

SERGIJEV'SKIJ POSSAD', a market-town in the Russian government of Moscow, 42 miles N.N.E. of the city of Moscow, is noted as the seat of the very rich Trinity monastery named *Troiza Lavra*, whose possessions, before the abolition of serfdom, included 100,000 'souls,' for whom it received an enormous commutation. Pop. of S., with the surrounding district (*St. Petersb. Cal.*, 1878), 27,471.

SERINGHAM, an island formed by the branching of the Cauvery river, almost opposite the town of Trichinopoly in S. India, about 80 miles in a direct line from the Coromandel or E. coast. It is 20 miles long by 2 wide at the broadest, and was an important military position during the wars against the Frenchman Dupleix (1749–63). At its lower end is an *anicut* or weir, 1080 feet long and 40 broad, constructed for irrigation purposes by a Hindu prince 1600 years ago. In the same neighborhood are the irrigation works of Sir A. Cotton. The town of S., at the upper end of the island, is beautifully situated within four walls. Pop. (1871) 11,271. It is celebrated for a square pagoda, covering an area of 4 sq. miles, and composed of seven separate enclosures, which is the most frequented and wealthy shrine of Vishnu in S. India.

SER'PENTS, FASCINATION BY, a kind of mesmeric influence exercised by the rattlesnake, tree-snake, and other reptiles over their prey. Birds, squirrels, even antelopes, unable to resist the fascinator's glance, make no attempt at flight, or will absolutely draw nearer to the serpent's fangs, unless aroused by some sudden cry, or by the intervention of an obstacle. See Ellis, *Three Visits to Madagascar* (1858).

SERRA'NO Y DOMINI'QUEZ, FRANCISCO, DUQUE DE LA TORRE, a marshal and statesman of Spain, was born at San Fernando, near Cadiz, November 10, 1810. Entering the army in 1825, he rose rapidly, becoming a general of division before he was thirty. He began his political career in 1841, as a deputy in the Cortes for Malaga. In 1843 he joined Narvaez in effecting the overthrow of Espartero. In 1845 he became a senator, and soon obtained a marked influence over Queen Isabella. In 1847, on the accession of Narvaez to power, he was sent to Granada as Captain-General. He now turned liberal, was banished in 1854, for participation in the insurrection at Sarragossa, but returned the same year as a supporter of Espartero and O'Donnell. In the subsequent rupture between these two he sided with the latter. In 1857 he went as ambassador to Paris; and as Captain-General of Cuba in 1860–62 reannexed St. Domingo to Spain, an act which secured him a dukedom. In 1866 he was president of the senate, and strongly opposed Narvaez for the illegal prorogation of the Cortes. At the revolution of September 1868 he joined Prim and Topete, and shortly after became president of the council of ministers at Madrid, and commander-in-chief of the army.

On June 16, 1869, he was elected Regent by a large majority; and this post he held till Prince Amadeo of Italy was prevailed upon to accept the crown (January 2, 1871). S. then became Premier, but resigned in July of the same year; and in April of 1872 he entered the field against the Carlists, with whom he concluded the convention of Amorevieta. On the abdication of King Amadeo, and the proclamation of a republic in February 1873, S. fled to France, but soon returned, and after the *coup d'état* of General Pavia in January 1874, became chief of the executive. He again entered the field against the Carlists, compelling them to abandon their trenches before Bilbao on May 1. In December he once more took command of the Army of the North; but withdrew to Biarritz on the proclamation of Alfonso XII. as king by Martinez Campos (December 28, 1874). He returned to Madrid, however, in the course of a month.

SEX'UAL SELEC'TION, a biological theory first enunciated by Mr. Darwin as part of his hypothesis of Descent of Natural Selection. In this theory the propagation of the characters and variations of animals and plants is said to be largely due to the selection by the females, as mates of the best-favored and most brilliantly colored males, and to the battles of males for the females. Of this theory Darwin says:—'This form of selection depends, not on a struggle for existence in relation to other organic beings, or to external conditions, but on a struggle between the individuals of one sex, generally the males, for the possession of the other sex. The result is not death to the unsuccessful competitor, but few or no offspring. S. S. is therefore less vigorous than natural selection. S. S., by always allowing the victor to breed, might surely give indomitable courage, length to the spur, and strength to the wing to strike in the spurred leg, in nearly the same manner as does the brutal cockfighter by the careful selection of his best cocks.' The theory is combated by Mr. Wallace in his *Tropical Nature* (1878).

SEYMOUR, a town of Jackson Co., Ind., at the intersection of the Ohio & Mississippi and the Jeffersonville, Mo., & Indianapolis railroads. It is surrounded by an agricultural section. Pop. 5200.

SEYMOUR, HORATIO, an American statesman, born at Pompey, Onondaga Co., New York, May 31st, 1810. He was admitted to the bar in 1832, and in 1841 began his political career as a member of the State Assembly on the Democratic side. He was elected Governor of the State in 1853, and in 1854 vetoed a prohibitory liquor law, on which account he lost the Governorship in 1855, but was re-elected in 1862. In 1868 he was nominated for the Presidency, but was defeated, and has not since taken much part in politics.

SGRAFFI'TO (Ital. 'scratched'), a species of ornamentation in plaster wherein a design is scratched with a bodkin through a thin white coat, exposing a dark-colored substratum, which serves as a shadow. After being used as a means of decorating pottery, S. was employed for mural decoration and carried to great perfection in Italy in 15th and 16th centuries. Old examples of it exist at Padua, Mantua, Pisa, and many other Italian towns. S. has been revived of late years in Italy, Germany, and England for the decoration of buildings. At the South Kensington Museum in London the method pursued is as follows:—On a rendered surface of Portland cement a coat of dark-red plaster ¼ inch thick is laid, and while still moist it is covered with a thin layer of light-colored plaster 'floated' on evenly. The intended design is then traced with a style on the wet plaster, which is cut accordingly with a knife.

SHABB'ATHAI ZEWI, a Jew, born at Smyrna, 1641, was a convert to the fantasies of Isaac Luria, a great student of the Cabbala, who declared that he held intercourse with the prophet Elijah, and that he was the Messiah, the son of Joseph. The notion of two Messiahs occurs in the Talmud: a 'son of David,' and a 'son of Joseph,' the latter being the forerunner of the former, and destined to suffer death in the struggle with the enemies of the kingdom of God. S. Z. himself came forward first as a

prophet, and then gave himself out for the Messiah, and, notwithstanding that he was repudiated by the Rabbis, gained a large number of followers among his co-religionists. Although S. Z. was converted to Mohammedanism (1667) the sect survived, and still acknowledged him as the Messiah. This they were enabled to do by justifying his apostacy, which they did on the ground that 'the form of religion which he proclaimed stood as far above Judaism as it did above Christianity and Mohammedanism, was destined to absorb all the three, and consequently was indifferent to each one's particular usages.' One of the principal tenets of the sect was that the Talmud was full of errors and promoted immorality. From the great veneration they paid to the Cabbala, and especially the book Zohar, they received the name of Cabbalists or Zoharites. They acknowledged a Trinity in the Godhead, regarding Adam as an incarnation of the divine nature and the second Person, and their Messiah as the third. There are said to be some remnants of the sect still lingering in Poland and Turkey. See Franck, *La Kabbale* (Par. 1843), and Worman's *Historic Studies*, in Dickinson's *Homiletic Monthly*, July and August 1878.

SHAHABAD, a district in Bengal, British India, which lies S. of the Ganges and borders on the N.W. Provinces. Area, 4385 sq. miles; pop. (1872) 1,723,974. Away from the river forest-clad hills rise abruptly to the plateau of Central India. The inhabitants are largely Rajputs, who formerly enlisted in the Bengal native army and rose against the British in 1857. Arrah, the chief town of the district, was the scene of an heroic defence and final relief by Major Vincent Eyre. The stronghold of the Rajput ringleader at Jugdespore was razed to the ground. Other places are Sasseram and the hill fort of Rohtasgurh. In S. district are the head-works of the Sone Canal. In 1876–77 the registered exports, chiefly sugar, indigo, food-grains, and oil-seeds, were valued at £329,000; the imports, which included cotton goods, and salt, at £414,000. The district is traversed throughout its entire length by the E. Indian Railway.

SHAH ALUM ('king of the universe'), the last of the Mogul emperors of Delhi who exercised even a nominal independence, reigned from 1759 to 1806. For twelve years he was an exile, chiefly at Allahabad, where on 12th August 1765 he granted to the E. India Company the Dewanny of Bengal, Behar, and Orissa. In 1771 he put himself under the power of the Mahrattas, but in 1788 a Mohammedan rebel, Ghulam Kadir, seized Delhi and with his own dagger struck out the emperor's eyes. The Mahratta chief Scindiah avenged this crime; and Lord Lake in 1803, after defeating the Mahrattas outside Delhi, placed S. A. in a position of comparative affluence during the three last years of his long and miserable life.

SHAM'LI, a town in the district of Muzuffernuggur, N.W. Provinces, British India, on the E. Jumna Canal, 24 miles W. of Muzuffernuggur. There is some trade and manufacture, but the people suffer from malaria caused by bad drainage. Pop. (1872) 9177. During the mutiny of 1857 S. was captured by the mutineers, and 113 of its brave native defenders were killed.

SHAMOKIN, in Northumberland Co., Pa. It has three railroads, and is surrounded by anthracite coal regions. Pop. 9500.

SHANK'LIN SAND, a name commonly applied to the Lower Greensand of geologists. It occupies a position between the Wealden strata and the Gault, and is typically represented in the Isle of Wight and on the coast of Kent, England. Its greatest thickness is about 800 feet, made up of calcareous sandstones, sands, and clays. The latter are in many cases used as fuller's earth. The fossils are numerous and chiefly marine, though remains of reptiles, such as *Iguanodon mantelli*, are occasionally found.

SHARON, a town of Mercer Co., Pa. It has railroad connection with the principal points of Pennsylvania, and is engaged in manufacturing and coal mining. Pop. 5684.

SHARON SPRINGS, an American summer resort, in Schoharie Co., N. Y. There are four mineral springs and numerous hotels. It is annually visited by numerous guests in search of health and recreation.

SHARP, WILLIAM, a line engraver, was born in London, England, January 29, 1749. He served an apprenticeship to a bright engraver, and after much rough humble work, acquired some skill as a writing engraver. On the publication of the *Novelist's Library* he gained a high reputation by his treatment of Stothard's graceful drawings, but his full power was only shown later in his execution of large plates, such as Guido's 'Doctors of the Church Disputing,' West's 'King Lear in the Storm,' Carlo Dolci's 'Virgin and Child,' and Copley's 'Siege of Gibraltar' and 'The Parting of Charles I. from his Family.' He was elected an honorary member of the Imperial Academy of Vienna, and of the Royal Academy of Munich in 1814, and died at Chiswick, July 25, 1824. S. was one of the ablest of English engravers, his style being at once manly and nervous.

SHEA, JOHN D. GILMARY, LL.D., born in New York, N.Y. He became a lawyer, but has devoted his life to literary pursuits. He has published numerous historical works, among which the following are the best known: *The Discovery and Exploration of the Mississippi Valley; History of the Catholic Missions among the Indian Tribes; The Catholic Authors of America;* and *Early Voyages up and down the Mississippi.*

SHEDD, WILLIAM G. THAYER, D.D., LL.D, an American theologian, born at Acton, Mass., June 21, 1820, and graduated from the University of Vermont in 1839. He graduated from Andover Seminary in 1843, and besides filling pastorates at Brandon, Vt., and in New York City, has occupied the following positions: professor of English Literature in the University of Vermont (1845–52), professor of Sacred Rhetoric in Auburn Theological Seminary (1852–53), professor of Ecclesiastical History in Andover (1853–62), professor of Biblical Literature in Union Theological Seminary, New York (1863–74); and in 1874 he became professor of Systematic Theology in the same institution, which position he still holds (1884). He has published *Lectures upon the Philosophy of History, Discourses and Essays, History of Christian Doctrine, Homiletics and Pastoral Theology*, and *Sermons to the Natural Man.*

SHEIL, RICHARD LALOR, born at Drumdowney, Waterford, Ireland, 17th August 1791, and educated at Stoneyhurst (1804–07), graduated at Trinity College, Dublin (1811), and was called to the Irish bar (1814). During the years 1816–22 he wrote six dramas, in 1822 contributed to the *New Monthly* his brilliant *Sketches of the Irish Bar* (2 vols. 1855), and becoming in the same year a member of the Catholic Association, devoted himself with O'Connell to the cause of Catholic Emancipation. In 1829 he received his silk gown, in 1830 entered Parliament, and having there proved himself one of the greatest orators of the day, became a commissioner of Greenwich Hospital (1838), Vice-President of the Board of Trade (1839), Judge-Advocate-General (1841), Master of the Mint (1846), and British Minister at Florence (1850), where he died 23d May 1851. See his *Memoirs* by W. T. M'Cullagh (2 vols. 1855).

SHELL, in artillery, a hollow projectile containing a bursting charge of gunpowder, which is exploded either by a 'time' or a 'percussion' fuze. It is the offspring of the *ollæ* or 'firepots' of the ancients, which held the celebrated Greek fire. The use of explosive projectiles has been known to the Chinese from a very remote period. Small shells (grenades) were thrown by hand, slings, or other means, before they were used with mortars. The earliest recorded employment of mortar and S. is at Jadra in 1376 by the Venetians. Horizontal fire of shells from howitzers, and afterwards from guns, was first attempted in the 18th c.

SHENANDOAH, in Schuylkill Co., Pa., on the Lehigh Valley and Philadelphia & Reading railroads, 13 miles from Pottsville. It is surrounded by coal fields, and over one-half of the total yield of the Schuylkill coal region is produced within three miles of the town. Pop. 13,000.

SHEN-SE, a province in the N. of China, W. of Shan-se. Area, 81,216 sq. miles; pop. (1852) 14,098,499. It is hilly but fertile, and very rich in coal and other minerals. It suffered greatly during the famine of 1875–78.

SHERE ALI, Amir of Afghanistan, was born about 1823. On the death of his father, Dost Mahommed, in 1863, he succeeded to the throne, though only the third surviving son, in accordance with the rule of paternal nomination. His early reign was one continual quarrel with those of his own blood. Though at first he maintained his authority, he was driven out of his capital, Cabul, in 1866, and gradually forced back to Candahar and Herat, which latter stronghold was always held for him by his eldest son, Yakub Khan. But the Indian Government of Lord Lawrence refused to recognize his rival brother; and by the spring of 1868 he had again established himself throughout Afghanistan.

In March 1869 took place the celebrated Umballa Durbar, at which Lord Mayo, with exceptional magnificence, entertained S. A., 500 miles within the British frontier. The Amir received £120,000 in cash, 10,000 stand of muskets, and a battery of light guns; and cordial expressions of mutual friendship were interchanged. He has since attempted, without much success, to introduce European reforms into Afghanistan, and his supremacy has been outwardly undisturbed. But his avowed preference for a younger son, Abdulah Jan, who died in August 1878, caused Yakub Khan to threaten rebellion. He was first appeased with the government of Herat; but in 1875, with genuine Afghan treachery, he was enticed to Cabul, and thrown into prison. The name of S. A. has recently attracted great interest in England. The armed occupation of Quettah and other measures aroused his suspicions nature. In 1877 his envoy at Peshawur rejected the proposals brought by Sir L. Pelly, which are supposed to have involved the reception of a British Resident at Cabul. In August 1878 a Russian mission under General Abramof, with a strong es-

cort, was honorably entertained at Cabul; and in the following month a similar British mission under Sir Neville Chamberlain was contumeliously turned back at the mouth of the Khyber Pass. The result was a war between Britain and Afghanistan, in which the latter was rapidly and completely beaten. S. A. was forced to flee from Cabul, and took refuge near the Russian frontier, where he died at Mazan-i-Sherif, 21st February 1879.

SHER'IDAN, PHILIP HENRY, a distinguished American general, was born at Somerset, Ohio, 6th March 1831. He was educated at West Point, and from 1853 to 1861 he served in Texas and on the Pacific coast. On the outbreak of the civil war, S. was a captain in the 13th Infantry. At first he held subordinate commands in the west, but in the autumn of 1862 he was transferred to the Army of Ohio, and commanded a division at the battle of Perryville, and again at the battle of Murfreesboro, where he distinguished himself so greatly as to be gazetted major-general of volunteers. In 1863 he served with distinction under Grant at the battle of Chattanooga, and on Grant's transference to the E. he took S. with him, appointing him chief of cavalry of the Army of the Potomac. In the protracted struggle between Grant and Lee in 1864 and 1865 S. rendered the most brilliant services to his chief in several daring cavalry raids into the enemy's country, but especially in the battles of the Wilderness, of Opequan Creek and Cedar Creek, and the final struggles around Five Forks and Appomattox which resulted in the surrender of Lee. In the autumn of 1864 the thanks of Congress were bestowed upon S. and his troops, and he was created major-general in the regular army. Since the war he has held various military commands, and has been raised to the rank of lieutenant-general. He visited Europe, and was a spectator of part of the struggle between the Germans and French. In 1875 he was instrumental in quelling the disturbances in Louisiana.

SHERMAN, JOHN, a brother of Gen. W. T., born at Lancaster, O., May 10, 1823, and became a lawyer. He was four times elected to Congress; and, in 1860, was made U. S. Senator, and was twice re-elected to this office. He was Secretary of the Treasury under R. B. Hayes, and in 1880 was again elected U. S. Senator from Ohio, which position he now holds (1885).

SHERMAN, in Grayson Co., Tex., 270 miles N. by E. of Austin. It is surrounded by a wheat, fruit, and cotton region. Pop. 6143.

SHERMAN, ROGER, an American patriot, born at Newton, Mass., April 19, 1721. He was first a shoemaker, then a merchant, and in 1754 was admitted to practice law. He was one of the committee which framed the Declaration of Independence (1776), and one of the framers of the 'Articles of Confederation' (1777). He rendered efficient service to the revolutionary cause, and was chosen U. S. Senator from Connecticut, in 1791. Died at New Haven, Conn., July 23, 1793.

SHILLABER, BENJAMIN P., born at Portsmouth, N. H., in 1814, became a printer, and for many years connected editorially with the Boston *Post*. He has published *Life and Sayings of Mrs. Partington. Rhymes with Reason and Without*, &c.

SHILLONG' (*Silang*), the Administrative capital since 1874 of the province of Assam, British India, and the headquarters of the district of the Cossya and Jynteah Hills. It lies among the mountains that form the watershed between the Brahmaputra and Surma river systems, 4900 feet above the sea. It is connected on the N. with Gowhatty, the former capital of the province, by a good cart-road. S. is healthy and conveniently situated, and has much increased since it became the residence of the chief commissioner and his staff. There is a church, and permanent official buildings are being erected. Pop. (1872) 1393.

SHI'LOH, BATTLE OF, fought on the Tennessee River, Tennessee, on the 6th and 7th of April 1862, between the Union army under Generals Grant and Sherman, and the Confederates under Generals Johnston and Beauregard. On the first day of the battle the advantage lay with the Confederates; on the second, the Union army, having received reinforcements, defeated their opponents, and forced them to retreat to Corinth.

SHIMO'GA, the chief town of the district of the same name, in the state of Mysore, India, on the left bank of the Tunga river, a tributary of the Kistna, 171 miles N.W. of Bangalore; pop. (1871) 11,034. Paper and chintz are manufactured.—The *district* of S., which lies in the extreme N.W. of Mysore, has an area of 3797 sq. miles; pop. (1871) 498,976. The crops are rice, *ragee*, sugar-cane, areca nuts, and coffee. At the village of Sorab the best sandal-wood carving in India is executed. By the falls of Gersoppa, which are among the finest in the world, the Sharavati river, 250 yards wide, throws itself down the E. Ghauts with a leap of 960 feet. At Sulekere is an artificial lake 40 miles in circumference, which is now being utilized for irrigation.

SHING-KING, a province of Manteimria, bounded S. by the Gulf of Leao Tong and Corea Bay, W by the Palisade, or Barrier of Stakes, a continuation of the Great Wall, E. by Corea, and N. by Kir-in-ula. Area, 40,000 sq. miles; pop. about 2,166,000, of whom 942,003 are Chinese. The capital is Mukden. The surface is mountainous, but the valleys are fruitful, and the soil is known to contain much coal, iron, gold, &c. Agricultural produce is exported.

SHINGLES (Lat. *cingulum*, 'a girdle') is the popular name for the variety of herpes known as *Herpes Zoster*. It is characterized by the arrangement of the inflamed patches, with their clustered vesicles, in the form of a half zone, following the distribution of one of the intercostal nerves, and extending from the back to the sternum. S. is generally preceded by slight fever and severe pain in the parts; the eruption runs its course in about a fortnight.

SHIP'KA, a village of Turkey, on the S. declivity of the Balkan range, 1798 feet above the sea, and 5 miles W.N.W. of Kasanlik, has 800 Bulgarian houses and two churches. The chief occupation is rose-growing, for the manufacture of rose-oil. S. gives its name to the S. PASS, 2938 feet (according to Barth) above it, reached by a steep path nearly impassable for carriages. From the pass a more gradual road (4½ hours' ride) leads 9 miles N. to Gabrovo (1300 houses), 839 feet lower. It was the scene of desperate and bloody struggles in August and September 1877, between Suleiman Pasha and a Russian force which had seized it after crossing the Balkans (14th July) by the Hainkoi Pass, and suffering defeat at his hands at Eski Sagra. In a vain endeavor to force the pass, the Turkish general threw away the lives of more than 20,000 veterans.

SHIP'S HUS'BAND, the owners' agent in the management of a ship, often himself one of the owners. His duties are to keep the vessel in repair and ensure her seaworthiness, to see her properly manned, to attend to her freightage and especially to her provisioning, to look after her papers, and in general to see her properly and efficiently equipped.

SHIR'LEY, JAMES, an English dramatist, born in London, England, September 13th, 1596, was educated at the Merchant Taylors' School, and at St. John's College, Oxford. He graduated at St. Catharine's Hall, Cambridge, took a cure near St. Albans, and subsequently turning Romanist, resigned his living to teach in St. Albans Roman School. Then he became a playwright in London, and had written in all 33 pieces before 1642, when Parliament suppressed theaters. During the civil wars S. aided the Earl of Newcastle with pen and sword. Returning to London, he gained subsistence once more by teaching, but he and his wife were driven from their Fleet Street home by the Great Fire, and both perished from fatigue on the same day, October 29, 1666. S.'s style is rich and strong.

SHIRT (Old Eng. *sceort*), a familiar article of male attire, was first worn in England during the pre-Norman period, linen being the material of which it was made. Woollen shirts were introduced later, and in the 10th c. the wearing of one was reckoned a severe form of penance. Silken shirts were in use in Chaucer's time, while during the 15th and 16th centuries shirts of fine lawn, richly embroidered on the collar, front, and wrists, were the fashion, and for their display the doublets were worn low-necked and 'slashed' in the arms. In Charles II.'s reign much of the S. was shown, and then it was common to ornament it with cut-work representing historical and religious subjects.

SHIS'DRA, a town of Russia, government of Kaluga, on the S., a feeder of the Ugra, 37 miles E.N.E. of Briansk. It manufactures oil, woollens, glass, leather. Pop. (1870) 11,703.

SHOLAPORE', the chief town of the district of the same name in the Bombay Presidency, British India, 283 miles S.E. of Bombay by rail. Pop. (1872) 53,403. It has grown with the growth of the cotton trade. The houses cluster round a fort which was captured by the British in 1818, when this tract of country was acquired from the Peishwa. The *district* of S., which was formed out of Poonah in 1838, lies between the Nizam's Dominions and Sattara. Area, 3925 sq. miles; pop. (1872) 662,986. It is a hilly country, forming part of the Deccan or central plateau of India. The food crops are millets, pulses, and a little wheat; but cotton is the staple of commerce. Weaving is largely carried on in the towns. This tract suffered more than any other part of the Bombay Presidency from the famine of 1877. The cattle especially died in large numbers, and only one-fifth of the revenue could be collected within the year.

SHOV'EL, SIR CLOUDESLEY, an English admiral, born about 1650, of poor parents, near Clay in Norfolk. He entered the navy as a cabin-boy, but had attained the rank of lieutenant in 1674, when, during an expedition to Tripoli to seek satisfaction for outrages on the English in those parts, he was sent by his commander, Admiral Sir John Narborough, with a requisition to the Dey. Twice S. was received with scorn, and the second time sent back without an answer; but from observations he had made he was able the same night to seize the enemy's guardship and burn four other vessels without losing a man. For this feat he was pro-

moted to the command of a ship. Knighted by William III. for gallantry at Bantry Bay, S. in 1692 became Rear-Admiral of the Red. He took part as such in the battle of La Hogue (1694), was Vice-Admiral of the Red in the expedition against Camaret under Lord Berkeley, and in that against Dunkirk held the chief command. He led the van in the battle of Malaga (1704), and took a prominent part in the capture of Barcelona. In 1706 he sailed to Portugal, under Lord Rivers, to aid the king of that country, and the year after joined the Duke of Savoy in the siege of Toulon, but on his voyage home with nine ships of the line he was wrecked off the Scilly Isles, October 22, 1707. A miserable monument marks his tomb in Westminster Abbey.

SHREVEPORT, a city of Caddo Parish, La., on the Red River, at the head of steamboat navigation, in the center of a cotton-growing district. It is the terminus of three railroads, and carries on an extensive trade and river commerce. Pop. 8009.

SHURTLEFF COLLEGE, an American educational institution, under control of the Baptists, at Upper Alton, Ill. In 1835 it was chartered under the name of Alton College, and in 1836 its name was changed to that which it now bears. Co-education of the sexes is practiced.

SIBSAUGOR (*Sibsagar*, 'lake of the god Siva'), the chief town of the district of the same name, in Assam, British India, about 11 miles S. of the left bank of the Brahmaputra, 46 miles S.E. of Luckimpur. Pop. (1872) 5278. In the neighborhood are many tanks and temples of the old native kings.—The *district* of S., which lies between the river and the Naga Hills, has an area of 2413 sq. miles; pop. (1872) 296,589. The tea-plant grows here indigenously, but the tea-manufacture did not flourish till 1852. In 1874 there were 22,573 acres under cultivation, yielding nearly five million lbs. of tea, or more than half the entire yield of the Assam valley; there were 92 Europeans and 24,000 natives employed, of whom the majority are imported from Chota Nagpur. An acre of adult plant ought to produce an average of 400 lbs., worth £40 in the English market.

SICILI, a town of Sicily, province of Syracuse, on a rocky hill overlooking a small stream, 3 miles from the coast and 8 S. of Ragusa. It occupies the site of the ancient Syracusan colony of *Casmenæ* (founded in 644), and has considerable trade, and a pop. (1875) of 10,887.

SICK'INGEN, Franz von, a famous German knight, was born 2d March 1481, at the Eberburg, near Münster-am-Stein. His father, of an old knightly family of the Palatinate, had made himself a power on the Rhine, and from his mother he inherited Landstuhl and Hohenburg. After years spent in the maintenance of private feuds, S. was in March 1515 outlawed by Maximilian for warring against the city of Worms, but in spite of this he appeared before the town with 6000 foot and 1100 horsemen, among them Götz von Berlichingen. While the struggle lasted, he fought first against, then for, the Duke of Lothringen, aided François, king of France, and Ulrich, Duke of Würtemberg (1516), and in 1518 was reconciled to Kaiser Max, who freed S. from the ban to gain his service. After the Emperor's death, François and Karl both solicited his help to obtain the imperial dignity. He attached himself to Karl, who lent him 20,000 gulden 'without pledge or surety.' Ulrich von Hutten, who lived with S. at Ebernburg, gained him over to the reforming principles, and persuaded him to support Reuchlin against the Dominicans of Köln, and take Butzer, Œcolampadius, and Schwebel into his service. In 1521 and 1522 S. fought for Karl V. in the Ardennes at the head of an army of mercenaries. Systematically secularizing the church lands on the Rhine, 'to make way for the new learning,' he was gradually nearing his great aim, a principality for himself, when in the autumn of 1522, during his feud with Trier, Philipp of Hessen and Ludwig of the Palatinate advanced against him, and on the 10th of October he was outlawed by King Ferdinand. Shut up and besieged in Landstuhl, he was on the 1st May 1523 mortally wounded, and died on the day after the capitulation, 7th May 1523. His children regaining the castle twenty years after, erected a stone monument over his grave in the chapel there, which has been restored by the present owners. Maximilian raised the S. family to the rank of 'Reichsfreiherren,' Joseph III. to 'Reichsgrafen.'

SIDDHARTHA, 'he who has accomplished his aim,' the name said to have been given at birth to Gautama Buddha. This was his individual name, Gautama that of his family, and Buddha ('enlightened') a subsequent appellation.

SID'MOUTH, Henry Addington, Viscount, the son of a London physician, was born at Reading, England, May 30, 1757, and passed from Winchester School to Brasenose College, Oxford (1774). He graduated B.A. (1778), and entering Lincoln's Inn was called to the bar (1784), a week later being returned to Parliament for Devizes. A firm supporter of Pitt, he filled the office of Speaker from 1789 to 1801, when differences having arisen on the question of Catholic Emancipation, Addington, as one of the 'King's Friends,' was called on to form a ministry, the chief event of which was the short-lived Peace of Amiens (1802). Pitt's return to power on condition of his abandonment of Emancipation (1804) was accepted by Addington, who for six months held the presidency of the council (1805), being at the same time raised to the peerage as Viscount S. As Secretary of State for the Home Department (1812–22) he incurred considerable obloquy by his conduct at the Manchester Reform meeting (1819); and having in 1824 withdrawn from official life, died at his residence in Richmond Park, February 15, 1844. See his *Life* by Dean Pellew (3 vols. 1847).

SIDNEY, a town of Shelby Co., O., on the Great Miami River and the Miami & Erie Canal. It has two railroads; is engaged in manufacturing; and is the center of a rich agricultural district. Pop. 4600.

SIE'BOLD, the name of a gifted family of physicians, anatomists, and physiologists in Germany, of whom the most distinguished was Philippe Franz Balthasar von S., born February 17, 1796, at Würzburg, where he studied medicine and the natural sciences. Entering the service of Holland, he accompanied the troops to Batavia in Java as medical officer in 1822. In 1823 he was commissioned by the government to visit Japan in the interest of science. S. spent six years in studying the flora and fauna of the Japanese islands, returning to Europe in 1830 to complete the publication of his results. In 1859 he again visited Japan, and returned to Europe in 1862. He died at Munich, October 18, 1866.

SIED'LEC, the chief town of a Russian government of the same name, kingdom of Poland, 40 miles E. by S. of Warsaw. The seat of a Roman Catholic bishop, it has a fine palace, girt with beautiful gardens, and carries on important baking, distilling, and sugar-refining industries. Pop. (1872) 10,013. The *government*, lying between the Vistula and the Bug, nearly corresponds to the old palatinate of Polachia. Area, 5534 sq. miles; pop. (1872) 548,970. In 1872 it yielded 1,430,369 chetwerts of potatoes, and the produce of its 359 factories (607 distilleries, 400 sugar-refineries, 339 glass-works), employing 1951 men, was 1,921,160 rubles.

SIE'MENS, Ernst Werner, a celebrated German electrician, was born at Lenthe, near Hanover, December 13, 1816. In 1838 he became an officer in the Prussian artillery; but devoted most of his time to scientific studies. In 1841 he patented a method for electroplating and gilding; and in 1848, in Schleswig-Holstein, he laid the first submarine mines which were fired by electricity. The next year he retired from the army, and, along with Halske, founded a telegraphic establishment at Berlin, which has constructed the telegraph lines of Russia, Spain, Brazil, N. Germany, &c. By his numerous improvements and inventions he has rendered great services to telegraphy; and has, besides, made valuable researches in electrical science generally.—His brother, Karl Wilhelm S., was born at Lenthe, April 4, 1822, and studied at Göttingen. In 1843 he settled in London as a civil engineer, and in 1853 founded a branch of the Berlin house, at the same time erecting a large establishment at Woolwich for the construction of telegraphic apparatus. He became a member of the Royal Society in 1862, was president of the Institution of Mechanical Engineers, and was first president of the Society of Telegraph Engineers. He also presided at the Iron and Steel Congress which met for the first time at Paris in the summer of 1877. He is the inventor of a regenerating gas furnace, a bathometer, a pyrometer, &c. His pyrometer measures high temperatures by the change of electrical resistance in a given bar of metal due to heat. His publications relate chiefly to these inventions, and are valuable contributions to the literature of science.—Friedrich S., a third brother, was born December 8, 1826, at Menzendorf. He began life as a seaman, but in 1846 followed his brother Karl to London, and greatly aided him in perfecting his gas furnace.

SIGEL, Franz, an American general, born at Zinsheim, Bavaria, Nov. 18, 1824, and entered the army of Baden, after having received a military education. Compelled by political reasons to leave Europe, he came to the U. S., in 1848, and for several years taught in New York. In 1861 he entered the Union service, and rendered gallant service during the civil war, rising to the rank of major-general. At the close of the war he took up his residence in New York.

SIGNORELL'I, Luca, the forerunner of Michael Angelo, was born at Cortona 1441, and in his thirteenth year apprenticed to Piero della Francesca. From him he acquired that mastery of anatomy seen in his first 'Madonna' and 'School of Pan,' both which he painted for Lorenzo de' Medici soon after coming to Florence (1475). At Florence and Loreto, in the Sixtine Chapel at Rome and half the Umbrian and Tuscan churches, he painted in the next twenty years frescoes and altarpieces, the finest perhaps a 'Circumcision,' now in the Hamilton Collection. All were eclipsed by the eight spirited 'Scenes from the Life of St. Bene-

dict' in the monastery of Monte Oliveto (1497), as these again by the 'Doom' at Orvieto (1499–1503), where, in his kinsman Vasari's words, 'angels, devils, ruins, nudes, and foreshortenings are done with a wondrous and inventive fancy.' This, the most daring and learned outcome of the Renaissance, the painter's triumph and monument, brought him a second summons to the Vatican; but in 1510 he withdrew to his native city, where, working to the last, he died in 1525. See two articles by Prof. Colvin in the *Cornhill* (1875), and Fischer's *L. S. und die Italienische Renaissance* (1878).

SILHET or SYLHET, the chief town of the district of the same name, now annexed to the province of Assam, British India, at the foot of the Khasi Hills, on the river Surmah, a tributary of the Brahmaputra. It is a Mohammedan town, built on raised ground among the marshes. Pop. (1872) 16,846.

SIL'ICATE PAINTS. The manufacture of S. P. is extensively carried on by the Silicate Paint Company at Liverpool and London. The new industry originated a few years since on the discovery of a large deposit of almost pure silica near Llandudno, in N. Wales. This natural silica, when dried, forms an almost impalpable powder, which mixes readily with colors and oil. The S.P., which may be had of all colors, are non-poisonous, unlike the ordinary lead paints. The new silicate white has a base of sulphide of zinc, is whiter, more durable, and has a greater body and covering power than white lead; the color is not affected by gases, and heat of 500° is successfully resisted.

SIL'IUS ITAL'ICUS, a Roman poet, born about 25 A.D., rose through high distinction as a pleader at the bar to the consulship in 68, the year of Nero's death. Vitellius made him proconsul of Asia, and, after discharging this office with honor, S. retired from public life, and died at the age of seventy-five. His chief work was the *Punica*, a heroic poem in 17 books, narrating the events of the Second Punic War. The materials are drawn from Livy and Polybius, and worked up 'maiori cura quam industria' (Pliny) into the coldest and dreariest composition ever misnamed a heroic poem. This, the only extant work of S., was discovered by Poggio at St. Gall during the Council of Constance, and was first printed at Rome in 1471. The best editions are those of Cellarius (Leip. 1695), Drakenborch (Utrecht, 1717), Ernesti (Leip. 1791–92), Ruperti (Gött. 1795–98), and Lemaire (1823).

SILL, JOSHUA W., an American general, born at Chillicothe, O., Dec. 6, 1831, and graduated from West Point in 1853. For gallant services in the civil war he was promoted brigadier-general of volunteers in 1862. At the battle of Perryville (Oct. 8, 1862) he commanded a division; and at the battle of Murfreesboro' (Dec. 31, 1862), was killed while leading a charge against the enemy.

SILVA'NUS (from *silva*, 'a wood'), an Italian divinity, guardian of trees, fields, and husbandmen. He marked out the boundaries of fields, he fostered the growth of trees, and he shielded flocks from destruction. The peasants had a festival in his honor, and offered him corn, milk, wine, and other rustic products. Through similarity of function, S. came to be identified with Pan and Faunus. His appearance was that of a hale and cheerful old man.

SIM'EON, the second of Jacob's sons by Leah, took part in the massacre of the Shechemites, and was selected by Joseph as the hostage for Benjamin. The *tribe* of S. received the S.W. corner of Canaan as its share of the conquered land, and it was still partially in possession of that territory at the time when the chronicler wrote (1 Chron. iv. 41–43).

SIMILE (Lat. a 'likeness') is a figure of speech which consists in the formal expression of the resemblance perceived or supposed to exist between two different things. Ex., 'As the stars, so shall thy seed be,' 'When ye pray, use not vain repetitions as the heathen do.'

> 'Pleasures are like poppies spread,
> You seize the flower, its bloom is shed.'

SIMON, JULES, properly JULES FRANÇOIS SIMON SUISSE, a French philosopher and politician, was born at Lorient, department of Morbihan, on December 31st, 1814. Educated at the École Normale, Paris, he succeeded his master, Cousin, in the professorship of philosophy at the Sorbonne in 1839. In 1852 he lost this post on account of his refusal to take the oath of allegiance to Napoleon III., and afterwards held several courses of lectures in different towns in Belgium, on philosophy and education. He was elected to the French Academy in 1863, and in the same year was returned to the Chamber of Deputies, where he took his place among the members of the moderate Left. After vigorously opposing the plebiscite of 1870 and the declaration of war with Prussia, he became a member of the Provisional Government on the 4th September 1870, and afterwards occupied the position of Minister of Education in the Thiers Government from 1871 to 1873. In 1875 he was elected to the Senate, where he became the leader of the Republicans; and from December 13th, 1876, til May 16th, 1877, he was Minister of the Interior under President Macmahon, whose strongest opponent he had formerly been. He afterwards became the editor of the *Echo Universel*, a moderate Republican organ.

SIMS, JAMES MARION, M.D., a distinguished American surgeon, born in Lancaster Co., S. C., Jan. 25, 1813, and graduated from South Carolina College in 1832. He graduated from Jefferson Medical College, Philadelphia, Pa., in 1835, and at once began the practice of medicine at Lancaster, S. C. In the same year he removed to Mount Meigs, Ala., and in 1838 to Macon Co. In 1840 he removed to Montgomery, and rapidly attained distinction by his many brilliant and successful surgical operations. Here he first succeeded in curing vesico-vaginal fistula. In the fall of 1853, he removed to New York, where after much opposition on the part of the leading physicians, he succeeded in establishing the Womans' Hospital. Besides his work here, Dr. Sims soon built up an extensive private practice. In 1861 he visited Europe, and while there operated in Dublin, London, and Paris. After this he practiced in New York, frequently visiting Europe and operating while there. Died in New York, Nov. 14, 1883.—H. MARION, M.D., son of the preceding, an eminent physician of New York, who has pursued the same specialties to which his father devoted his life, and has met with an equal degree of success.

SING-SING, in Westchester Co., N. Y., on the Hudson River and the Hudson River Railroad, 30 miles from New York. It has several military academies, female seminaries, and other institutions of learning. It has also pill and porous plaster works, file factories, lime-kilns, and limestone quarries. Sing-Sing State Prison is located here. Pop. 6578.

SIOUX CITY, a city of Woodbury Co., Ia., on the Mississippi River, about 100 miles above Omaha. It has 8 railroads; is the center of an agricultural region, and a supply point for a very extensive and growing country; and has large railroad shops, elevators, and commission houses. Pop. 13,000.

SIOUX FALLS, a town of Minnehaha Co., Dakato, on the Sioux River, and 90 miles N. of Sioux City, Ia. It has several railroads, and is a rapidly growing business center, having water power, which is, as yet, only partially developed. Pop. 4500.

SIPUN'CLE, the name given to the membranous tube perforating the septa or divisions of the shell in such *Tetrabranchiate* cephalopods as the Pearly Nautilus, &c.

SIRE'NIA, an order of *Mammalia* including but two existing genera—the Manatees and Dugongs. Another Sirenian, the *Rhytina*, was discovered by Behring, but became extinct in 1768.

SISTERS OF CHARITY, in America. A religious order, of the Roman Catholic Church, introduced into this country by Elizabeth Bayley Seton, of N. Y., who, with her two sisters-in-law, Harriet and Cecilia Seton, assumed the religious habit, and opened a convent in Emmettsburg, Md., in 1808. In 1812 the sisterhood numbered 20 members, and Mother Seton was chosen Superior-General. At the death of the Superior, in 1821, the order numbered 50 members, had branch houses in several leading cities, and was in an exceedingly flourishing condition. The body increased with such wonderful rapidity that, in 1852, it became necessary to divide the work of the order, and in consequence the Mother-House at St. Joseph's, near Cincinnati, became independent of Emmettsburg, and was made the headquarters of the work carried on in that section of the U. S. They retain the same rules and costume of Mother Seton's foundation at Emmettsburg. This new branch has also been blessed with great prosperity, and numbers now about three hundred and eighty members, and has thirty-five branch houses; some in Ohio, Michigan, Colorado, and New Mexico. See ORDERS, RELIGIOUS, in AM. SUPP.

SIR'LOIN (Fr. *sur*, 'over,' and loin), a loin of beef. Tradition reports that the name originated through Charles II., after dining off a loin of beef, playfully knighting it—

> 'He held his sword pleased o'er the meat,
> "Rise up, thou famed *Sir-loin*."'

SIVAJI', the founder of the Mahratta power in India, and the boldest warrior the Hindus have ever produced, though, like Hyder Ali and Runjeet Singh, he could neither read nor write. He was born of Rajput descent at the hill fort of Sewneri in 1627, and was brought up at Poonah, which belonged to his father, who had also feudal estates in the Carnatic. At the age of nineteen he began his career by seizing the neighboring strongholds, and by attacks upon the Mohammedan kingdoms of Bijapur and Delhi. In 1659 he treacherously assassinated with his own hand the Bijapur general, and established his power over the whole Mahratta country. He twice sacked Surat, and fitted out a fleet to intercept the pilgrims to Mecca. In 1664 he assumed the title of Rajah and established a mint, but shortly afterwards joined the imperial army, and even appeared at the court of Aurungzib at Delhi. In 1674 he was solemnly enthroned at Raighur, which he had lately stormed. On this occasion he was weighed against gold, and the sum (about 10 stone or 16,000

pagodas in value) was distributed among Brahmins. At this time the British at Bombay made a treaty with him. The whole of the Deccan was now tributary, and he led a marauding expedition as far as S. Tanjore. S. died at Raighur in 1680. None of his children showed any ability, but his descendants ruled in the diminished State of Sattara, latterly under English protection, until 1848.

SKEAT, Rev. Walter William, born in London, England, 21st November 1835, proceeded in 1854 from King's College School, London, to Christ's College, Cambridge, graduated B.A. as fourteenth wrangler in 1858, and obtained a college fellowship in 1860. S. now took orders, and after three years of parochial duty, became mathematical lecturer at Christ's College (1864–67), and English lecturer (1867–76). Appointed Director of the 'English Dialect Society' on its establishment in 1873, he has been one of its most laborious and successful editors. In 1878 he was unanimously elected to the newly-founded Elrington and Bosworth Professorship of 'Anglo-Saxon' in the University of Cambridge. S. is perhaps the most admirable editor of Early English literature that has ever lived. Familiar with all its contents, and more profoundly skilled than any of his contemporaries in the difficult lore of MSS., he also brings to the elucidation of his texts a keenly penetrative yet sympathetic criticism that overlooks nothing and weighs everything. Some of his editorial labor, *e.g.*, *Piers the Plowman* and his Essay on the 'Rowley Poems' of Chatterton, is as masterly as anything ever achieved in regard to a Greek or Roman classic.

SKENE, James, a scion of an ancient Scottish family, was born at Rubislaw, 5th March 1775, spent several years of his youth in Saxony, where he acquired a perfect knowledge of German. On his return to his native country, he formed a close friendship with Sir Walter Scott, who dedicated to him the fourth canto of *Marmion*. In 1806 he married Jane, daughter of Sir William Forbes of Pitsligo, by whom he had three sons and four daughters. He died 27th November 1861. S. was a man of fine character, cultivated tastes, and lively talents. Scott owed him not a little in various ways. Some of the Jewish scenes in *Ivanhoe* were suggested by S., who also furnished the great novelist with part of his materials for *Quentin Durward*. His archæological tastes he transmitted to his second son, William Forbes S., born at Inverie, Kincardineshire, 7th June, 1809, educated at the High School of Edinburgh, studied in Germany and at the Universities of St. Andrews and Edinburgh. In 1831 he became a Writer to the Signet.

SKOB'ELEFF, General, a brilliant and daring Russian officer, born about 1840, and is said to be the great-grandson of a 'Scobie' from the W. of Scotland, who emigrated to Russia, and rose to distinction in the Russian navy. S. first served in Central Asia under Kaufmann, where his extraordinary audacity and splendid courage soon won him a great name. His exploits have almost become legendary among the soldiers of the Czar. Intrusted by Kaufmann with the command of the forces sent against Khokand, he conquered and annexed a territory containing two millions of inhabitants. At the outbreak of hostilities between Russia and Turkey in 1877, S. happened to be in disgrace at court, and came to the seat of war unattached. At the crossing of the Danube at Sistova he fought in the ranks as a private soldier, took part in the great surprise-march of Gourko through Bulgaria, obtained command of a regiment of Cossacks after the Russian disasters at Plevna, and gave material help at the recapture of Lofteha, 3d September. Appointed commander of the left wing of the Russian army at Plevna, S. stormed with frightful loss the Sofia and Krishine redoubts (September 11), but was forced to abandon them next day, was present at the surrender of Osman Pasha, whom he was the first to greet, afterwards captured the entire Turkish force at Shipka, and marched with the victorious Russians from Sofia to San Stefano. He was a thoroughly scientific and accomplished officer, and had even more than a Russian's skill in languages, speaking and writing with ease, in addition to his native tongue, French, German, English, Italian, Roumanian, Bulgarian, Polish, Turkish, and modern Greek. He died at Moscow, 7th July 1882.

SLEA'FORD, a market-town of Lincolnshire, England, on the Slea, 14 miles E.N.E. of Grantham by rail; has a cruciform parish church (1271–1403), with a spire 144 feet high; alms-houses (enlarged 1858) and a grammar-school founded by Robert Carre in 1604; and a Second Pointed cross, 70 feet high, erected (1850) as a testimonial to Mr. Handley, M.P. for S. Lincolnshire. S. publishes one weekly newspaper, and has a considerable trade in agricultural produce. Pop. (1881) 3680.

SLOCUM, Henry Warner, an American officer, born at Pompey, Onondaga Co., N. Y., Sept. 24, 1827, and graduated from West Point in 1852. In 1856 he resigned from the army and began to practice law in Syracuse, N. Y. In 1861 he entered the Union service, and at first Bull Run was severely wounded. He was made brigadier-general of volunteers, and was present at Gaines' Mill, Glendale, and Malvern Hill. In July, 1862, he was made major-general of volunteers, and participated in second Bull Run, South Mountain, Antietam, Chancellorsville, and Gettysburg. He afterwards served under Sherman on his 'march to the sea,' and in 1865 resigned from the army, and began the practice of law in Brooklyn, N. Y. He has since been twice elected to Congress.

SLOVACK'I, Julius, a Polish poet, son of a professor in the University of Wilna, was born there, August 23, 1809, and after completing his studies threw himself, as a soldier and a poet, into the popular war of 1830. On its failure he went abroad; and, after traveling through the East and various parts of Europe, settled at Paris. He died at Rome, April 3, 1849. Most of S.'s poems depict the darker sides of human life and character. There was something demoniac in his genius, which drove him, like Mickiewicz, after a long struggle, into the mystic, religio-political sect of Towianski.

SMECTYM'NUUS, an answer to Bishop Hall's *Divine Right of Episcopacy*, was published at London in 1641, and was so entitled because the joint work of five Presbyterian divines—Stephen Marshall, Edmund Calamy, Thomas Young, Matthew Newcomen, and William Spurstow.

SMILES, Samuel, the historian of industrial enterprise, was born at Haddington, Scotland, in 1816, educated for the medical profession, and practised for some time at Leeds, where he published *Physical Education* (1837) and a work on *Railway Property, its Conditions and Prospects* (1849). After holding the editorship of the *Leeds Mercury* he became secretary to the Leeds and Thirsk Railway in 1845, and transferred his services about 1852 to the South-Eastern Railway, from which he retired in 1866. S. received the degree of LL.D. from Edinburgh University in 1878.

SMITH, George, an English Assyriologist, was born at Chelsea, March 26, 1840, and taking an early interest in Assyrian researches, commenced in 1857 the study of Accadian. He was appointed Keeper of Antiquities at the British Museum (1865), on the recommendation of Sir Henry Rawlinson, whom he helped in the third volume of his *Cuneiform Inscriptions of Western Asia* 1867), and himself published in 1871 a masterly handbook on the *Phonetic Value of the Cuneiform Syllabary* and a *History of Assurbani-pal*, in which 3000 lines of inscriptions in the British Museum relating to Sardanapalus are transcribed, transliterated, and translated. His discovery (1872) of a tablet containing the Chaldean account of the Deluge awakened general interest, and the proprietors of the *Daily Telegraph* advanced £1000 towards the expenses of excavations on the site of Nineveh. Accordingly in January 1873 he quitted England, reached Mosul in March, and having made important excavations at Kouyunjik and paid a flying visit to the sites of Babylon and other buried cities, returned to England in the following autumn. Next year a second expedition, undertaken this time on behalf of the British Museum, was interrupted by the expiry of his *firman*, which the Turkish authorities refused to renew. However, in these two expeditions, with barely four months' actual work, he had fixed the date (860 B.C.) of the S.E. palace at Nimrûd, discovered a fragment of a crystal throne, a *stylus*, marble lintel, &c., and secured for the nation nearly 3000 tablets, described in his *Assyrian Discoveries* (1875). In March 1876 he started once more for the East, and during a stay in Syria established the site of Carchemish, the Hittite capital, at the modern Jerablûs (Gr. *Hierapolis*). The plague-stricken and unsettled state of the country stood in the way of excavations, and he was on his homeward way when he died at Aleppo, August 19, 1876.

SMITH, Gerrit, an American philanthropist, was born in Utica, New York, 6th March 1797. He inherited large landed estates from his father, an old partner with J. J. Astor in the fur-trade. He gave away nearly the whole of his property to negroes—as much as from 40 to 60 acres of freehold to 3000 persons in the single year 1846. He was an eccentric advocate of vegetarian diet and teetotalism, and in a literal sense kept an open 'tavernous' house. His charities were estimated at $50,000 a year. He contributed largely to the expenses of the Civil War, in the interest of the Union, but joined Horace Greeley in signing the bail-bond of Jefferson Davis in 1867.

SMITH, Henry Boynton, DD., LL.D., an American theologian, born at Portland, Me., Nov. 21, 1815, and was educated at Bowdoin College. He studied theology at Bangor, Andover, and in Germany. Upon his return to America, he was pastor of a church (Congregational) in Massachusetts; professor of Hebrew at Andover Seminary; professor of mental and moral philosophy at Amherst College; professor of church history in Union Seminary, New York; and afterwards of systematic in the last. Besides numerous lectures and addresses, he published *The Relations of Faith and Philosophy; The Problem of the Philosophy of History; The Idea of Christian Theology as a System;* and *The Reformed Churches of Europe and America.* Died in New York, in 1877.

SMITH. John Pye, born at Sheffield, England, May 25, 1774, was from 1800 to 1850 successively classical tutor, divinity lecturer, and principal of the Independent College at Homerton, where he was also for forty-three years pastor of the 'Old Gravel Pits Chapel.' He died at Guildford, Surrey, February 5, 1851.

SMITH, Sir Thomas, born at Saffron Walden, Essex, England, 1512, at fourteen entered Queen's College, Cambridge. He early distinguished himself as a Grecian, was made fellow of his college in 1531, and two years later became a public lecturer. He and his friend Cheke attacked the prevailing mode of pronouncing Greek, which differed widely from that now in use. At first strenuously opposed, S. and his colleague by patience conquered all the authorities except Gardiner, Bishop of Winchester. In 1539 S. traveled on the Continent, taking a doctor's degree at Padua; and on his return he became professor of civil law at Cambridge. Under Edward VI. he became a secretary of state (1548), and was knighted. While his patron Somerset was in office, he was employed as ambassador to Belginm and France. At the accession of Mary he lost all honors, only retaining a pension of £100 a year; but in Elizabeth's reign he again became a secretary of state, Chancellor of the Order of the Garter, and ambassador to France.

SMOOTHING-IRONS are domestic implements of iron or steel with a flat face for smoothing linen, &c. There are many varieties which mainly differ in the modes of heating and nature and attachment of the handle. The common *sad-iron*, consisting of a solid triangular heater and handle of cast iron, remains in use notwithstanding the drawbacks of heating it before a fire and its hot handle. These are removed in many S. I. of recent introduction by making the body of the iron hollow, and heating it by incandescent charcoal, the flame of gas or a lamp, or a red-hot iron heater. A handle of wood or of perforated iron, which in some kinds is detachable, is also substituted for the solid cast-iron one.

An *Italian Iron* for crimping and smoothing frills, &c., consists of a narrow hollow cylinder with one end closed and rounded and the other open. A tapering red-hot heater is introduced into it, and the articles to be ironed are pressed gently against the heated surface.

SMRI'TI, 'that which is remembered and handed down by tradition.' The Sanscrit term for the whole of the Post-Vedic literature, which is believed to be founded on direct revelation, though delivered by human authors. It includes the Laws of Menu, the Mahabharata and Ramayana, the Puranas and Tantras. It is opposed to Sruti, or revelation.

SNEEHÆTT'A, the highest peak of the Dovre chain, in Norway, rises from a mass of similar heights, a torn pyramid of mica-slate intersected with quartz. 7333 feet above the sea. Before the discovery of the Jotunfjelde, S. was regarded as the loftiest summit of Norway.

SNEEZ'ING consists in a violent and spasmodic action of the respiratory muscles. A deep inspiration is first taken, and the air is then forced violently through the nose, the mouth being closed, and the effort shaking the entire frame. The common cause of S. is irritation of the pituitary membrane of the nose, while in other cases S. may be excited even through the sense of sight and from irritation of the eye, through the sympathy which exists between the sense of sight and that of smell. Occasionally S. is excited by internal nervous causes, and independently of outward irritation of the nose or air-passages, and affections of the stomach or bowels are occasionally said to produce this effect. The custom of blessing a sneezing person has been long in vogue, and was practised by the ancients. Its origin is unknown, but in classical times S. during worship or sacrifice was regarded as a good omen.

SNIG, a species of eel found in many parts of England, and known by the olive-green color of its back, the under parts being a golden yellow. The term, however, like that of 'Grig,' is employed by fishermen in a vague and loose way.

SOFT'AS (Arab. 'burnt,' *i.e.*, with zeal for knowledge), a name given to the students in the Mohammedan colleges (*Medresse*), where they are taught theology and jurisprudence, and from which they pass into the Ulemas, taking their place among the imaums, muftis, or cadis. Their dress is a large white turban, and a long robe reaching nearly to the ground. In May 1876 a demonstration of these S. caused the downfall of the grand Vizier Mahmoud Pasha, shortly followed by the deposition of Sultan Abdul Aziz; and after the outbreak of hostilities with Servia and Montenegro, they formed from among their own number a battalion of volunteers to take part in the 'holy' war.

SOL'IS Y RIBADENEIRA, Antonio de, born at Alcàlà de Henares, 18th July 1610, studied law and theology at Salamanca, and in his eighteenth year produced a comedy, *Amor y Obligacion*. Its success gained him a patron in the Count de Oropesa, Viceroy of Navarre and Valencia, from whose service he passed to the Court of Madrid (1654). Here the Queen-Mother made him *Cronista Mayor* (1666); as such he wrote his *Historia de la Conquista de la America Septentrional* (Madr. 1684), whose 'copious and sustained eloquence places him,' says Ticknor, 'by the side of Mendoza and Mariana,' though in boldness and dignity their inferior. Among his comedies, *La Gitanilla de Madrid*, *Triumfos de Amor y Fortuna*, and *El Alcazar del Secreto*, are counted his masterpieces. Having taken the tonsure (1667), S. died at Madrid, 19th April 1686. There are French, Italian, and German versions of his *Historia*, and an English one by T. Townsend. See Ticknor's *History of Spanish Literature* (4th ed. 1871).

SOMBRERE'TE, a town of Mexico, state of Zacatecas, 65 miles N.W. of the town of that name, is the center of a silver-mining district, said to have contained the richest metallic veins ever discovered, but now almost worked out. Pop. 14,000.

SOM'ERS, John, Baron S. of Evesham, a celebrated English statesman, was born, probably 4th March 1652, at Worcester, where his father was an attorney. It was at first intended that he should adopt his father's profession, but in 1667 he entered Trinity College, Oxford, and in 1669 became a fellow of the Middle Temple, being called to the bar in 1676. He soon became known as a rising young lawyer and Whig politician. It was the Revolution which first brought him into real prominence. The Declaration of Rights was drawn up and presented by him, and he was a leading member of the convention Parliament. Under William III. he became successively Solicitor-General and Attorney-General, and in 1693 Lord Keeper of the Great Seal. In 1697 he was raised to the peerage, and made Lord Chancellor; but when the Tory influence shortly afterwards preponderated he was deprived of the seals (1700) and impeached by the House of Commons (1701), but ultimately acquitted by the House of Lords. The Whig reaction which followed Marlborough's first victories restored him to power, and he was instrumental in bringing about the union of England and Scotland in 1707. In 1710 he finally retired from office, and died 26th April 1716. Besides being a statesman of unusual acuteness and integrity, S. was a great orator, a sound lawyer, and a distinguished patron of literary men, such as Newton, Locke, Bayle, and Addison, the last of whom dedicated to him the first volume of the *Spectator*. S. was one of the first Englishmen to appreciate and assert the sovereign genius of Milton. A collection of state papers, from originals in his library, was edited under the title of the *S. Tracts* (1748–52), and a new edition was published by Sir Walter Scott (1809–15).

SOMETSU'KI WARE, a species of Japanese porcelain decorated under the glaze with ornaments in a blue pigment obtained from cobalt ore. It is made principally for domestic use. Another kind, manufactured at Hizen for the foreign market, bears colored enamels fused on the glaze.

SONDELI (*Sorex murinus*), a species of shrew-mice, also named the Moudjouron, and musk-rat of India. It exudes a strong odor of musk from the inguinal or abdominal glands. Although named 'musk-rat,' it is not a true rat, belonging to the order *Insectivora;* yet it is rat-like in form and size. Its fur is a chestnut hue above and grey beneath.

SONDERBURG, a fortified town of Prussia, province of Schleswig-Holstein, on the W. coast of the island of Alsen. It was in great part destroyed by the Prussian batteries April 5, 1864, and its fine old castle is now converted into a Prussian barrack. Pop. (1875) 5834.

SONE or SOANE, a large river of Central India, rising in the native state of Rewah, only a few miles from the sources of the Nerbudda and the Bytarni, and flowing N.E. joins the Granges about 17 miles above Patna city, after a total course of 465 miles. It has been identified with the *Eranoboas* of the Greek geographers, and there is little doubt that its former junction with the Ganges was at Patna itself, exactly opposite the confluence of the Gogra. For 350 miles it runs through a hilly tract, and for 100 miles through the plains of S. Behar; but it has throughout the character of a mountain-torrent, and is useless for navigation. Immense quantities, however, of bamboos are floated down. The sandy bed is in some places 3 miles wide, and is entirely filled by floods during the rainy seasons; but in the summer the stream dwindles to 100 yards wide, and is fordable. It abounds with excellent fish. At Koelwar, where it is joined by its chief tributary, the Koel, it is crossed by the E. Indian Railway, on a lattice girder bridge.

SONTHALS (*Santáls*), an aboriginal hill tribe found in S. Bengal, India, who have attracted considerable attention. Their physiognomy is distinctly of a negroid type, but their philological and ethnical affinities have not been definitely ascertained. The S. are a nomad race, with little affection for home, but a strong reverence for mountains and rivers. They supply a large portion of the hired labor of the plains, especially in indigo factories. In 1855, owing to the exactions of Hindu landlords and moneylenders, they broke into an armed rebellion, which required to

be repressed by vigorous measures. At the same time the tract where they are most numerous was formed into a new district, with exceptionable regulations, called the Southal Pergunnahs. Area, 5488 sq. miles; pop. (1872) 1,259,287, of whom 850,000 are in British territory. The *district* of the S. covers the Rajmehal hills, and is also peopled by another aboriginal tribe of Pahariya Mals. The chief towns are Sahibgunje and Rajmehal, both on the Granges, where the river traffic is transferred to and from the railway. The capital is Dumka. In the last few years the S. have show a tendency to adopt Hinduism in its entirety. A few are Christians.

SOPHI'A DOROTHE'A, Electoral Princess of Hanover, known as the Princess of Ahlden, was born September 15, 1666, the daughter and heiress of Georg Wilhelm Duke of Braunschweig-Lüneberg-Celle. She was married, in spite of her extreme repugnance, in 1682 to her cousin, George Ludwig, Electoral Prince Hanover, afterwards George I. of England, and was the mother of King George II. and of Sophia Dorothea, the wife of Friedrich Wilhelm I. of Prussia. The severity of the treatment she experienced from her morose husband drove her to desperation, and she determined to fly with Graf Philipp Christoph von Königsmarck to Wolfenbüttel; but the intrigue having been discovered by the Grafin von Platen, the Graf was slain by the electoral guards as he came from the chamber of the Princess, July 1, 1694, and S., after having been divorced, December 28, 1694, was imprisoned in the old castle of Ahlden, where she died, November 13, 1726. See *Die Herzogin von Ahlden* (Leip. 1852).

SORDI'NO (Ital.) in music, a mute used in musical instruments to damp or deaden the sound. When the mutes are to be used, the musical direction is *con sordini* and when not *senza sordini*.

SOTH'ERN, Edward Askew, a successful modern comedian, was born in Liverpool, England, April 1, 1830. His earliest engagement on the stage was at the National Theater, Boston, Mass., in 1852. For the next six years he played at Wallack's and Keen's theaters, New York. In 1858 he appeared at the latter theater as 'Lord Dundreary,' in the play of *Our American Cousin*, a perfect piece of caricature which immediately hit the public fancy. It is to this exquisite piece of acting that Mr. S. owes most of his popularity. During the last twenty years he has repeated it many thousands of times in America, at the Haymarket Theater, London, and in the English provinces. Perhaps his next best character is 'David Garrick' in T. W. Robertson's play of that name. He died 20th January 1881.

SOUBISE', the name of an old French noble family, which brought all its titles and possessions into the family of Rohan by the marriage in 1557 of its last heiress with René II., Vicomte de Rohan.—Benjamin de Rohan, Seigneur de S., second son of René II., was born at La Rochelle in 1583, and early distinguished himself in the Huguenot cause. On the fall of La Rochelle he retired to London, where he died, October 9, 1642.—Charles de Rohan, Prince de S., with whom the family died out, was born at Paris, July 16, 1715. He early became a favorite of Louis XV., and accompanied him as aide-de-camp in his campaigns (1744–48). In 1748 he became lieutenant-general, and in 1751, by the influence of Mme. de Pompadour, governor of Flanders. On the outbreak of the Seven Years' War in 1756 he received the command of one of the two French armies, but after some successes he was disastrously defeated by Friedrich of Prussia at Rossbach, November 5, 1757, on which he returned to Paris, the subject of a thousand epigrams. In 1758 he led a new army to Germany, and, with the aid of the Duc de Broglie, achieved successes at Sondershausen (July 23) and Lützelburg (October 10). S. was now made a marshal, and in spite of several reverses kept the command until the peace, February 15, 1763. He now returned to court, where, after the death of Pompadour, he became the favorite of Dubarry. He was the only courtier who followed to the tomb the body of the king, and his devotion induced Louis XVI. to request him to retain his place as minister. S. died at Paris, July 4, 1787.

SOUNDING-BOARD, in a pianoforte, a piece of wood, usually the best Swiss fir, placed behind the strings in order that the resonance may be increased. Its edges are attached to the framing, leaving the central part to vibrate freely under the strings when they are struck. The term is also applied to a wood screen placed behind a speaker in halls and churches for acoustic purposes.

SOUTHBRIDGE, a town of Worcester Co., Mass., on the Quinnebaug River and a branch of the New York & New England Railroad, 70 miles from Boston. It is engaged in manufacturing, and is an important business center. Pop. 6465.

SOUTHERN ALPS, the name given to the central and loftiest portion of the great dividing range of the S. Island of New Zealand. Many of the peaks are perpetually snow-capped, the highest being Mount Cook (13,200 feet). The glaciers of the S. A. rival those of the Swiss Alps in magnitude, and on the W. side extend to within a few hundred feet of the sea-level.

SOUTHINGTON, in Hartford Co., Conn., 20 miles N. of New Haven. It is engaged in the manufacture of general hardware, carriage hardware, pocket cutlery, silver-plated ware, and watches. Pop. 5411.

SOUTH NORWALK, a seaport of Connecticut, on Long Island Sound, 42 miles by rail N.E. of New York, has 4 churches, 1 newspaper, and varied hardware manufactures. Pop. 13,956.

SOUTH PUEBLO, a city of Pueblo Co., Col., on the Arkansas River and the Denver & Rio Grande Railroad, and the terminus of the Atchison, Topeka & Santa Fe Railroad. It is engaged in agriculture, stock-raising, and manufacturing. It has extensive Bessemer steel works, and also smelting works. Pop. 12,000.

SOUTH'WELL, Robert, born at St. Faith's, Norfolk, England, in 1560, was educated at Douay, became a Jesuit at Rome in his sixteenth year, and in 1583 was appointed rector of the English Jesuit College there. Next year he undertook a mission to England, and became chaplain to the Arundels. For alleged complicity in a plot against Elizabeth he was sent to the Tower in 1592, where he was confined three years, and put to the rack ten times. Finally he was condemned to death February 20th 1595, and on the following day was hanged, drawn, and quartered. His literary compositions, chiefly poetical, and all on moral and religious subjects, have ever been in favor with Catholics.

SOUTHWORTH, Emma D. E. Nevitt, an American novelist, born at Washington, D.C., Dec. 26, 1818. Her publications are numerous, and have had a large circulation. Among them are the following: *The Family Doom, Prince of Darkness, The Bride's Fate, The Changed Brides, How He Won Her. The Widow's Son, The Bride of Llwellyn, The Bridal Eve, The Fatal Marriage, The Lost Heiress, The Wife's Victory, Retribution, The Curse of Clifton, Cruel as the Grave*, and *The Spectre Lover*.

SPAL'ATIN, Georg, born in 1484 at Spalt in Bavaria, was originally named Burchart, but called himself S. from his native place. After studying at Nürnberg, Erfurt, and Wittenberg, he became (1507) pastor at the village of Hohenkirchen, near Gotha. In 1512 he was appointed university librarian at Wittenberg, and in 1514 court chaplain and privy secretary at Dresden, in which position he had great political influence as the most trusted counselor of the Elector. He greatly advanced the cause of the Reformation as 'superintendent' at Altenburg, where he died 16th January 1545. The chief works of S. are his biographies of Friedrich the Wise (new ed. by Neudecker and Preller, Jena 1851) and Johann the Constant, his *Christliche Religionshändel* (published as *Annales Reformationis*, Leip. 1718), his history of the popes and emperors of his time, and his letters. See the biographies of S. by Schlegel (Jena 1693), and Wagener (Altenb. 1830).

SPAN'ISH MAIN, a name commonly given in the 16th and 17th centuries to the mainland of S. America from the Isthmus of Darien to the mouth of the Orinoco.

SPAR'TEL, Cape, the N.W. extremity of Africa, at the Atlantic entrance to the Strait of Gibraltar. It is a bold headland, with a range of basaltic columns like the Giant's Causeway.

SPAWNING OF FISHES. In all Vertebrates the sexes are distinct, but impregnation in fishes is, as a rule, effected externally to the body of the female. In some fishes (e. g., sharks) the male is provided with a pair of organs named claspers, and by means of these the male adheres to the female during the act of fecundation. Most fishes spawn by simply depositing their eggs, the male shedding the milt upon them. In some, e. g., the blennies, the young are retained within the parent body until they are ready to swim. Impregnation in this case must be internal.

SPEL'MAN, Sir Henry, born at Congham, Norfolk, England, in 1562, passed from Walsingham School to Trinity College, Cambridge, and thence to Lincoln's Inn (1580). He served as high sheriff of Norfolk (1604), as a commissioner for settling land-titles in Ireland, and for inquiring into the exaction of English fees; then, having been knighted about 1612, withdrew from public life and devoted himself to archæology and a study of the Old English tongue. He died in 1641.

SPENCER, a town of Worcester Co., Mass., on a branch of the Boston and Albany Railroad, 12 miles from Worcester. It is engaged in manufacturing boots, shoes, woollen cloth, and wire. Pop. 7466.

SPICH'EREN, or SPICH'ERN, a village in the circle of Forbach, Elsass-Lothringen, 2¼ miles S. of Saarbrucken, with 1000 inhabitants. During the Franco-German War the French strongly entrenched themselves on the S. Berg (875 feet), with its steep, scantily-wooded slopes, but after a sharp engagement, 6th August 1870, were obliged by the Prussians, under General von Goeben, to retreat though numerically superior.

SPIDER-CRAB, the name given to various Crustacean genera included in the order *Decapoda*, and belonging for the most part to the family *Maiadæ*. The typical species *Maia Squinado* or spinous S. C., is four or five inches long; but the other forms so named are very much smaller.

SPIEL'HAGEN, FRIEDRICH, a German novelist, was born at Magdeburg, 24th February 1829. Brought up at Stralsund, where his father was *baurath* from 1834, he studied at Berlin, Bonn, and Greifswald, and having successively been tutor, actor, and officer in the Landwehr, took finally to literature, settling at Berlin in 1862. His 'social' novels, most of which have been translated into English, are over-long and surcharged with invectives against the clergy and aristocracy, but their power is great, and from first to last they have steadily improved.

SPINAL NERVES, the name applied to the paired nerves which arise from the *spinal cord*, and which are distributed to the various parts of the body. The S. N. are so named in contradistinction to the *cranial nerves*, or those which originate from the brain itself. Thirty-one pairs of S. N. arise from the spinal cord of man. They pass from the spinal cord and spine through the *intervertebral foramina*, or openings between the bodies of the vertebræ. Eight pairs are *cervical;* twelve are *dorsal* nerves, also named *thoracic;* five are *lumbar*, five *sacral*, and one *coccygeal*. Each spinal nerve arises by *two* roots, an anterior and posterior, from the spinal column. The posterior root has a nerve mass or *ganglion*, which is wanting in the anterior. The fibres of the anterior roots are *motor* in nature, *i. e.*, impulses travel by these roots outwards *from* the cord or brain to the body. The fibres of the posterior roots are *sensory*, *i. e.*, impulses are conveyed by these fibres to the cord or brain. The anterior and posterior fibres unite just beyond the nervous ganglion to form a single nerve-trunk, in which the two sets of fibres are indistinguishable.

SPIR'IT LEVEL. A S. L. consists essentially of a hermetically sealed slightly-curved glass tube nearly filled with alcohol, and containing a small bubble of air, which exactly occupies the middle point when the tube is perfectly horizontal. The tube is commonly mounted in a case of wood, faced with brass, which is laid on the surface to be tested. Telescopes, theodolites, and other instruments of precision are provided with spirit levels.

SPIR'ULA, a curious genus of cuttlefishes belonging to the *Dibranchiate* division of the Cephalopoda, and distinguished by an internal chambered shell, the *septa* or partitions of which are perforated by a ventral tube or *ipuncle*. *S. Peronii* is the common species, the shells of which are cast up by thousands on the coasts of New Zealand, though, curiously enough, the living animal is rarely met with.

SPOON (Old Eng. *spón*, a 'chip' or 'splinter' of wood), a familiar domestic implement used in carrying food to the mouth, and for other purposes. The earliest spoons were probably bivalve shells to which handles were attached for convenience. Many ancient Egyptian spoons of glass, wood, stone, and ivory preserve the primitive shell form. Horn was formerly a very common material for S.-making, and out of its use arose the proverb, 'To make a S. or spoil a horn,' signifying a determination to accomplish an object at any cost. German-silver spoons are now chiefly in use. They are stamped from sheet metal by means of 'punches,' and 'bolsters' of steel worked by presses. In the subsequent operations the 'blank' is 'pippened,' filed, bowled, and set, and buffed or polished; better-class spoons are finished by electroplating, with silver or gold. Christening gifts in the Middle Ages took the form of *Apostle spoons*, so named because the stems bore figures of the Apostles.

SPOTTISWOODE, WILLIAM, LL.D., F.R.S., an English mathematician, was born at London, Jan. 11, 1825. From Eton and Harrow he passed to Balliol College, Oxford, where he graduated in 1845, and subsequently gained two mathematical scholarships. On quitting Oxford he became manager of the business of the Queen's printer, devoting his leisure to the study of physical and mathematical science, to philosophy and Oriental languages. He is a member of many scientific societies, to whose transactions he has contributed papers of unquestioned ability. He was president of the British Association at the Dublin meeting of 1878, and succeeded Hooker as president of the Royal Society in November of the same year.

SPRAGUE, WILLIAM BUELL, D.D., was born at Andover, Conn., 16th Oct. 1795, studied at Yale and Princeton, settled as pastor at W. Springfield in 1819, transferred to Albany, N. Y., in 1829, but in 1869 went to Flushing, Long Island, where he died 7th May 1876. S. wrote many evangelical sermons, &c. His chief work is *Annals of the American Pulpit* (1859–60).

SPRENG'ER, ALOYS, born at Nassereut, in Tirol, 3d September 1813; from 1832 studied medicine and Oriental languages at Vienna, and going to London (1836), assisted the Earl of Munster in his *Military Science of the Mohammedan Nations*. In 1843 he sailed for India, and there promoted the establishment of Western culture as founder of a native press, as president of the College of Delhi (1845), as secretary to the Asiatic Society (1850), and in various other capacities. He returned to Europe (1857), and became honorary professor of Oriental Languages and Literature at Bonn.

SPRINGFIELD, a city of Greene Co., Mo., on the St. Louis & San Francisco Railroad, 241 miles S.W. of St. Louis. It is the most important place in this section of the state, and is surrounded by a fine agricultural district. Pop. 12,000.

SQUIRR'EL-MONK'EY (*Callithrix*), a genus of *Platyrhine* or Old World monkeys, found in Brazil, and closely resembling squirrels in appearance. *C. cinereus* is a familiar species, also named the Saimiri; another example is the *C. torquatus*, or Collared Callithrix. These monkeys are inoffensive and intelligent, and may become very tame.

STAHL, FRIEDRICH JULIUS, an eminent German jurist, was born of Jewish parents at Münich, January 16, 1802; at the age of seventeen passed over to Christianity, became professor at Würzburg (1832), Erlangen (1835), Berlin (1840), and sought to combat 'radical' liberalism, basing both jurisprudence and civil polity on Scripture. A member of the First Prussian Chamber from 1849, he was one of the ablest leaders of the reactionary party in Prussia, and opposed with eloquence and vigor the broadening of the Prussian constitution. He died at Brückenau, August 10, 1861. S.'s great work is *Philosophie des Rechts nach Geshichtl. Ansicht* (4th ed. 1870), but he was an incessant and brilliant polemic, and wrote numerous pamphlets and treatises.

STAINES, an interesting old English town, in Middlesex, on the left bank of the Thames, 6 miles S.E. of Windsor, and 18 S.W. of London by the South-Western Railway. Its church of St. Mary, rebuilt in 1828, has a tower by Inigo Jones (1631), and the granite bridge of three arches, which here crosses the river, was designed by Rennie (1832), and cost £40,000. A stone (hence the town's name) bearing date 1285 here marks the limit of the Thames Conservancy. A Roman Catholic church, in Gothic style, was erected in 1868. There are mustard mills, breweries, and market-gardens. S. has a well-known race-course. Pop. (1881) 4933.

ST. ALBANS, in Franklin Co., Vt., on the Central Vermont Railroad, at its junction with the Missiquoi Railroad, 63 miles from Montreal, and 3 from Lake Champlain. It is the great butter market of New England, and a trade center. Pop. 7193.

STALL'BAUM, JOHANN GOTTFRIED, born at Zaasch in Prussian Saxony, 25th September 1793, in 1808 entered the Thomasschule, and in 1815 the University of Leipzig, whither after two years of teaching at Halle (1818–20) he returned to be an undermaster in his old school. He became its rector (1835), and in 1840 was appointed extraordinary professor, retaining both offices down to his death, 24th January 1861. S. did good service to classical philology by his critical edition of Plato's Works (12 vols. Leip. 1821–25), a separate edition of his text (8 vols. Leip. 1825), and an edition with a commentary in the *Bibliotheca Græca* (9 vols. Gotha, 1827; new ed. 1867). Besides other editions of the classics, he published *Ueber den innern Zusammenhang musikalischer Bildung der Jugend mit dem Gesammtzwecke des Gymnasiums* (Leips. 1842), *Das Griechische und Lateinische in unseren Gymnasien* (Leip. 1846), &c.

STANDISH, MILES, one of the 'Puritan fathers,' and best known as the hero of Longfellow's poem, *The Courtship of Miles S.*, seems to have been born in Lancashire, England, about 1584, and claimed to be a cadet of the knightly family of S. of Duxbury Hall in that county. After serving for some time in the Netherlands, where he attained the rank of captain, S. came to America in the *Mayflower* in 1620, rendered good service to the young colony in its dealings both with Indians and with the mother country. He founded the township of Duxbury in Plymouth Co., Mass., where he died, 3d October 1655, and where a monument to him was commenced in 1872. His friendship with John Alden is well known to all readers of Longfellow. Other interesting information about S. is given in Justin Winsor's *History of Duxbury* (1849).

STAN'LEY, THOMAS, an English scholar of great repute in his day, was born at Cumberlow, in Hertfordshire, in 1625, educated at Pembroke Hall, Cambridge, and entered the Middle Temple. Between 1655 and 1662 S. published his *History of Philosophy* in three parts, still a useful storehouse of facts, the best edition of which is that of 1743, with a life of the author. In 1663 appeared his edition of *Æschylus* with a Latin translation and commentary, a work long since superseded. He published also various poems and translations from classical and Continental authors. He died in London, April 12, 1678. See the *Life* prefixed to Brydges' edition of *S.'s Poems* (1814–15).

STANS'FIELD, CLARKSON, an English landscape-painter, born of Irish parentage, at Sunderland, in 1793. During a roving

youth spent at sea he came in casual contact with Douglas Jerrold, and procured the lasting friendship of Captain Marryat, who early appreciated his artistic powers. He was latterly engaged as captain's clerk on board a man-of-war's-man, but in consequence of a fall from the fore-topgallant mast-head retired from the navy, and procured employment as a scene-painter first at the Edinburgh Theater-Royal (where he formed a life-long intimacy with David Roberts), then at the Old Royalty, London, and eventually at Drury Lane. After the success of the first picture he exhibited at the British Institution in 1826—'Market-boats on the Scheldt'—he devoted himself more and more to easel-painting. In 1828 he obtained a prize of fifty guineas from the institution, in 1832 was made A.R.A., and R.A. three years later. Together with Roberts and others he established the Society of British Artists in 1830. Among his more famous pieces are 'Wreckers off Fort Rouge,' 'A Calm at Sea,' 'Mount St. Michael,' 'Views of Venice,' 'Battle of Trafalgar,' 'Battle of Ischia.' 'The Abandoned,' 'Against Wind and Tide,' 'Siege of St. Sebastian,' 'The Bass Rock.' Frequent visits to the Continent supplied S.'s ready brush with such a variety of subjects that his work never sank into sameness. Although one of the most fertile and effective of scene-painters, his art is characterized by elaboration rather than breadth, and its fidelity to nature, delicacy of finish, and harmony of color, have obtained for S. the name of 'the English Vandervelde.' He died at Hampstead, 18th May 1866.

STAN'TON, EDWIN M'MASTERS, an American statesman, was born at Steubenville, Ohio, December 19, 1814. Admitted to the bar in 1836, he rose rapidly to the head of his profession, and while acting in California in 1858 as counsel for the United States in certain important land cases, he did good service to students of history by collecting a large mass of documents relating to Mexican affairs. In 1860 S. was appointed by Buchanan Attorney-General, and in 1862 he became Secretary of War under Lincoln. In this capacity he showed a zeal and prudence so strongly appreciated by the nation, that when in 1867 he was requested by President Johnson to resign his portfolio, the Senate refused to concur in the suspension, and the unseemly strife was only ended in May 1868 by S.'s voluntary resignation. On December 20, 1869, he was nominated by President Grant associate Justice of the United States Supreme Court; but his incessant labors had undermined his health, and he died on December 24 of the same year.

STANTON, ELIZABETH CADY, an American advocate of 'Woman's Rights,' born at Johnstown, N.Y., Nov. 12, 1815. She was a daughter of Daniel Cady, and in 1840 married Henry B. Stanton. She has delivered many addresses, and has written much in favor of granting the right of suffrage to woman.

STARKE, JOHN, an American patriot, born at Londonderry, N. H., Aug. 28. 1728. He served under Abercrombie against the French in 1758–59. On Aug. 16, 1777, he defeated a force of Hessians, under Col. Baum, near Bennington, and on the same day he defeated a force commanded by Col. Breymann. For this Congress made him brigadier-general, and he afterwards served under Gates and Washington. At the close of the war he became a farmer. Died at Manchester, N. H., May 8, 1822.

STEATOR'NIS, or 'Fat Bird' (*S. Cœripensis*), a species of *Caprimulgodæ*, or Goat-Sucker, found in Trinidad, and so named from the fat obtained by the Indians from the young birds, which are knocked down in great quantities by long poles. The fat is melted in clay pots, and is highly valued by the natives.

STEDMAN, EDMUND CLARENCE, an American poet, born at Hartford, Conn., Oct. 8, 1833, and was educated at Yale College. In 1859 he came to New York, and has since been engaged in literary work. He has published, *Poems Lyric and Idyllic* (1860), *Alice of Monmouth, and Other Poems* (1864), *The Blameless Prince, and Other Poems* (1869), and others.

STEELL, SIR JOHN, a Scottish sculptor, was born at Aberdeen in 1804, and received his first artistic education in the Royal Academy, Edinburgh. On his return from Rome in 1833 his colossal model of Alexander and Bucephalus attracted attention; and from that period onwards his career has been one of distinguished success. The figure of Queen Victoria for the front of the Royal Institution in Edinburgh procured him in 1844 the title of Sculptor to her Majesty in Scotland; and after the unveiling of the national monument to the Prince Consort in Charlotte Square, 17th August 1876, the artist was knighted at Holyrood Palace. To the embellishment of Edinburgh he has further contributed by the statue of Sir Walter Scott on the Scott monument, the equestrian statue of Wellington, the statues of Lords Melville and Jeffrey, of Professor Wilson (1865) and Dr. Thomas Chalmers (1878). In the hall of Greenwich Hospital is his statue of Lord de Saumarez; in the cathedral at Glasgow his monument to the 93d Highlanders; and in the Cathedral at Dunkeld his monument to the 42d Royal Highlanders. At Calcutta the statues of Dalhousie and Wilson are his; and at New York the colossal statues of Sir Walter Scott (1872) and Robert Burns (1873) in the Central Park.—GOURLAY S., brother of the preceding, born at Edinburgh in 1819, received his art-education at the Board of Manufactures under Sir William Allan, and studied privately under Robert Scott Lander, R.S.A. He first exhibited in 1832. Among his principal works are 'Robert Burns turning up the Monse's Nest' (1839; engraved); 'The Master of Ravenswood parting with Caleb Balderstone' (1842); 'Scene from *The Monastery*' (1843); 'Llewelyn and his brave Hound Gelert (1857); 'The Death of Old Mortality' (1859); 'The Highland Raid' (1863); 'A Cottage Bedside at Osborn' (1863; engraved); 'The Pass of Leny—Cattle going to the Tryst'; 'A Challenge' (1876), &c.

STEELTON, in Dauphin Co., Pa., on the Pennsylvania Railroad, at its junction with the Philadelphia & Reading, three miles E. of Harrisburg. It manufactures Bessemer steel, steel rails, switches, and other articles, and has a steam flouring mill with a capacity of 500 barrels per day. Pop. 6000.

STEEN'WYCK, HENDRIK, a Dutch painter, born at Steenwyck in 1550, died about 1603. He excelled in the execution of church interiors, ablaze with tapers. His son Hendrik, called 'the Young S.,' was born about 1589, and became the friend of Vandyke, for whom he painted backgrounds. He died in London, in what year is unknown.

STEEVENS, GEORGE, an English critic, was born at Stepney, Middlesex, 10th May 1736, educated at Kingston-on-Thames and Eton, and in 1754 became a scholar of King's College, Cambridge. His first publication, *Twenty of the Plays of Shakspeare* (1766), at once secured him a position among the literary workers of his time, and Johnson gladly accepted his assistance for the edition of Shakspeare which was completed in 1773; but after the appearance of Malone's 'Supplement' in 1780, S. set to work on his own account as a rival commentator, and in 1793 he produced a corrected text of the great dramatist in 15 vols. Though the work was as remarkable for the audacity of its gratuitous alterations as for its exhibition of learning and ability, it met with complete success, and remained the standard edition till the publication of Knight's in 1838. He died at Hampstead, January 22, 1806.

STEFF'ENS, HENRIK, was born May 2, 1773, at Stavanger in Norway, entered Copenhagen University in 1790, and devoted himself to botany and mineralogy. After traveling at the expense of the Danish state in Norway (1794), and in Germany (1798), he was successively appointed lecturer at Copenhagen University (1802), professor at Halle (1804), at Breslau (1811), and at Berlin (1832), where he died, 13th Feb. 1845.

STENOCHROMY (Gr. *stenos*, 'short,' and *chroma*, 'a color;' hence a short way of coloring), a process of Polychrome Printing, recently brought to considerable perfection by Mr. Otto Radde of Hamburg. A color-block representing a picture or design is built up after the manner of a mosaic, with soapy compositions, prepared by thoroughly incorporating pure pigments with fatty substances. The color-compositions melt with heat, solidify on cooling, and possess the same specific gravity and yielding power. The method of forming the color-block is as follows:—

A shallow wooden frame of the size of the intended picture is taken, and into a portion of it, marked off with strips of brass placed edgewise, a quantity of liquid color is poured. As soon as the color has solidified, the required outline is traced on it, the brass strips are removed, and the color is cut vertically to the tracing by means of a peculiar knife. Another compartment or cell is then formed with the pieces of metal, and a second color is poured in and cut vertically as required. The same plan is followed with all the other colors; and when the picture is completed, the surface is leveled, and impressions are taken on paper of an absorbent nature with slight pressure in a kind of lithographic press. The stenochrome is finished by an overprint from a stone which marks the outlines. For highly-finished pictures from two to four over-prints are necessary to obtain proper blending effects.

STE'PHEN, JAMES, born at Pode, Dorsetshire, in 1759, of an Aberdonian family, was educated at Winchester. After serving as a parliamentary reporter, he received a post in the W. Indian island of St. Christopher's, there gained a thorough mastery of colonial law, and returning home with a large fortune became a celebrated advocate in prize cases before the Privy Council. Entering Parliament for Tralee, and appointed under-secretary for the colonies, he warmly espoused the anti-slavery cause, and for his suggestion of the successful Continental Blockade (1803) was created a master of the Court of Chancery. He died at Bath, 10th October 1832.—His son, HENRY JOHN S. (1787–1864), serjeant-at-law, was author of a *Treatise on Pleading in Civil Actions* (1824); *Summary of the Criminal Law* (1834), *New Commentaries on the Laws of England* (1841; 7th ed. by his son James S., 1874, &c.).—The third son, SIR JAMES S., born at Lambeth, 3d January

1789, having graduated LL.B. from Trinity Hall, Cambridge (1812), was called to the bar at Lincoln's Inn 1813). Appointed counsel to the Colonial Office and Board of Trade, he held these posts till 1834, when he became under-secretary of state for the colonies in Melbourne's Ministry. Ill-health obliged him to retire from office (1847), when he was knighted; but two years later he accepted a call to the chair of modern history at Cambridge, which he occupied down to his death at Coblenz, 15th September 1859.—Sir James Fitzjames S., eldest son of the preceding, was born in London, March 1829, and educated at Eton, King's College, London, and Trinity College, Cambridge, graduating B.A. (1852). Called to the bar of the Inner Temple (1854), he traveled the Midland Circuit; and becoming Queen's Counsel (1868), was recorder of Newark-on-Trent (1859–69), and legal member of the Council of the Viceroy of India (1869–72), as such being author of the Indian Evidence Act. He was knighted, and in 1875 became Professor of Common Law at the Inns of Court. In 1873 he unsuccessfully contested Dundee as a moderate Liberal. In November 1878, when the policy of the English Government in reference to the Ameer of Afghanistan was vehemently assailed, S. was one of its most unflinching champions.—His younger brother is Leslie S. (born 1832), late fellow of Trinity Hall, president of the Alpine Club, and editor of the *Cornhill Magazine*.—Sir George S., the first James S.'s youngest son, was born at St. Christopher's in 1794, and, formerly a solicitor, was called to the bar in 1849, traveling the Northern Circuit. Like his father, an earnest abolitionist, he was also active in the reform of parochial relief, the police force, and imprisonment for debt, earning thereby the honor of knighthood (1837). In 1855 he emigrated to Victoria.

STE'PHEN, St., King of Hungary (997–1038), was canonized after his death in recognition of his services as the introducer of Christianity into Hungary. An Order named after him exists in Hungary, and he is the patron of numerous churches.

STE'PHENS, Alexander Hamilton, an American statesman, was born at Crawfordville, Georgia, February 11, 1812. He was educated at the University of Georgia, and was called to the bar in 1834. After sitting for some years in the Georgia House of Representatives, he was elected a member of the United States House of Representatives, where he sat from 1843 until 1859, being a prominent member of the Democratic party. In the disputes which preceded the Civil War, while opposing the *policy* of secession, he maintained the *right* of a State to secede from the Union. On the outbreak of the struggle he became a member of the Confederate congress, and Vice-President in the Provisional Government, being afterwards confirmed in that post under the so-called 'permanent constitution.' At the end of the war he was confined for five months as a state prisoner in Fort Warren, but was released on parole in October 1865. He was twice elected to Congress, where he maintained his position as a staunch Democrat. Died at Atlanta, Ga., March 4, 1883.

STEPHENS, Ann S., Author. Born March 30, 1810, at Humphreysville, Derby, Conn. Her father, John Winterbotham, in partnership with General Humphreys of General Washington's staff, built and operated the first broadcloth manufactory in America, and for many years was the leader in that industry. She married, in 1831, Edward Stephens, a merchant of Portland, Maine, and a member of one of the old families of Plymouth, Mass. During her residence in Portland she published the *Portland Magazine*, which attained a large circulation. In 1838 she removed to New York City, where she edited *The Ladies' Companion*, then the leading periodical in the United States, and subsequently became editor of *Graham's Magazine*. About 1840 she became associate editor of *Peterson's Magazine*, in which she has remained up to the present day, and where most of her books have first appeared in serials. Her first novel issued in book-form was *Fashion and Famine*, which had an unprecedented sale, was translated in almost every European country, and placed its author in the front rank of the *littérateurs* of her date. Then followed *The Old Homestead*, *Mary Derwent*, and a succession of novels, all distinguished by vigor of style and versatility of subject, and all received with marked favor by the reading world. In fact Mrs. Stephens' career as an author is an exceptional instance of uninterrupted success in literary labor throughout half a century, during which time she has numbered among her friends most of the distinguished men and women of her day.

STEU'BENVILLE, a town of Ohio, in a district with rich deposits of bituminous coal, 70 miles from Pittsburg by rail, has 17 churches, 4 newspapers, a large nail-factory, blast furnaces, foundries, machine-shops, boiler-works, an oil-refinery, &c. Pop. (1870) 8107. Present pop. 13,800.

STEVENS, Isaac Ingalls, an American general, born at Andover, Mass., March 25, 1818, and graduated from West Point in 1839. He served with distinction during the Mexican War, winning promotion by his gallantry at Contreras, Chernbusco, and Chapultepec. In 1861 he was made brigadier-general of volunteers, and in 1862, major-general. He participated in second Bull Run, and on Sept. 1, 1862, while at the head of his division, and leading a charge against the enemy, he was shot and instantly killed.

STE'VENS, Thaddeus, an American statesman, was born at Peacham, Vermont, April 4, 1793, graduated at Dartmouth College in 1814, was admitted to the Pennsylvanian bar in 1816, and soon acquired a large practice. In the presidential campaign of 1828 he opposed Jackson, was repeatedly a member of the State Legislature from 1833, was chosen in 1836 a member of the Convention to revise the State constitution, became a canal commissioner in 1838, and took an active part in procuring for Pennsylvania a public-school system. In 1842 he was elected to Congress, of which he remained a member uninterruptedly till his death at Washington, 11th August 1868. S. was a keen anti-slavery politician, a bitter enemy of the South; and by the force of his convictions, no less than his business talents, rose to be one of the leaders of the Republican party. He played a foremost part in the famous impeachment of President Johnson.

STEVENS POINT, in Portage Co., Wis., on the Wisconsin River, and on the Wisconsin Central and another railroad. It is largely engaged in lumbering, and has flour and saw mills, planing mills, foundries, and shingle mills. Pop. 7000.

STEW'ART, Alexander Turney, an American millionaire, was born near Belfast, Ireland, 27th Oct. 1802, studied at Trinity College, and emigrated in 1818 to New York, where he taught classics and mathematics. Having lost in trade the little money he had taken with him, he returned to Ireland, disposed of some remaining property, and investing in Irish laces, returned to New York to open in Broad Street (1823) the store, which subsequently expanded into the largest dry-goods establishment in the world, with branches in England, Scotland, Ireland, France, and Germany, besides factories for woollens, carpets, hosiery, &c., in the United States, England, and Scotland, the whole employing some 8000 persons. S. also became a large holder and improver of real estate in and around New York, Saratoga, &c., and eventually acquired a fortune only, if at all, inferior to that of Astor and that of Cornelius Vanderbilt, the railway speculator. He despatched a vessel with breadstuffs to Ireland during the famine of 1846, erected the model Garden City on Long Island, near Brooklyn, established a home for working-girls in New York, and contributed large donations to the sufferers by the Chicago fire (1871) and the Franco-German War. He was president of the United States Commission at the Paris Exhibition of 1867, but took almost no other part in public affairs. He died childless, 10th April 1876, leaving his estate, with the exception of certain legacies, to his wife. A search for next of kin called forth over 2000 claims, but a more startling incident was the mysterious abstraction of the body of the deceased in November 1878. The perpetrators of this ghastly deed, still undetected, are supposed to have been actuated by the hope of ransom.

STEW'ART, Balfour, LL.D., F.R.S., an eminent physicist, was born at Edinburgh, Scotland, November 1, 1828. After passing several sessions at the Universities of St. Andrews and Edinburgh, he went out to Australia, where he engaged in business from 1852 to 1854. In 1855 he returned to England, served for a few months in Kew Observatory, of which after being for three years assistant to Forbes, professor of natural philosophy at Edinburgh, he was appointed director (July 1, 1859). He has also filled the chair of natural philosophy at Owen's College, Manchester, since July 7, 1870. As a meteorologist he enjoys a wide reputation. He is also one of the founders of spectrum analysis, being the first who experimentally established the equality between the radiative and absorptive bodies (1859). For these researches he obtained the Rumford medal of the Royal Society in 1868. In conjunction with Professor Tait he investigated the Rotation of a Disk in Vacuo (*Philosophical Transactions*, 1865–66).

STICH'OMANCY (Gr. *stichos*, 'a line,' and *manteia*, 'divination'), a form of bibliomancy in which the future is augured from lines in a book taken haphazard.

STICK'-INSECTS, the name applied to certain very remarkable insects belonging to the order *Orthoptera*, and to the family *Phasmidæ*. The body exactly mimics a small piece of dried twig, and when at rest the legs are disposed in an irregular manner so as to increase their resemblance to pieces of stick.

STIEL'ER, a famous German cartographer, was born at Gotha 26th February 1775, studied law at Jena and Göttingen, received an office in the ministerial department at Gotha in 1797, became a member of council in 1829, and died 13th March 1836. His principal works, masterpieces of art and science, are a *Hand-Atlas*, issued in conjunction with Reichard (75 maps, Gotha 1817–33; new ed. by Petermann, 90 maps, 1872), and a *Schul-Atlas* (Gotha 1821).

STILETT'O (Ital. from Lat. *stilus*, 'a pointed instrument used in writing'), a short pointed dagger introduced in the Middle Ages, and even yet well known in Southern Europe.

STILL, JOHN, D D., born at Grantham, in Lincolnshire, England, about 1543, studied at Christ's College, Cambridge, became Master of St. John's (1574) and of Trinity (1577), was made bishop of Bath and Wells (1592–93), and died 26th February 1607–8. S. has an obscure place in English literature as the supposed author of the second oldest comedy in the language, *Grammer Gurton's Needle*, a piece of low rustic humor in rhyme, turning on the loss and recovery of the needle with which Grammer Gurton was mending the breeches of her man Hodge.

STILLWATER, a city of Washington Co., Minn., at the head of Lake St. Croix. It is engaged in mercantile pursuits and the manufacture of lumber and other articles; and is surrounded by a rich agricultural region. Pop. 13,060.

STING, the name given to the offensive apparatus occurring as a terminal appendage to the abdomen of certain insects, notably the Bees, Wasps, Ants, and other *Hymenoptera*. The S. or *aculeus* is a sharp-pointed appendage protected by two lateral processes. A poison-gland communicates with the S., the secretion of this gland being introduced by the S. into the wound.

STI'PER STONES, or Arenig formation, the lowest series of rocks in the Silurian system. It consists of several thousand feet of flags, shales, and siliceous or quartzose sandstones with contemporary igneous rocks. The formation is analogous to the calciferous sandstones, &c., in the state of New York. About eighty species of fossils have been detected in the English rocks of this period, though with the exception of anelid-burrows, specimens are not abundant.

STIR'LING, JAMES HUTCHISON, LL.D., was born at Glasgow, Scotland, June 22, 1820, entered Glasgow University in 1833, and studied with distinction for nine consecutive winter sessions in Arts and Medicine, graduating in the latter faculty in 1842. He practised in Wales for some years, but on the death of his father in 1851 relinquished his profession, and devoted himself wholly to metaphysics and literature.

STIR'LING, WILLIAM ALEXANDER, EARL OF, a Scottish poet and politician, belonged to a family which since the middle of the 15th c. had been settled in Clackmannanshire, where it held the lands of Menstrie. The poet, who was the seventh baron of Menstrie, was born in 1580, in his youth traveled on the Continent as tutor and companion to the Earl of Argyle, and followed James VI. to London, where his talents and accomplishments raised him high in favor at court. Knighted in 1614, he obtained in 1621 a grant of Nova Scotia in America (though it had previously been discovered and partly occupied by the French), of which he was appointed 'hereditary lieutenant,' with the right of creating an order of baronetcy on payment of one hundred and fifty pounds. In 1626 he became Principal Secretary of State for Scotland, in 1630 was created Earl of S., and died in London, 12th September 1640.

ST. JOHNSBURY, in Caledonia Co., Vt., on Passumpsic River. It is extensively engaged in manufacturing, and the works of the Fairbank's patent weighing scales are located here. Pop. 5800.

STOCK'MAR, CHRISTIAN FRIEDRICH, FREIHERR VON, a celebrated diplomatist, was born at Koburg, 22d August 1787. He studied medicine, and practised first in his native city, and then for two years in the army. In 1816 he was appointed physician to Prince Leopold of Koburg, to whom he subsequently became private secretary. His tact, sagacity, elevation of character, and knowledge of affairs procured him the confidence of the prince, and led to his taking a prominent part in European diplomacy. Among the many delicate negotiations with which he was intimately concerned were the accession of Leopold to the Belgian throne (1831), the marriage of Prince Ferdinand of Koburg with Queen Maria II. of Portugal (1836), and the marriage of the Prussian Crown Prince with the Princess Victoria of England (1858). He was the beloved friend and trusted counselor of Prince Albert and Queen Victoria, and in Theodore Martin's *Life of the late Prince Consort* (vol. i. 1874, vol. ii. 1876) may be traced the rare qualities of head and heart which gained him alike power and popularity. Ennobled in 1821, he was made Freiherr of Bavaria in 1831. He died at Koburg, 9th July 1863.

STODDARD, RICHARD HENRY, an American poet, born at Hingham, Mass., July, 1825. He became a mechanic, but early in life began to give evidence of his poetic genius. Since 1870 he has devoted himself to literary work. Among his works are the following: *Footprints* (1849), *Adventures in Fairy Land* (1853), *Songs of Summer* (1857), *The King's Bell* (1862), *Little Red Riding Hood* (1865), *Abraham Lincoln, a Horacian Ode* (1865), *Putnam the Brave* (1869), and *Female Poets of America*.

STONE, CHARLES P., an American general, born at Greenfield, Mass., 1826, and graduated from West Point in 1845. He served throughout the Mexican war, and was promoted for gallantry at Molino del Rey and Chapultepec. In 1856 he resigned from the army, but at the outbreak of the civil war entered the Union service, and was made brigadier-general of volunteers. In 1862 he was placed under arrest and confined in Fort La Fayette for nearly a year, although no charges were made against him. He afterwards served under Gen. Banks, and was present at the siege and capture of Port Hudson. In 1864 he resigned from the army, and in 1870 entered the service of the Khedive of Egypt. He has since returned to the U. S.

STONE, PRESERVATION OF. Many processes have been devised for preventing the destruction of buildings and monuments by atmospheric influences, but as yet the results have not been entirely satisfactory. Fatty and oleaginous substances for filling the pores of the stone are efficacious only when renewed from time to time. Several inventors have employed *mineral* solutions with fair success. Kuhlmann chose an aqueous solution of silicate of potash (water-glass), and applied it to the Louvre and the cathedral of Notre Dame in Paris. Fluosilicic acid washed with an alkaline solution, alumina soap, a silicate coated with asphaltum varnish, fuller's earth in diluted hydrofluoric acid, and an alkaline silicate washed with chloride of calcium solution, have all been suggested. The last-mentioned process, Ransome's patent, has so far received most favor. The silicate is brushed over the stone, and when it has dried the other solution is applied; double decomposition takes place, and an insoluble silicate of lime is precipitated in the pores of the stone, filling them up and thereby cementing together the particles of the stone.

STONEHAM, in Middlesex Co., Mass., on the Boston & Maine Railroad, 12 miles N. of Boston. It is extensively engaged in the manufacture of shoes and leather. Pop. 6000.

STORRS, RICHARD SALTEN, D.D., an American clergyman, born at Braintree, Mass., Aug. 21, 1821, graduated from Amherst College in 1839, and from Andover Seminary in 1845. In 1846 he became pastor of the Church of the Pilgrims (Congregational), Brooklyn, N. Y., where he still remains (1884). He is regarded as one of the most scholarly and eloquent men in the American ministry. Besides numerous sermons, he has published *The Graham Lectures on the Wisdom, Power, and Goodness of God, as Manifested in the Constitution of the Human Soul* (1856), and *Preaching without Notes* (1875).

STOUGHTON, a town of Norfolk Co., Mass., on the Old Colony Railroad, 19 miles from Boston, extensively engaged in the manufacture of boots and shoes. Pop. 4875.

STOW-ON-THE-WOLD, a market-town of Gloucestershire, England, 28 miles S.S.E. of Evesham by rail, has a 14th c. parish church, a Gothic town-hall, erected (1877) at a cost of £4000, and malting and brewing industries. Pop. (1881) 1636.

STRADIVA'RI or STRADUA'RI, a celebrated violin-maker, born at Cremona in 1644, was a pupil of Nicolo Amati, in whose employment he continued till 1700. Then he started for himself, and soon surpassed all his contemporaries in the excellence of his workmanship. Even yet he has no equal. His best instruments were made between 1700 and 1730, and now command from $1000 to $3000. S. died December 18, 1737. His sons Francesco and Omobono S., possessed not a little of their father's art.

STRAIN, in kinematics, is any definite alteration in the form or dimensions of a given portion of matter. When the stress which produces the S., or the stress which is called into action by the S., is taken into consideration, the question becomes one of dynamics. In solid bodies S. is always accompanied with internal stress, and this property of exerting stress when strained is called elasticity. Thus a coiled string, or a bent bow, is an example of a strained body, and the external force which each exerts is the resultant of the stresses produced in its elements by the S.

STREATOR, a city of La Salle Co., Ill., on the Vermillion River. It has four railroads, and is an important business center. It has large glass and bottle works and is surrounded by the Vermillion coal fields. Pop. 10,000.

STREET, ALFRED BILLINGS, an American poet, born at Poughkeepsie, N. Y., Dec. 18, 1811. He began to practice law in Monticello, N. Y., but in 1839 was made state librarian, and removed to Albany. This position he held for many years. Died 1881. He published in prose *The Council of Revision of the State of New York* (1859), *Woods and Waters, or the Saranacs and the Racket* (1860), *Digest of Taxation in the U. S.* (1863), and *The Indian Pass* (1869). In poetry he published *The Burning of Schenectady, and other Poems* (1842), *Drawings and Tintings* (1844), and *Frontenac* (1849).

STREPSIRHI'NA (Gr. 'twisted-nosed'), a division of Monkeys or *Quadrumana* having twisted or curved nostrils, and found chiefly in Madagascar. The Lemurs, Aye-Aye or *Cheiromys*,

Slow Lemurs, and Loris, belong to this group, which has also received the name *Prosimiæ*. From their brain-characters as well as from their *placentation*, the Lemurs especially are believed to occupy an intermediate position between carnivora and quadrumana.

STRESS is a convenient term introduced by Profesor Rankine to express the mutual action between any two portions of matter. Thus the pressure between a table and a book resting on it is of the nature of a S., which has two aspects, according as we fix our attention upon the table or the book. With reference to the former the pressure is *downwards*, with reference to the latter *upwards*, and these two forces, which according to Newton's third law, are equal and opposite, form, when regarded as a whole, the S. Similarly the attraction of the earth for the sun and the attraction of the sun for the earth are opposite aspects of the same S., and the same can be said of all forces which obey Newton's third law, *i. e.*, of all known forces which invariably exist in pairs.

STROGAN'OFF, a noble family of Russia, descended from ANIKA S., a rich Novgorod merchant of the beginning of the 16th c., who had large possessions in the Ural Mountains, established salt manufactories, and started the trade between Russia and Siberia. His three sons, YAKOFF, GRIGORIJ, and SEMEN S. founded towns and fortified villages ('Ostrogs') on the river Kama, with their own troops defended their possessions against robber neighbors, and built fortresses in Siberia to check Mongol incursions. Semen, the youngest, supported by a nephew and by Yermak Timofeyeff, Hetman of the Don Cossacks, attacked the Mongols and took the capital Sibir (1581), with all Siberia. The S. family received now a monopoly of trade with Siberia, as well as other privileges, and from manufactories, mines, foundries, and gold washing gained great wealth, but in 1722 Peter the Great deprived its then representatives, the three brothers, ALEXANDER, NICHOLAS, and SERGEI S., of all their privileges, only conferring instead of them the title of baron.—ALEXANDER S. (1734–1811), son of Sergei, imperial chamberlain and privy councilor, was married to a relative of the Empress Elizabeth. He was made a count of the German Empire in 1761, and a Russian count in 1798.—His son, COUNT PAUL S., fought as a general against the French, and distinguished himself in 1814 at the battle at Craonne, where his only son fell by his side. He died in 1817, leaving a daughter heiress of his estates.—GRIGORIJ S., grandson of Nicholas S. (1770–1858), was in 1821 Russian ambassador at Constantinople. He was made a count in 1826, and imperial chamberlain in 1846.—His eldest son, SERGEI S., was from 1835 to 1847 curator of Moscow University, and in 1857 was appointed to direct the archæological excavations in Russia, of which he has prepared a series of valuable reports. He is also noted for his earnestness in stimulating art and science, and promoting the internal progress of Russia.—His younger brother, ALEXANDER S., born 1805, was from 1839 to 1841 minister of the interior, and in 1855 became governor-general of New Russia, with the task of restoring order in the Crimea and rebuilding Sebastopol.—His son, GRIORIJ, imperial master of the horse, in 1856 formed a morganatic marriage with Maria, Archduchess of Leuchtenberg, eldest daughter of the Emperor Nicholas.

STRONG, JAMES, S.T.D., a distinguished American scholar, born in New York, Aug. 14, 1822, and graduated from Wesleyan University in 1844. In 1858 he was made professor of Biblical literature in Troy University, and in 1868 became professor of exegetical theology in Drew Seminary, Madison, N. J. He is a member of the American committee for the revision of the English Bible. He undertook, in connection with Rev. John McClintock, D.D., the preparation of a *Cyclopædia of Biblical, Theological, and Ecclesiastical Literature*, and upon the death of Dr. McClintock, in 1870, supervised the remainder of the work.

STROSSMAYER, JOSEPH GEORG, a Croatian bishop, was born at Essek in Slavonia, 4th February 1815, and studied in the Diakovo seminary, at the University of Pesth, and, after taking priest's orders (1838), in the Vienna Augustinum. As bishop (1849) of Diakovo (a diocese including Bosnia and Syrmia), he became the head of the Croatian party in the Vienna *Reichsrath* and by his statesmanlike strivings for autonomy incurred the dislike of the imperial government. In Western Europe, however, he is chiefly known as one of the chief opponents of the Infallibility Dogma in the Vatican Council (1870), being one of the 88 who voted 'No.' His speeches, there, made Dupanloup own him his master in oratory, but their liberal sentiments respecting Protestantism called forth the cry of 'Heretic!' He has passed three winters at Rome since the promulgation of the decree, but has been wisely left to his own beliefs, since his influence over his countrymen has been rendered boundless by a princely liberality, of which his latest instance was his sending $15,000 to the Slavonic sufferers in the Russo-Turkish war.

STUART, JAMES E. B., an American general, born in Virginia, in 1833, and graduated from West Point, in 1854. He served with distinction on the frontier against the Indians, and at the beginning of the civil war entered the Confederate service, where he was placed in command of a brigade of cavalry. He soon came to be recognized as the most brilliant cavalry officer in the Confederate service. He participated in many of the engagements of the war, and died at Richmond, Va., May 11, 1864, from the results of a wound received in battle.

STUKE'LEY, WILLIAM, M.D., F.R.S., an antiquary of considerable repute, was born at Holbeach, Lincolnshire, England, November 7, 1687. In 1703 he entered at Corpus Christi College, Cambridge, whence he graduated M.B. in 1709. After residing for a time at Boston, he betook himself to London in 1717, where he was admitted fellow of the College of Physicians. In 1726 he retired to Grantham, in his native county, where he acquired a good practice, which, however, he abandoned three years afterwards for the Church, being presented to the living of All Saints', Stamford. In 1747 the Duke of Montagne gave him the rectory of St. George the Martyr, Queen Square, where he died March 3, 1765. S., who was known among his friends as the 'Arch-Druid,' was a credulous and fanciful speculator.

STUY'VESANT, PETER, born in Holland in 1602, entered the Dutch service, and as director of the colony of Curaçoa lost a leg in the attack on the Portuguese island of St. Martin. Appointed director-general of the New Netherlands (1647), he concluded peace with the Indians, in 1650 settled the boundaries of the English and Dutch possession, and in 1655 annexed New Sweden on the Delaware. His refusal to admit the protest of a convention (1653) against the revival of obsolete statues had roused a widespread discontent; and when in 1664 an English fleet appeared before New Amsterdam demanding its surrender, he found himself abandoned by his subordinates, and on 3d September the town was given up to the English, who changed its name to New York. S. next year repaired to Holland to give an account of his conduct, but soon returned, and down to his death in August 1682 lived at his farm, the Bowery, on the site of the present Bowery Street.

SUGAR-MITE, a name given to the *Tyroglyphus sacchari*, a species of *Acarina* or Mite found in unrefined sugar. The body is oval-shaped, the mandibles scissor-like, and the feet have suckers. Dr. Hassall of London reported that in 69 out of 72 samples of unrefined sugar mites were discovered. Grocer's itch is caused by these creatures. Over 500 have been found in ten grains of sugar; one pound may thus contain 100,000 sugar-mites.

SU'KHUM KA'LE, a seaport and military station in Asiatic Russia in the government of Transcaucasia, is situated at the foot of the Caucasus on the E. shore of the Black Sea. In 1831 a commercial port was established here, which has, however, been much overshadowed by Poti, 48 miles S., but it is still a station on the line of the Black Sea Telegraph, and a shipping place of the Russian steamers. On May 14, 1877, S. K. was captured after bombardment by the Turkish ironclads, and played a somewhat important part during the subsequent conduct of the war as a Turkish base of operations. Pop. (1874) 1161.

SULL'IVAN, ARTHUR SEYMOUR, an English composer, was born in London in 1844, sang when a child in the chapel-royal, and was educated at the Royal Academy of Music. At the age of fourteen he gained the Mendelssohn scholarship, enabling him to pursue his studies under the best masters at home and abroad. He composed the incidental music for the *Tempest*, performed at the Crystal palace in 1862, and since that time his works have been many and varied.

Among the most important are the cantatas of *Kenilworth* and *The Bride of Neath Valley*, a symphony in E minor, and two oratorios, *The Prodigal Son*, and the *Light of the World*. He has also composed several bright and tuneful operettas, such as *Cox and Box*, *The Contrabandista*, *Trial by Jury*, and the successful two-act comic operas, *The Sorcered* and *H.M.S. Pinafore* (1878). In the last three works Mr. W. S. Gilbert was his literary coadjutor. In 1878 S. came to America to supervise the production of *Pinafore* in New York; since which he has composed, in connection with Mr. Gilbert, the *Pirates of Penzance*. Mr. Sullivan is one of the most popular song composers of the day. He conducted the English concerts at the Paris Exhibition, and the Promenade concerts at Covent Garden, in 1878.

SULTANPORE', the chief town of the district of the same name in Oude, British India, on the Gumti River, 92 miles S.E. of Lucknow, and 59 N. of Allahabad. Pop. (1869) 5708. It was formerly the capital of the Bhars, an aboriginal tribe expelled by the Mohammedans, but it is now decaying. The military cantonments lie on the opposite side of the river. During the mutiny of 1857, the sepoys rose and murdered their officers and the civil officials, but the women had been sent beforehand safe to Allahabad.

SUMBULPUR', the chief town of the district of the same name, Central Provinces, British India, on the left bank of the

Mahanuddi river, 340 miles E. of Nagpur; pop. (1872) 11,020. The town has lately been much improved. It contains several old temples.

SUMMERFIELD, JOHN, one of the pioneer Methodists of America, born at Preston, England, Jan. 31, 1798, and became a preacher in 1818. He came to America in 1821, where he made a marked impression by his eloquence, and added materially to the growth of the Methodist Church. Died in New York, June 13, 1825. His life was written by Rev. John Holland (1829) and by Rev. William M. Willet (1857).

SUMPTER, THOMAS, an American patriot, born in Virginia, 1734, and was a prominent opponent of British oppression during the period which immediately preceded the war of the Revolution. He rendered valuable military service during the war, and was a member of the convention which adopted the Federal Constitution. He was afterwards member of Congress, U. S. senator, and minister to Brazil. Died near Camden, S. C., June 1, 1832.

SUNDEEP, an island at the mouth of the Meghna, the principal mouth of the Brahmaputra, included within the district of Noakolly, Bengal, British India. Area, 420 sq. miles; pop. (1872) 87,016. It is of recent alluvial formation, and liable to be swept by floods. By the disastrous cyclone of 31st Oct. 1876 one-half the population is estimated to have perished either of drowning or subsequent cholera. The crops are rice and betel-nuts. In the 17th c. it was notorious as the home of Portuguese pirates, who devastated all the river coasts of Bengal; and up to a late period lawlessness has prevailed, owing to the difficulties of communication with the mainland.

SUP'PLE JACK, a name given to various strong twining and climbing shrubs of the Western hemisphere. The S. J. imported into Europe from the W. Indies for walking-sticks is the barked branches of one or more species of *Paullinia* of the natural order *Sapindaceæ*. From the tough and flexible quality of these branches they are commonly employed as riding-switches in Jamaica. In the United States, S. J. is applied to *Berchemia volubilis*, a rhamnaceous twiner which ascends the highest cypresses (*Taxodium distichum*) in the Dismal Swamp.

SURAJ'AH DOW'LAH, the last of the independent Nawabs of Bengal, and the instigator of the massacre of the Black Hole. In 1756 he succeeded his grandfather, Ali Verdy Khan, a man of great ability, to whom he had behaved as a second Absalom. S. D. began his reign by plundering his wealthy relations, and within two months after his accession marched against Calcutta on some slight pretext. His object was money; and the death of 125 English prisoners in the military dungeon of Fort William was, from his point of view, an unimportant accident. The arrival of Clive and Admiral Watson caused his retreat to Moorshedabad. Peace was at first concluded, but a conspiracy among the Nawab's officers led to the battle of Plassey. After his defeat, S. D. fled up the Ganges, but he was betrayed by a *fakir* whom he had previously wronged, brought back, and killed by order of the son of Meer Jaffier, the new Nawab installed by the British. He had not completed his twentieth year, and was only fifteen months on the throne.

SUR'FACE, in mathematics, is the boundary of a solid, and has two dimensions, length and breadth. It may be conceived to be generated by the motion of a straight or curved line, just as a curve is generated by the motion of a point. Of all surfaces, the most important are those of the second order, which are intersected by a straight line in at most two points, and whose curve of section by a plane is a curve of the second order. Hyperboloids, ellipsoids, paraboloids, spheres, cones, and cylinders, and also the limiting case of two planes, are included among the so-called quadric surfaces.

SURI, the chief town of the district of Beerbhum, Bengal, British India, 109 miles N.W. of Calcutta, and 3 miles S. of the More River, pop. (1872) 9001. It is healthily situated on a gravel ridge, but has no trade or manufacture.

SUR'PLICE FEES are ecclesiastical dues payable to the English clergy on marriages, churchings, christenings, and burials.

SURR'EY, HENRY HOWARD, EARL OF, an English poet, grandson of the victor at Flodden, was born about 1517. Of his earliest years nothing is known, but in 1526 he was cup-bearer to Henry VIII., whom he attended on his famous visit to Boulogne in 1532, when the interview took place between the English and French monarchs on the 'Field of the Cloth of Gold.' In 1533 he was present at the coronation of Anne Boleyn, and carried the 'fourth sword with the scabbard upright before the king.' There is no evidence that he was entered either at Cambridge or Oxford, but his poems show an exquisite renaissance culture, which he probably owed to the liberal associations of home. 'His father is said to have been a patron of men of letters; his mother was the friend and protector of Skelton, who celebrates her bounty in the *Crown of Laurel;* and amongst the close circle in whose society his boyhood was passed were such men as Lord Berners, the translator of Froissart, Vere, Earl of Oxford, Lord Stafford, Lord Morley, and others equally distinguished by their literary attainment.' In 1536 S. lost his dear friend and brother-in-law, the Duke of Richmond. To this period belongs the romantic but unhistorical episode in his career—his visit to Italy in the character of knight-errant to assert the peerless charms of his mistress Geraldine—a story which first appeared in Nash's *Unfortunate Traveler, or Life of Jack Wilton* (1594), and was first exploded by Dr. Nott in his elaborate edition of Wyatt and S. (1815). In 1535 S. was in fact married to the Lady Frances Vere, and his eldest son, Thomas, was born in the following year at the very time the poet is represented as tilting in the lists at Florence in honor of a paramour who was only seven years of age! In 1537 S. was a chief mourner at the funeral of Lady Jane Seymour; in 1540 he took part in the tourneys held at the marriage of Anne of Cleves, and in September 1541 he was appointed along with his father joint-steward of the university of Cambridge. In the wars with France (1544–46) S. was a commander and achieved some brilliant successes, but a disaster that happened to his troops at St. Etienne in January 1545–46 was made the occasion of his recall; the fierce hostility of the Hertford family (then highest in royal favor), encouraged by groundless rumors of S.'s 'designs upon the throne,' resulted in a charge of treason. The soldier-poet was condemned to death 13th January 1547, and on the 21st of the same month was beheaded at Tower Hill in the thirtieth year of his age.

SWALLOW-TAILED BUTTERFLY and MOTH, the name of the *Papilio Machaon*, a large and beautiful genus of butterflies, and of the *Durapteryx Sambucaria*, a common English moth. In both insects the hinder wings are prolonged to form pointed tails or projections, from which their popular names are derived. The larva of the S.-T. M. is of a reddish color, and is usually found on such trees as willows and elders.

SWAN'AGE CLAY, a thin deposit of Middle Purbeck age, very remarkable for the fossil remains of mammalia which it contains, about fifteen species having been described by Dr. Falconer and Professor Owen. Only about eight species besides have been obtained from the whole range of Secondary rocks. They appear for the most part to be referable to insectivorous marsupials.

SWIND'LING, a popular term used to denote fraudulent procedure—especially when the deception is gross and the rascality marked.

SWINTON, WILLIAM, an American writer, born at Edinburgh, Scotland, April 23, 1833, came to America when ten years old, and was educated at Amherst College. He became professor of belles lettres in the University of California. He has published—*Rambles Among Words* (1859), *Campaigns of the Army of the Potomac* (1864), *The Twelve Decisive Battles of the War* (1870), *History of the New York Seventh Regiment during the Rebellion* (1870), and *Word Analysis* (1872).

SYLVES'TER, JAMES JOSEPH, F.R.S., a distinguished mathematician, was born at London, England, September 3, 1814. He graduated second wrangler at Cambridge in 1837, but being a Jew, was disqualified from entering for the Smith's Prize. He was professor of natural philosophy in University College, London, till 1855, when he became professor of mathematics at the Royal Military Academy, Woolwich. In 1876 he was appointed to the mathematical chair at Johns Hopkins University, Baltimore, Md. His numerous valuable papers are of great originality; and to him and Cayley the development of the higher algebra is mainly due. His best work is the application of the chemical atomic theory as an illustration of the theory of invariants and covariants of binary quantics, published in the *American Journal of Mathematics* (parts I. and II. 1878).

SYN'CRETISM (Gr. *syn*, 'together,' and Lat. *cerno*, 'to perceive'), was a term first used by the Calvinist, David Pereus, in his work *Irenicon* (1614), in which he made an attempt to allay the spirit of dissension to which the Reformation had given rise. The Lutheran George Calixtus, however, took a more prominent part in the work of reconciling the separated parties, and gave rise to the so-called Syncretistic Controversy. The real aim of the teaching of Calixtus was to induce the three leading branches into which the Church was divided—the Roman Catholic, Reformed, and Lutheran—to abstain from their mutual hatred and enmity, and to cultivate mutual love and goodwill. His opponents supposed or represented it to be that he wished the three to unite and form one body. See Gass, *G. Calixt. und der Synkretismus* (Bresl. 1846).

SYNE'SIUS, the Philosopher, was born of Heracleid descent about 370 A.D., at Cyrene, a city of the Libyan Pentapolis. There he passed his boyhood, and after brief military service repaired to the famous Alexandrian schools, where he became Hypatia's favorite pupil. A visit to Athens ended in disappointment. 'Athens retaining nothing of splendor but a name that once was

famous;' he returned to Cyrene, and in 397 was sent on an embassy to Arcadius at Constantinople, his residence the next three years.

The extant oration, *Peri Basileias*, a bold discourse on a ruler's responsibilities, received the emperor's approbation, and won great privileges for the Pentapolis. At Constantinople he may have heard St. Chrysostom, and when in 403 he revisited Alexandria, the Patriarch Theophilus induced him formally to become a Christian neophyte, and marry a Christian wife. This marriage, and his still semi-pagan opinions, stood in the way of his accepting the bishopric of Ptolemais, to which he was elected in 409; but when Theophilus consecrated him a twelvemonth later, he seems to have renounced the married state. His episcopate, marked by the fearless excommunication of Andronicus, tyrannical governor of the Pentapolis, and by his steadfast opposition to the Arians, was short, since he died, according to Druon, in 413. The 'Squire Bishop'—as Kingsley styles S. from his love of field sports—became, like Tillotson, 'a father of the Church without having been her son;' and his works, those even after his conversion, retain the literary cult of Paganism. We have by him two homilies, ten hymns, 157 charming letters (394–413), some fantastic Neo-Platonic treatises, &c., but of the dramas mentioned by himself not one survives. The best complete edition is Morell's, with Petavius' Latin rendering (2d ed. Par. 1640), and there is an excellent French translation by H. Druon, with a biography prefixed (Par. 1878).

SYR'IAC LANGUAGE AND LITERATURE.—The Syriac language belongs to the Northern or Aramaic branch of the Semitic Languages. In the 1st c. A.D. it was developed by Christians into a written language, but from that time it was gradually supplanted by Arabic, and it now exists only in the corrupt dialects about the lakes Urmiah and Van, kept alive by the efforts of missionaries. The best grammar of this 'modern S.' is by Nöldeke (Leip. 1868). From the Syriac chirography, which, in its oldest form, the 'Estrangelo,' was once widely diffused in Asia Minor, were derived not only the Kufic Writing of the Arabs (from which the Arabic, Persian, and Turkish alphabets have sprung), and the Zend and Pehlevi writing of the Iranians of the time of the Sassanidæ, but also through the medium of the Nestorians, the chirography of the Ugrians, Mongols, Kalmuks, and Mantchus. The extant Syriac literature is almost exclusively Christian, composed after Greek models, and containing many words of Greek origin. Its oldest classic specimen is the Peshito. Its poetry wholly consisted of unrhymed hymns, of which the chief writers were Bardesanes and his son Harmonius. The golden age of Syriac literature dates from Jacobus, Bishop of Nisibis (died A.D. 350) to Ibas, Bishop of Edessa (died A.D. 470), the great schools of which two cities were, down to the middle ages, the centers of Syriac learning. The greatest writer of this period was Ephraem Syrus.

From the 4th c. Syriac literature is mainly translations of Greek philosophical and scientific works, which formed the basis of the Arabian writings of the 8th and 9th centuries, that through Spain carried Eastern learning to Western Christendom. From the 10th c. it declined, and in the 13th its last great writer was Bar-Hebræus. The chief collections of Syriac MSS. are in the Vatican, the Bibliothèque Nationale, the Bodleian, and the British Museum. The best Syriac grammars are by Uhlemann (2d ed. Berl. 1857); Hoffmann (2d ed. by Merx, 1867–70); the best Syriac chrestomathies (with vocabularies) by Bernstein and Kirsch (2 vols. Lond. 1867); Rödiger (2d ed. Halle 1868), and Martin (Par. 1875).

SYZYGY, in astronomy, occurs when the sun, moon and earth are in one line, so that when the moon is new or full it is said to be in S.

SZARVAS, a town of Hungary, on the Körös, a tributary of the Theiss, about 90 miles south-east of Pesth. It lies in the center of a swampy district. Bee-keeping is one of the principal industries of the inhabitants. Pop. (1870) 18,917.

T.

TABA·NUS, a genus of *Diptera* or flies, including the gad-flies, clegs, &c. The *T. borinus*, or large gad-fly, is a familiar species, which greatly irritates cattle. These flies abound in spring and summer. Their proboscis is esserted, and the antennæ are 3-jointed. In tropical countries the species of this genus attain their largest size.

TABOR COLLEGE, an educational institution, at Tabor, Fremont Co., Ia., incorporated in 1866, and controlled by the Congregationalists. It has two buildings, 234 acres of land, and a small endowment.

TAC'NA, in full, SAN PEDRO DE TAC'NA, a town of southern Peru, in a fertile valley, 2000 feet above the sea, has a considerable trade. A railway 39 miles long connects it with the port of Arica. Pop. 15,000.

TAIT, PETER GUTHRIE, a Scottish mathematician and physicist, was born at Dalkeith, April 28, 1831. He was educated at the Edinburgh Academy, and after studying for one session at the University of Edinburgh, proceeded to St. Peter's College, Cambridge, where he graduated as Senior Wrangler and First Smith's Prizeman in 1852, and was shortly after made a fellow of his college. In 1854 he became Professor of Mathematics at Queen's College, Belfast, and in 1860 was elected to the natural philosophy chair at Edinburgh.

His experimental investigations into the thermal conductivity of metal bars, and into the thermo-electric relations of metals through wide ranges of temperature, are published in the *Transactions* of the Royal Society of Edinburgh. He is best known, however, for his more purely mathematical researches, including many quarternion applications and an elaborate paper on *Knots*. In conjunction with Steele he has written *Dynamics of a Particle* (1856); is joint author with Sir W. Thomson of the first volume of a projected exhaustive *Treatise on Natural Philosophy* (1867); and with Shairp and Adams Reilly of *Life and Letters of Principal Forbes* (1873). His *Quaternions* (1867) is the best introduction to the subject, and his *Thermodynamics* (1868), and *Recent Advances* (1876) are models of two distinct scientific literary styles—the one designed for science students, the other for general readers. The *Unseen Universe* (1874) and its sequel, *The Parodoxical Philosophy* (1878), by Balfour Stewart and T., aim at proving, from consideration of the physical principle of 'Continuity,' that science and religion are not inconsistent with each other.

TAI-YUAN', a town of China, capital of Shan-si, on the Fuen-Ho, an affluent of the Hoangho, 250 miles S.W. of Pekin. For many years the residence of the emperors, it is noted for its magnificent mausoleums. The chief manufactures are sword-blades and knives. Pop. estimated at 300,000, has been greatly reduced by the famine of 1875–78.

TALBOT, SILAS, an American soldier, born in Rhode Island in 1750; entered the Colonial service at the outbreak of the Revolution; distinguished himself by his bravery at several engagements, particularly at Fort Mifflin; and rendered gallant services upon the sea, capturing the English vessels *The Lively*, *The King George*, and *The Dragon*. He was a member of the N. Y. legislature, and member of Congress in 1793. The latter portion of his life was spent in New York city, where he died June 30, 1818.

TALFOURD, SIR THOMAS NOON, born at Doxey, near Stafford, England, January 26, 1795, was educated by Dr. Valpy at Reading, studied law under Mr. Chitty, was called to the bar at the Middle Temple in 1821, and rapidly rose in his profession. He represented the borough of Reading from 1835 to 1841, and again from 1847 to 1849, and in the latter year was appointed justice in the Court of Common Pleas. While charging the grand jury at the Stafford assizes he was struck with apoplexy, and shortly after expired, March 13, 1854. T. was an eloquent, able, and laborious lawyer, but his fame rests mainly on his four tragedies—*Ion*, produced by Macready at Covent Garden in 1836; *The Athenian Captive* (1838); *Glencoe, or the Fate of the Macdonalds* (1840); and *The Castilian*, which never appeared on the stage. All these bear witness more or less to the author's deep and fervent study of the Greek drama on the one hand and the poems of Wordsworth on the other—*Ion* being perhaps the finest of the four.

TALLART, CAMILLE, COMTE DE, was born of an ancient Dauphiné family, 14th February 1652, and entering the army, rose rapidly, thanks to his natural talents and to his cousin, Marshal Villeroi. As early as 1674 he commanded a corps at Mülhausen, and having served under Turenne in Elsass, been

wounded at Rheinfelden, and raised to the rank of major-general (1688), he led an army over the frozen Rhine (1692), and mastered the Rheingau at a blow. As skillful a diplomatist as soldier, he helped to negotiate the Peace of Ryswyk (1697), and was employed by Louis to bring England over to the Partition Treaty. It failed to avert the War of the Spanish Succession, in which, under Bouffler, T. signalized himself at Kaiserswerth (1701) and Nymwegen (1702), capturing Trier, forcing Alt-Breisack to capitulate, and stripping the Prince of Hessen-Kassel of the Palatinate. Created Marshal (1703), and with Marsin despatched to command the French troops in Bavaria, T. lost against Marlborough and Prince Eugene the battle of Blenheim (1704), where with 15,000 of his men he fell into the hands of the English. During seven year's captivity in London he managed to secure the favor of Queen Anne, and largely contributed to the recall of his conqueror Marlborough; so when in 1711 he was released without either ransom or exchange, Louis XIV. welcomed him with the title of Duc d'Hostun. He became Minister of State (1726), and died May 30, 1728, leaving behind him the *Campagnes du Maréchal de T.* (Amst. 1762).

TALL'IS, THOMAS, the father of English cathedral music, was born about 1529. During the reigns of Henry VIII. and Queen Mary, he was a gentleman of the chapel-royal, a position more important than his salary of 7½*d.* a day might indicate. On the accession of Queen Elizabeth T. seems to have embraced the Reformed faith and to have become organist of the chapel. He published in 1575, in connection with Byrd, *Cantiones Sacræ*, a collection of anthems and hymns, which was protected for twenty-one years by the first patent of the kind ever issued. He set to music the portion of the English liturgy which is now sung, including the morning, evening, and communion service, and the litany and responses. His style was learned, grave, and devout, and he may be considered altogether the greatest English composer before the days of Henry Purcell. That he was a master of counterpoint is proved by his extraordinary *Song of Forty Parts* (8 separate trebles, 8 mezzo-sopranos, 8 counter-tenors, 8 tenors, and 8 basses), which, abounding with subjects of fugue and imitation, extends to 138 bars in *allabreve* time. There are extant his *Order of Daily Service* (edited by Bishop, 1843, and by Rimbault, 1847), *Full Cathedral Service* (edited by Rimbault, 1847), and *Order for Morning Prayer, with the Litany Noted* (new ed. 1854). T. died November 23, 1585, and was buried in the old parish church of Greenwich.

TALLMADGE, BENJAMIN, an American patriot, born on Long Island, in 1754; entered the Colonial service at the beginning of the war for independence; and rendered valuable service, by his brilliant and daring capture of a company of 500 tories at Lloyd's Neck, and the capture of Fort George at Oyster Bay. He served under Washington in several of the principal engagements of the war, was a member of congress (1801–17), and died in Connecticut, March 7, 1835.

TALMAGE, THOMAS DE WITT, D.D., a prominent American clergyman of the Presbyterian Church, born at Boundbrook, N. J., Jan. 7, 1832, graduated from New York University in 1853, and from the seminary of the Reformed (Dutch) Church in 1856. He became pastor of the Reformed church of Belleville, N. J., in 1856; removed to Syracuse, N. Y., in 1859; removed to Philadelphia, Pa., in 1862; and became pastor of a Presbyterian church in Brooklyn in 1870. By his eloquence he has drawn about him a large congregation, his church now having the largest membership of any of his denomination in America. The edifice in which he preaches, known as the Brooklyn Tabernacle, seats 4000 people. His sermons are noted for their evangelical sentiment, and are printed every week by papers both in America and England. He has published *The Almond Tree, Crumbs Swept Up, Abominations of Modern Society, Around the Tea Table, Old Wells Dug Out, Sports that Kill*, and *Every Day Religion*.

TÁLÚK', properly TAALLU'QAH, an Arabic word implying dependence, used through India for a species of land-tenure. In Bengal Proper the T. is an estate subordinate to the *zemindary* or estate in chief; one class pays its revenue direct to Government, the other only through the *zemindar*. In the N. W. Provinces the term is applied to an estate divided between several proprietors, superior and inferior, of whom the latter pay revenue through the former. In Oude the term is used of the great landholders, some of whom have the title of Rajah or Maharajah, and immense incomes. In Madras, a T. is merely a large revenue division. The holder of a T. is called a *talukdar*. See Wilson's *Glossary of Indian Terms* (1851).

TAMAQUA, a town of Schuylkill Co., Pa., on the Tamaqua River and the Philadelphia & Reading Railroad. Coal is found in the vicinity, and some manufacturing is carried on. Pop. 5730.

TAM'MANY SOCIETY, an association organized in the City of New York, May 12, 1789. It took its name from a chief of the Delaware Indians, named Tammany. Branch societies were organized in Philadelphia and other cities, and the objects of the order were of a charitable and benevolent character. These organizations, however, soon died out, with the exception of the New York society, which was converted into a political institution. It was as the leader of the Tammany Society that William M. Tweed gained an ascendency in the Democratic party, which made him dominant not only in the City of New York, but also in the State, and which enabled him to conduct a most gigantic system of frands in the government of the City of New York, for the enrichment of himself and his political associates. After the overthrow of Tweed, the society was reorganized, and it is still a strong political power, under the leadership of John Kelly. The building of the Society is located on Fourteenth Street, in New York.

TANDAH, a town in the district of Fyzabad, Oude, British India, 3 miles from the left bank of the Ghogra River, 60 miles S.W. of Lucknow. It is the seat of the largest weaving colony in the province, who manufacture both coarse cloth and fine muslin. Pop. (1869) 13,543.

TANEY, ROGER BROOKE, LL.D., a distinguished American jurist, born in Calvert Co., Md., March 17, 1777, and graduated from Dickinson College in 1795. In 1799 he began to practice law in his native county, and rapidly rose to prominence in that profession. After filling various political positions, he was, in 1835, made Chief-justice of the United States, which position he held until the time of his death. Mr. Taney was an able jurist, but his prejudices were strongly in favor of the South, and he made himself very unpopular at the North by his decision in the Dread Scott Case, and by a decision, made in 1861, where he held that President Lincoln had no authority to suspend the writ of *habeas corpus*. Died at Washington, Oct. 12, 1864.

TANN, LUDWIG, FREIHERR VON, a general in the Bavarian army, was born at Darmstadt, June 18, 1815, and entered the Bavarian service as lieutenant in 1833. In 1840 he became first-lieutenant of the staff, and in 1844 of the adjutant to the Crown Prince Maximilian, whom he accompanied on his travels in Greece. In 1848 he led a troop of volunteers in the revolt of Slesvig-Holstein against Denmark, and distinguished himself at Hoptrupp and at Düppel. Shortly before the conclusion of the war he returned to Bavaria, where he became successively colonel in 1850, major-general in 1855, general adjutant of the king in 1859, and in 1860 lieutenant-general and commander of a division. In the war of 1866 he acted as chief of the staff of Field-Marshal Prince Karl, and in 1869 became general of infantry with the command of the First Bavarian army corps, which took a distinguished part in the battles of Wörth, Beaumont, Sedan, and Orleans. He was, however, forced to retreat from Orleans, and received on the 9th November a severe defeat from General Aurelle, losing 10,000 prisoners and two guns, and being driven back to Artenay. The arrival of reinforements under the Grand Duke of Mecklenburg enabled the German army to recover their position, and T. earned fresh glory for himself at Baroches-les-Hautes, Orleans, and Beaugency. After the war he resided at Munich as general-commandant of the first army corps.

TANN'AH, the chief town of the district of the same name, in the Bombay Presidency, British India, 24 miles N. E. of Bombay by rail; pop. (1872) 14,299. The first railway in India was opened from Bombay to T. in 1853.

TANN'ER, THOMAS, born at Market-Lavington, Wiltshire, England, 25th Jan. 1674, after studying at Queen's College, Oxford, obtained an All Souls' fellowship. He became rector of Thorpe in Norfolk (1701), canon of Ely (1713), archdeacon of Norfolk (1721), canon of Christ Church (1724), and Bishop of St. Asaph (1732), dying at Oxford, 14th Dec. 1735.

TÁNTIA TÓPÍ ('the weaver who became an artilleryman'), the most energetic of the rebel ringleaders during the Sepoy Mutiny of 1857. He commenced as a lieutenant of Nana Sahib, of whom he is said to have been a relation; but after the latter had fled into Nepaul, he continued the war for several months, retreating with great rapidity through Bundelcund and Central India, but was finally captured, tried, and hanged in April 1859. T. T. was the last armed rebel in the field.

TAPPAN, ARTHUR, an American philanthropist, born at Northampton, Mass., May 22, 1786, and during most of his life was engaged in mercantile pursuits, first in Montreal, Canada, and after 1812 in New York. He was one of the organizers of the American Tract Society, and gave largely for religious and charitable purposes. He was for some time connected with the American Anti-Slavery Society, to which he was a liberal contributor, but withdrew from it, when disunion was favored as a remedy for slavery. Died at New Haven, Conn., July 23, 1865.

TAPPAN, HENRY PHILIP, D.D., an American divine, born at Rhinebeck, N. Y., April 23, 1805; educated at Union College (1825) and Auburn Theological Seminary; was pastor of churches in Schenectady, N. Y. (Reformed), and Pittsfield, Mass. (Congre-

gational); became professor of moral philosophy in the University of New York (1832), and chancellor of Michigan University (1852), which position he resigned in 1863. He is the author of several philosophical and theological works.

TAS'MAN, ABEL JANSSEN, a celebrated Dutch navigator, was born probably at Hoorn, about 1600. Commissioned by Van Diemen, the governor of the Dutch Indies, to explore the S. coast of the Australian continent, he left Batavia with two ships, August 14, 1642, passed Mauritius October 8, and on November 24 discovered a coast which he called Van Diemen's Land, but which is now known as Tasmania. He sailed along its S. and E. coasts without being aware of its insular character, and proceeding further E. discovered (December 13) the southern island of New Zealand (January 6), the Fiji Islands, returning to Batavia, June 15, 1643. His account of this voyage was reprinted at Amsterdam in 1722. On the 29th January 1644 he set out on a second voyage to explore the coasts of New Guinea and Australia, from which he never returned.

TASSO'NI, ALESSANDRO, an Italian poet, born at Modena in 1565, studied law at Bologna and Ferrara, became secretary of Cardinal Colonna in 1597, and accompanied him to Spain in 1600. In 1612 he entered the service of Carlo Emanuele of Savoy, for whom he had a high regard, but he was soon forced by the intrigues of his political enemies to give up his position. In 1626 he obtained the office of secretary to Cardinal Lodovisio, and after the Cardinal's death he was appointed in 1632 chamberlain to Francis I of Modena. By his hostile *Considerazioni sopra le Rime del Petrarca* (Modena 1609) he acquired the name of *Petrarchomastix;* in his *Pensieri Diversi* (Rome 1612) he made a similar attack on Homer and Aristotle, and maintained that in everything—in literature as well as in science—the moderns had the pre-eminence; and in the *Secchia Rapita* (Paris 1622), a mock-heroic poem ostensibly describing the contest that arose from the rape of a Bolognese bucket by the people of Modena, he treats everything ancient as old-fashioned, and indulges in hilarious but cynical mockery of the general round of human life. His patriotism was severely wounded by the encroachments of the Spanish power, and in his *Filippiche* (Lat. ed. 1878), and his *Manifesto* (Flor. 1855), he laments the decay of Italian independence. T. died at Modena in 1635. The *Secchia Rapita* is his most popular work; it is regularly reprinted from time to time. A collection of his letters by Gamba appeared at Venice (1827).

TATT'IES (from a Sanscrit word *tat*, 'canvas'), the screen of matted grasswork which is placed before the open doors and windows in most parts of India during the season of the hot winds, and constantly wetted with water to cool the air by evaporation.

TAVI'RA, a seaport in the S. of Portugal, province of Algarve, on both banks of the Rio Sequa, about equi-distant (20 miles) from Faro on the W. and the Guadina on the E. It has a Moorish castle, two collegiate churches, a richly-endowed hospital, and good sardine and tunny fisheries. Pop. 9000.

TAY'LOR, JOHN, styled by himself 'The King's Majesty's Water-Poet,' was born in Gloucester, England, about 1580. After serving in sixteen voyages, having been with Essex at Cadiz and the Azores, he began to ply as a waterman on the Thames, at the same time keeping a public-house, and soon became known as a humorist and a writer of doggeral verses which he hawked about for sale. The most memorable incident in his life, however, was his traveling on foot from London to Edinburgh, 'not carrying any money to or fro, neither begging, borrowing, or asking meat, drink, or lodging.' He set out on the 14th July 1618, and reached Edinburgh on the 13th of August. This journey was believed by Ben Jonson to have been undertaken 'in malice or mockage' of him on account of his similar journey shortly before; yet, meeting him at Leith, Ben presented T. with 'a piece of gold of two-and-twenty shillings to drink his health in England.' In 1630 T. published *All the Works of J. T., being Sixty and Three in Number*, but before his death in 1654 he had produced 138 separate publications.

TAY'LOR, JOHN, D.D., born in Lancashire, England, in 1694, was educated at Whitehaven, and obtained his degree from a Scotch university. He acted as pastor for many years to a Norwich Unitarian congregation, but 1757 became tutor in the academy of Warrington, where he died, March 5, 1761.

TAY'LOR, MEADOWS, an Anglo-Indian author and administrator, was born at Liverpool, England, 25th September 1808, and exchanged the drudgery of a merchant's office for a situation in a so-called merchantile house in Bombay, where he was rescued from becoming 'Baxter's shopboy' through the kindness of a relative, Mr. Newnham, then chief secretary to the local government, who procured him a commission in the Nizam's army. In Hyderabad he set himself to earnest study of the languages, and was for four years (1826–30) in charge of a large district of the Nizam's dominions. After a visit to England (1838–40) he was placed in charge of Shorapore, a small state tributary to the Nizam, and here, as in the district of Nuldroog, to which he was transferred in 1850, he labored with a zeal, wisdom, and benevolence which made him 'a ministering angel to a population whose last refuge from unbearable tyranny was a migration into British territory.' In the crisis of the Mutiny he was sent to preserve order in Berar, and in 1860 was driven home by failing health. He had risen to the rank of colonel, and was selected by the Queen herself for a Companionship of the Star of India. After a brief visit in 1875 to the scene of his early labors, he died at Mentone, May 13, 1876.

TAY'LOR, NATHANIAL WILLIAM, D.D., an American divine, born at New Milford, Conn., June 23, 1786; educated at Yale College (1807); entered the ministry in 1812; and became professor of didactic theology in Yale seminary in 1822, which position he held until the time of his death, March 10, 1858. He published, besides sermons, *Lectures on the Moral Government of God* and a volume of lectures and essays.

TAY'LOR, THOMAS, 'the Platonist,' was born in London, England, 15th May 1758, and destined for the Dissenting ministry, received three years' schooling at Paul's. Poverty forced him to accept a clerkship at Lubbock's Bank, but all his leisure he gave up to study, and published in 1787 the *Hymns of Orpheus*, first of a series of classical, and mainly philosophical, translations. Besides occasional papers, he issued in the years 1780–1834 no fewer than 37 different works, in 63 volumes (one-third of them large quartos). Some, published by patrons, belong by their history to the curiosities or amenities of literature; others, for which he was paid by booksellers, to its calamities. Thus his *Pausanias* (3 vols. 1794) brought him but £18; *Plato* (5 vols. 1804) lay for forty-four years entombed at Arundel Castle; whilst *Aristotle* (9 vols. 1812), whose edition was limited to fifty copies, gained him a pension of £100 from Mr. Meredith, a retired tradesman. This T. enjoyed down to his death at Walworth, his residence for forty years, 1st November 1835.

TAY'LOR, TOM, journalist and dramatist, was born at Sunderland, England, in 1817. He was educated at Glasgow University, and at Trinity College, Cambridge, where he gained a Fellowship, and took the third place in the Classical Tripos of 1840. In 1845 he was called to the bar at the Inner Temple, and began to go the Northern Circuit, but soon relinquished the legal profession, and become a leader-writer for the *Morning Chronicle* and *Daily News*, at the same time doing much work as a dramatist. T. was one of the earliest contributors to *Punch*. T. has written over 100 dramatic pieces, nine-tenths of which, he himself declares, are perfectly original. Died in 1880.

TAY'LOR, WILLIAM, 'of Norwich,' born in that city in 1765, was educated at Palgrave by Mrs. Barbauld's husband, and in 1779 entered his father's counting-house. Two visits to the Continent made him familiar with French, Italian, and German, and commerce he soon exchanged for an assidnous study of the last-named literature, which he had the honor of introducing to his countrymen. Translating, at first an amusement, was rendered a necessity by mercantile losses, and during his later years T. was a voluminous contributor to the *Monthly Review*. Died at Norwich, in March 1836.

TCHERKA'SI, a town in the government of Kiev, Russia, on the Dnieper, 110 miles S.E. of Kiev. It has 6 Russian, 1 Protestant, and 1 Roman Catholic, churches, a synagogue; manufactures beet-root sugar, and trades with France and Germany in wool, linen, spirits, cereals, and cattle. Pop. (1875) 13,914.

TECUMSEH, or TECUMTHA, an American Indian chief of the Shawnee tribe, born in Ohio, about 1770. He participated in several battles between the settlers and his tribe, and in 1805 attempted to organize a great Indian confederacy for the purpose of resisting the whites. He collected a considerable force, but was defeated by Gen. Harrison at the battle of Tippecanoe, Nov. 7, 1811. In the war of 1812 he served with the English, to whom he rendered valuable assistance, and by whom he was made brigadier-general. He was killed in battle, Oct. 5, 1813. His life has been written by Benjamin Drake (1841).

TEESTA (*Tista*), a large river of N. Bengal, India, which rises in the Thibetan Himalayas, and after breaking through Sikkim in a fine gorge flows S.E. into the Brahmaputra after a total course of 313 miles. It used formerly to flow S.W. into the Ganges, but the main stream was diverted by a great flood in 1785. The T. has a large traffic in rice, jute and tobacco.

TEJUCIGAL'PA, a town of Honduras, Central America, on the Rio Grande, 40 miles S.E. of Comayagua, is the capital of a department of the same name, and contains a university and cathedral. Though it has decayed considerably, owing partly to the emigration of some of the Spanish families, and partly to the exhaustion of the gold and silver mines, it is still an important city. Pop. 12,000.

TEL-EL-KEBIR (the 'Great Mound'), situated on the border of the Egyptian desert, 80 miles from Ismailia, was strongly forti-

fied by Arabi Pasha to check the advance of the British under Sir Garnet Wolseley. By a midnight march (September 12, 1882) the British general here surprised, and within two hours utterly routed the Egyptians, and so finished the campaign.

TELEOS'TEI, a well-known order of fishes, including all familiar food-fishes, and such generally as have a well-developed bony skeleton. The T. include the Malacopteri, Anacanthini, Acanthopterygii, Lophobranchii, Plectognathi. *Fossil T.* are first found in the Cretaceous rocks, and exist in their maximum development in the oceans of to-day.

TELL'ICHERRY, a town in the district of Malabar, Madras Presidency, British India, 325 miles E.S.E. of Madras, and 64 N. from the railway terminus at Beypore. An English factory was established here as early as 1708. T. is celebrated for an unsuccessful siege (1779–82) by the troops of Hyer Ali. It is now an active seaport, chiefly for the export of coffee, sandalwood, and cardamoms from the Wynaud, and the import of rice. Pop. (1871) 20,504.

TEM'PLE, Frederick, born in England, 30th November 1821, from Tiverton grammar-school gained a Balliol scholarship, and having taken a double first (1842), was elected fellow and mathematical tutor. Ordained in 1846, he became principal of the Training College at Kneller Hall near Twickenham (1848–55), and head master of Rugby (1858–69). A liberal in politics, a 'Broad Churchman' in theology, T. wrote one of the famous *Essays and Reviews* (1860), that on the 'Education of the World,' and his appointment to the see of Exeter in 1869 was met by strong though unavailing opposition. He has published *Sermons Preached in Rugby Chapel* (1858–60; new ed. Lond. 1867).

TENN'ENT, Sir James Emerson, son of William Emerson, a rich Belfast merchant, was born at Belfast, Ireland, 7th April 1794, graduated B.A. at Trinity College, and traveled through Europe and the Levant (1824–25). In Greece he met Byron, whom he emulated in enthusiasm for the Hellenic liberation. He wrote *A Picture of Greece* (1826); *Letters from the Ægean* (2 vols. 1829), and a *History of Modern Greece* (2 vols. 1830). In 1831 he was called to the bar, but never practised, as in the same year he married the daughter and heiress of Mr. W. Tennent, a rich Belfast banker, whose name and arms he assumed. Returned to Parliament by Belfast in 1832, he at first supported Lord Grey, but withdrawing from the Whigs with Lord Stanley and Sir James Graham in the Derby 'dilly,' he ever after followed Peel as a Liberal-Conservative. He was secretary to the Indian Board, 1841–45, to the Colonial Government of Ceylon, 1845–50, to the Poor-Law Board, 1852, and to the Board of Trade, 1852–67. On his retirement from official life in 1867 he was rewarded with a baronetcy. He died in London, 6th March 1869.

TEN'TACLES, the name given to the tactile appendages common in lower animals (*e. g.*, sea-anemones, corals, zoophytes, &c.), and which subserve prehension and touch, or both of these.

TERAI' or TURRYE', the name for the narrow strip of swampy jungle which uniformly underlies the lowest ridge of the Himalaya Mountains in the N. of India, continuously from Kumaon to Assam. This is about 15 miles wide, and is kept perpetually moist by rivulets, and by infiltration from a peculiar bed of boulders and sand, called *bahbar*, which immediately adjoins it above. It is overgrown with jungle and enormous grasses, the home of tigers and other wild beasts. At no time can it be healthy, and at certain seasons of the year the malaria is absolutely fatal to strangers, though the aboriginal tribe of Therus seem to flourish. Proceeding from the W., the first portion lies in the Rohilcund division of the N.W. Provinces, forming the *district* of T., with an area of 920 sq. miles, and a pop. (1872) of 185,658; the chief town is Kashipur. The next portion, bordering Oudh and Behar, lies chiefly within Nepaul territory. The third piece was annexed from Bhotan after the war of 1864, and is known as the E. and W. Duars.

TERHUNE, Mary Virginia Hawes, an American authoress, born in Amelia Co., V., about 1835, and in 1856 married Rev. Edward Payson Terhune, D.D. She is best known by her *nom de plume*, 'Marion Harland.' She began to write early in life, and has published *Alone* (1854), *The Hidden Path* (1855), *Moss Side* (1857), *Miriam* (1860), *Nemesis* (1860), *Husks* (1863), *Husbands and Homes* (1865), *Sunnybank* (1866), and others. She now (1885) resides in Brooklyn, where her husband is pastor of a prominent Reformed church.

TERRY, Alfred Howe, an American general, born at Hartford, Conn., Nov. 1827; entered upon the practice of law; volunteered at the outbreak of the civil war; was present at first Bull Run and the capture of Port Royal; and led the expedition which captured Fort Fisher, in 1865. By his gallantry he rose from the rank of colonel to that of major-general.

TESS'ELATED PAVE'MENT, a mosaic pavement composed of colored Tesseræ arranged to form a regular pattern or a picture. T. P. was made by the ancients. Many examples of Roman workmanship have been brought to light in England and other localities. Theatrical and battle scenes exquisitely executed with colored stones have been discovered at Pompeii.

TEUTON'IC LAN'GUAGES, a subdivision of the great Indo-European or Aryan family of languages. The name Teutonic is derived from the Teutones, after whose conquest by Marius it came to be applied to all German-speaking people. Its origin is found in the Old High German *diot*, 'people,' *duit-isc*, 'national,' the Old Eng. *theod* and *theodisc* (comp. Umbrian Lat. *tuticus*, from *tuta*, 'city'), of which the words *Deut-sch* and *Dutch* are modern forms. The T. L. are divided into three groups—(1) the Scandinavian; (2) the Low German; (3) the High German. The Low German embraces Gothic, the most primitive known Teutonic language, Platt-Deutsch, Frisian, Dutch, Flemish, Old Saxon—spoken between the Rhine and Elbe, a specimen of which is extant in the *Heljand* (Old Eng. *Heiland*), '*Healer*' or 'Saviour,' a work of the 9th c.—and English. See Jacob Grimm, *Deutsche Grammatik* (Gött. 1819–40); Max Müller's *Lectures* (1861–64); Schleicher *Compendium der Vergleichenden Grammatik der Indo-German-Sprachen* (Weim. 1866); Helfenstein, *Comparative Grammar of the T. L.* (1870).

THACHER, Peter, D.D., an American clergyman, born at Milton, Mass., March 21, 1752; educated at Harvard College (1769); was pastor of churches in Malden, Mass (1770–85) and Boston, Mass. (1785–1802); and attained great reputation as a pulpit orator. Died at Savannah, Ga., Dec. 16, 1802.

THALAMIFLO'RÆ, a subdivision of dicotyledonous plants, including all those orders in which the majority of genera have distinct petals, inserted with the stamens on the receptacle under or around the ovary.

THALASSICOLL'IDA, a group of *Protozoa* belonging to the order *Radiolaria*, and closely allied to Foraminifera and other *Rhizopoda*. They have structureless cysts, and give off processes resembling rays, and which may unite so as to form a network. The T. exist as simple or compound organisms.

THAL'ER, a German coin worth about three shillings of English money. It is going out of use.

THANKSGIVING DAY. In the year 1621, Gov. Bradford of the colony of Plymouth, appointed a special day of praise and thanksgiving to Almighty God, for the blessings of his providential care. The custom thus early inaugurated by the Pilgrim fathers, has been observed down to the present day, and has gradually grown to be a national institution, although at first observed only in the New England states. The day is annually appointed by the President, and is usually the fourth Thursday in the month of November.

THATCHER, Henry Knox, an American naval officer, born at Thomaston, Me., in 1806; entered the navy in 1823, and in 1862 had risen to the rank of commander; participated in the attack upon Fort Fisher and the siege of Mobile; was made rear-admiral (1868), retired from the service in 1868, and died in 1880.

THECODON'TIA, an order of extinct *Reptilia*, regarded by Owen as crocodilian in character, but by Huxley and others as resembling the *Deinosauria* more closely than Crocodilia. Owen defines Thecodont reptiles as having biconcave vertebræ, with the ribs of the trunk long and bent, the front ribs having a divided head. The sacrum consists of three vertebræ, and the femur or thigh has a third trochanter. The limbs are adapted for walking. The teeth have compressed crowns, are pointed with serrated margins, and arise from distinct *alveoli* or sockets. The T. belong to the Triassic age. *Belodon*, *Palæosaurus*, and *Thecodontosauras* are three notable genera.

THEL'WALL, John, born in London, England, 27th July 1764, after a brief apprenticeship to a tailor, studied law, but refusing from conscientious scruples to be called to the bar, entered on a literary career (1785). His *Poems on Several Occasions* (1787) were followed by *Poems written in the Tower and Newgate*, whither his bold harangues in favor of the French Revolution brought him in 1794. With Horne Tooke and Hardy he was tried for high treason but acquitted, after which he became a public lecturer on politics, and in 1801 on elocution, and as such distinguishing himself by his treatment of stammering. He published several works upon this and kindred subjects, and died at Bath, 17th February 1834.

THENARD, Louis Jacques, a French chemist, was born at La Louptière (Aube), 4th May 1777; studied chemistry at Paris under Banquelin, was appointed (1810) Professor at the Collége de France, and later at the Polytechnic School and in the philosophical faculty of the University; in 1825 was created Baron, and in 1852 peer of France. In 1837 T. resigned his professorship at the Polytechnic School, and in 1840 that at the University. In 1842, however, he became grand officer of the legion of honor,

and in 1850 member of the Council of Public Instruction. He died at Paris, June 21, 1857.

THEODO'TION, a native of Sinope or Ephesus, is the author of a Greek version of the Old Testament. He flourished in the latter half of the 2d c.; was first a disciple of Tatian, then a Marcionite, and finally an Ebionite. His version is simply that of the Septuagint disfigured and accommodated to his Ebionitish opinions. Singular to say, in spite of its heretical origin, it was not rejected by the Church, and was even in some parts, *e. g.*, the Book of Daniel, a special favorite.

THI'BAUDEAU, ANTOINE CLAIRE, COMTE, a French statesman, was born at Poictiers, 23d March 1765, and became an advocate in 1789. He took some part in the Revolution, but was not a fanatical Republican. Named by Bonaparte a member of the Council of State, he helped to draw up the Code Napoléon, was made Prefect of the department of Bouches-du-Rhone (23d April 1803), and a Count in 1809. In 1815, though he had disapproved the return of Napoleon, he yet opposed the recall of the Bourbons, and was banished. He traveled about Switzerland, Germany, &c., till 1830, when he returned to Paris, but lived in retirement till Louis Napoleon's *coup d'état*, after which he was named in the first list of members of senate, and was created a grand officer in the Legion of Honor, 11th August 1853. He died 8th March, 1854.

THIERSCH, FRIEDRICH WILHELM, a German scholar, born at Kirchscheidungen, near Freiburg-an-der-Unstrut, June 17, 1784, studied theology and philology at Leipzig and Göttingen, and in 1809, following a call to the newly-founded Munich Lyceum, there founded a Philological Institute. The enthusiasm T. had shown in the German War of Liberation he presently directed to Hellenic regeneration, and in 1831 visited Greece, where on the murder of Capo d'Istria he co-operated towards the election of Otto of Bavaria to the throne. Returning to Munich, he was elected President of the Academy in 1848, and died February 25, 1860.

THI'ONVILLE (Ger. *Diedenhofen*), a small fortified town of Germany, in Lothringen, on the Moselle, 18 miles N. of Metz by rail. It was taken by the Germans after a bombardment of two days, November 24, 1870. Pop. (1875) 7168.

THIRL'WALL, CONNOP, born at Stepney, England, 11th January 1797, at three learnt Latin, at four 'read Greek with ease and fluency,' and in 1809 figured as author of *Primitiæ*, a volume of sermons, tales, and verse. Charterhouse strengthened his precocious growth, and as scholar with Whewell, Sedgwick, and Julius Hare of Trinity College, Cambridge, he carried off the Craven, Bell, and senior chancellor's medal, and having graduated as a senior optime—there was then no classical tripos—was elected to a college fellowship (1819). His translation of Schleiermacher's *St. Luke*, introducing 'rationalism' to English theology, was made while he was a law student at the Temple, and he was actually called to the bar in 1825, the year when we find him one of a debating society whose members included Mill, Maurice, Macaulay, Sterling, the Bulwers, and Wilberforce. A Trinity tutorship, however, led to his taking orders and return to Cambridge, where with Hare he translated Niebuhr's *History of Rome* (1828), and became a joint-editor of the *Philological Museum* (1832–33), to it contributing among other essays on the widest subjects one, singularly subtle and profound, on *The Irony of Sophocles*. His *History of Greece* (1835–40; new and enlarged, ed. 1856) was written under great disadvantages for 'Lardner's Cyclopædia,' and has been partly eclipsed by Grote's, but was the first Greek history that, rising above the school-book level, betrays no trace of party animus, whilst from its learning, accuracy, and dignified if passionless style, it must always rank as an English classic. His pamphlet on the *Admission of Dissenters to Academical Degrees* (1834) cost him his tutorship, but was rewarded by the Whig Government with the living of Kirkby-Underdale, and in 1840 Lord Melbourne raised him to the see of St. David's. In six months' time he could preach to Welshmen in the Cymric tongue, out of his revenues he expended in thirty years £30,000 on the augmentation of poor livings, and a long list might be formed of churches and schools built or enlarged through his munificence. But T. is chiefly known to the outside world by his public utterances, the eleven Charges (1842–72), which, whether on Tractarianism or the Gorham controversy, Ritualism or *Essays and Reviews*, were always marked by a judicial fairness and that rarest quality of common-sense. The Liberal representative of the Bishops' bench, he stood alone or almost so in his attitude towards the removal of Jewish disabilities, the Maynooth Grant, Colenso's inhibition, and Irish Church disestablishment, while in Convocation he held the balance of opinion. Having resigned his see in 1874, he died at Bath, 27th July 1875, and was buried in Westminster Abbey.

THOM, JAMES, a self-taught sculptor, was born at Ayrshire, England, in 1799. While still an obscure stone-cutter, he suddenly became famous by a group representing 'Tam o' Shanter and Souter Johnny,' and cut in the common sandstone on which he was accustomed to work. It is a miracle of dramatic vigor and artistic skill. This group, which now adorns the 'Burns Monument' at Doon, near Ayr, was first exhibited in Edinburgh in November 1828. Orders flowed in on the gifted sculptor, who removed to London, whence in 1837 he came to the United States, where he settled, and where his genius found a liberal recognition. T. died of consumption at New York, 17th April 1850.

THOMAS, GEORGE HENRY, a distinguished American general, born in Virginia, July 31, 1816. In 1836 he became a cadet at the Military Academy, at West Point, graduated there in 1840, after which he served in Florida against the Indians, in the war against Mexico, and for five years in Texas. In November 1860 he returned to the East, and on the outbreak of the Civil War immediately placed his sword at the service of the Federal Government. He commanded a brigade at the battles of Martinsburg (July 3, 1861) and Bunker Hill (July 15). In November he received a command in the army of the Ohio, and contributed greatly to the important victory at Mill Springs (January 19–20, 1862). On the advance into Kentucky, he was appointed second in command of the army of the Ohio, and lead the right wing in the battle of Perryville (October 8). During 1863, in the battle of Murfreesboro', T. led the center of the army under General Rosecranz, and at the battle of Chickamanga he sustained a five hours' struggle against overwhelming forces, and alone prevented the defeat of the Federal army.

On October 27, he received his commission as brigadier-general in the regular army, and during the campaign of 1864 he served under General Grant. On the 27th September of that year he was placed in chief command in Tennesse, where he was successful in out-manœuvring General Hood, and inflicting a severe defeat upon him at Franklin (November 30). On the 15th and 16th December he completely defeated Hood, destroying his army, for which he was thanked by Congress and voted a gold medal by the State of Tennessee. In 1869 T. commanded the military division of the Pacific, with headquarters at San Francisco, where he died, March 28, 1870.

THOMAS, THEODORE, an eminent American musician, born in Hanover, Germany, 1835, and came to America with his father in 1845. He has become famous as an orchestral leader and conductor of concerts.

THOMAS, THEODORE GILLARD, an eminent American physician and surgeon, born in South Carolina, in 1831; educated at the South Carolina Medical College; in 1862 became professor of obsteterics in the College of Physicians and Surgeons in the City of New York, where he rapidly rose to distinction as a lecturer and surgeon. He has made a specialty of women's diseases, and has written a work upon that theme, which has been translated into several languages. He is one of the most brilliant surgeons of his time.

THOMPSON, DANIEL PIERCE, an American novelist, born at Charlestown, Mass., Oct. 1, 1795; educated at Middlebury College, Vt. (1820); removed to Virginia, where he taught for sometime, and was subsequently admitted to the bar; removed to Vermont (1824), and opened offices at Montpelier, where he died in 1868. He is chiefly known to the public by his works of fiction, the most popular of which were *The Green Mountain Boys* and *The Rangers*.

THOMPSON, JOSEPH PARRISH, D.D., LL.D., an American clergyman, born at Philadelphia, Pa., Aug. 7, 1819; educated at Yale College (1838) and in the theological seminaries at Andover and Yale; was pastor of Congregational churches in New Haven, Conn. (Chapel Street) and New York city (Broadway Tabernacle); and in 1873 removed to Germany, where he resided at Berlin. He was the author of numerous publications, among which the following may be mentioned: *Christianity and Emancipation; Man in Genesis and Geology; Church and State in the United States* and *Life of Christ*. Died at Berlin in 1879.

THOMPSON, ZADOC, an American scientist born in Vermont, May 23, 1796; educated at the University of Vermont (1823); was state geologist (1845–48) and one of the faculty of his *alma mater* (1851–53). He published *The History of Vermont* and *Geography and Geology of Vermont*, both of which are works of critical scholarship and permanent value. Died at Burington, Vt., in 1856.

THOM'SON, REV. JOHN, a Scottish landscape-painter, was born in the manse of Dailly in Ayrshire, September 1, 1778. It was in vain that the boy artist pleaded with his father to let him become what nature had made him: he was destined for the church; and so, after studying at the University of Edinburgh, he was duly admitted to the practice of the clerical profession. In 1800 he was appointed his father's successor, and in 1805 he obtained the parish of Duddingstone, near Edinburgh. While a divinity student he had taken lessons in his favorite art from Alexander Naysmith, and he now prosecuted it with such success, that before long he

was admitted an honorary member of the Royal Scottish Academy, and found so great a demand for the productions of his pencil, that his annual profits as an artist amounted to £1800. His favorite subjects were castles such as Craigmillar, and Highland scenes such as the Trossachs and Loch Achray. Not only were Sir Walter Scott, Sir Thomas Dick Lauder, and other Scottish celebrities, well-known visitors at the Duddingstone manse, but Turner and other English artists were among the rarer guests. T. died 27th October 1840. His elder brother, THOMAS T., abso born in the manse of Dailly, 10th November 1768 studied at Glasgow, passed advocate at Edinburgh in 1793, held the office of deputy clerk-registrar (instituted 1806), did good service under the Record Commissioners, edited a number of works for the Bannatyne Club, and contributed to the *Edinburgh Review*. In 1828 he was appointed one of the principal clerks of the Court of Session. He died at Shrubhill, Leith Walk, Edinburgh, 2d October 1852.

THOM'SON, SIR CHARLES WYVILLE, F.R.S., an eminent zoologist, was born at Bonsyde, Linlithgowshire, Scotland, March 5, 1830. He began the study of medicine at Edinburgh University in 1845, became lecturer on botany at King's College, Aberdeen, in 1850, was elected professor of natural history at Queen's College, Cork, in 1853, and in 1854 settled at Belfast as professor of mineralogy and geology in Queen's College, a chair which he afterwards united with the natural history chair vacated by Dr. Dickie in 1860. In 1870 he succeeded Allman in the zoology chair at Edinburgh University. He early directed his attention to the lower forms of animal life. The discovery, by G. O. Sars in 1864, of a new *Crinoid* at a depth of 700 feet, convinced T. that the accepted theory that life did not exist in deep water was not by any means established. To settle this point he has taken a leading part in the dredging operations of the government vessels, the *Lightning* (1868), the *Porcupine* (1869–70), and the *Challenger* (1872–76). Besides demonstrating the existence of life at all depths, these expeditions, especially the last, have added many new species of animals, and increased our knowledge of the physical characters of the great oceans. T. was knighted shortly after the return of the *Challenger*. He has written valuable papers on zoological subjects, beautifully illustrated by his own most finished sketches, and is author of *The Depths of the Sea*, giving an account of his two first cruises, and the *Voyage of the Challenger*, the first and second volumes of which, published respectively in 1876 and 1878, treat of the Atlantic. The voyage told severely on his health, and he died on 10th March 1882.

THOM'SON, THOMAS, was born at Crieff, in Scotland, April 12, 1773. After studying at the University of St. Andrews, he succeeded his brother, James Thomson, afterwards D.D., and minister of the parish of Eccles, Berwickshire, as editor of the Supplement to the 3d ed. of the *Encyclopædia Britannica*, graduated in medicine at Edinburgh in 1799, and was for some years subsequent to 1802 scientific editor of James Mill's *Literary Journal*. He was the first to introduce the use of symbols in chemistry, and to announce Dalton's Atomic Theory, privately communicated to him in 1804, in the 3d ed. of his *System of Chemistry* (5 vols. 1807). In 1818 T. became Professor of Chemistry in the University of Edinburgh, and died at Kilmun, in Argyllshire, August 2, 1852. T. was a very voluminous writer.

THOMWELL, JAMES HENLEY, D.D., LL.D., an American divine, born in South Carolina, Dec. 9, 1812; educated at South Carolina College (1831); entered the ministry of the Presbyterian Church, and, after presiding over a church at Lancaster, S. C., became professor of logic and belles lettres in South Carolina College (1838); resigned this position to become pastor of a church in Columbia, S. C., in 1840; returned to the college as professor of sacred literature and the evidences of Christianity in 1841; resigned to become pastor of a church in Charleston, S. C., in 1851; became president of the college (1852), and was made professor of theology in the Seminary at Columbia, S. C., in 1855. He published several controversial works, the most notable of which was *Arguments of Romanists Discussed and Refuted*. Died at Charlotte, N. C., in 1862.

THORBURN, GRANT, born near Dalkeith, Midlothian, Scotland, February 18, 1773, was in early life a nailmaker, and on account of political troubles removed to New York in 1794. After a chequered career, he became a successful seedsman, and as 'Lawrie Todd,' a voluminous writer for periodicals. He acquired a high character for practical benevolence; and the nobility of his disposition and strange vicissitudes of his life, are faithfully reflected in Galt's novel of *Lawrie Todd* (1830). His works include *Forty Years' Residence in America* (1834), *Men and Manners in Great Britain* (1834), *Fifty Years' Reminiscences of New York* (1845), and *Life and Writings of G. T., Prepared by Himself* (1852). He died at New Haven, Conn., January 21, 1863.

THOR'BURN, ROBERT, a Scottish painter, was born at Dumfries in 1818, studied at the Edinburgh Academy from 1833, and three years later proceeded as a miniaturist to London, where he rapidly rose to fame. He adopted a largeness of size as well as of style unusual in miniatures, and in aiming at the higher qualities of oil-painting lost none of the purity, brightness, and transparency peculiar to able paintings on ivory. For many years his portraits, on account of their art not less than the eminence of their subjects, were among the most attractive works exhibited at the Royal Academy, while the long roll of his illustrious sitters included the Queen, the Prince Consort, and many members of the royal houses of France, Germany, Belgium, &c. T. was particularly happy in the treatment of female beauty. He was made A.R.A. in 1848, and died 19th November 1863.

THOR'EAU, HENRY DAVID, born in Boston, Mass., July 12, 1817, graduated at Harvard in 1837, was a schoolmaster till 1840. An abolitionist who had run into perils by his efforts against slavery, an ardent naturalist, 'who knew,' says his friend Emerson, 'the country like a fox or a bird,' he withdrew in 1845 to a hermitage, built by himself in Walden Wood, and there for two years lived at an annual cost of $70. From this solitude T. emerged to pursue his father's calling of pencil-making at Concord, where he died 6th May 1862.

THORN'BURY, GEORGE WALTER, born in London, England, in the autumn of 1828, for a short time studied painting, but ultimately devoted himself to letters, contributed a series of papers on topography to the *British Journal* (1845), and to the *Athenæum* (1851) some chapters on the Crystal Palace, afterwards republished. Essayist, novelist, lyrist, biographer, traveler, and art-critic, T. was also a successful lecturer; but sank under overwork, and died 11th June 1876.

THORN'HEADED WORMS, or ACAN'THOCEPH'ALA, a group of *Scolecida* allied to the *Nematoid* worms, and so named from the armature of the head. They are internal parasites, possessing neither mouth nor digestive system, and having a proboscis armed with hooks. The sexes are distinct. The only distinct genus of T. W. is *Echinorhynchus*, the species of which, in a fully-grown condition, inhabit the digestive system of vertebrates, and occur in fishes, birds, and mammals. The young undergo a metamorphosis. Thus the embryos of *E. gigas*, which inhabit the pig's intestine, are found in the larvæ of the cockchafer.

THORP, the Scandinavian equivalent of the Ger. dorf, 'a village,' in local nomenclature sometimes stands by itself, *e. g.*, Le Torp, in Normandy; but oftener appears as a suffix, as in Eng. Althorp, Wilstrop, and Nor. Clitourps. Being Danish rather than Norwegian, this suffix often helps us to determine whence Scandinavian settlers arrived in England; and whilst it is very common in E. Anglia, it occurs very seldom in Westmoreland, but once in Cumberland, and never in Lancashire.

THOURHOUT' ('Thor's wood'), a town of Belgium, province of W. Flanders, 14 miles S.W. of Bruges by rail. It manufactures mustard, starch, sabots, hats, &c., and has a teacher's training-school. Pop. (1873) 7857.

THRASYBU'LUS, a celebrated Athenian general and democratic leader in the latter part of the Peloponnesian War, first heard of (411 B C.) as commanding a galley in the fleet at Samos, afterwards one of the most active in bringing about the downfall of the Four Hundred and the recall of Alcibiades. His close friendship with the latter involved him in his disgrace after the battle of Notium, and on the establishment of the Thirty Tyrants he was banished, and retired to Thebes. In 403 he entered Attica at the head of seventy other exiles, seized Pyle, and occupied the Peiræus, and ultimately forced from the oligarchical party a general amnesty. In 394 he commanded the Athenian armies in Bœotia and before Corinth, and in 390 was sent with forty ships to aid the Rhodians against Teleutias. He next sailed to Byzantium and reduced several of the islands, but while cruising on the Pamphylian coast he cast anchor in the mouth of the Eurymedon, and was murdered in his tent by the natives during the night (390).

THREAD-CELLS, the name given to certain peculiar cells or cysts, found chiefly in the tissues of *Cœlenterate* animals. They contain fluid, and are provided with an internal thread-like filament. Under pressure the cell ruptures, the thread is everted, and the fluid escapes. These cells form a poison-apparatus for paralyzing prey.

THURMAN, ALLEN G., an American statesman, born at Lynchburg, Va., Nov. 13, 1813, and began the practice of law in Ohio in 1835. He was elected to Congress, was a judge of the supreme court of Ohio, and in 1869 was made U. S. senator. He has been one of the most prominent leaders of the Democratic party, and was a candidate for the presidential nomination in 1876, 1880, and 1884.

THYLACO'LEO, a remarkable genus of extinct *Marsupialia*, the fossil remains of which occur in the Recent or Tertiary and Post-Tertiary deposits of Australia and Tasmania. Professor

Flowers regards T. as a 'highly-modified and aberrant form of the type of marsupials now represented by the *Macropodidæ* (Kangaroos) and *Phalangistidæ*, though not belonging to either of these families as now restricted.' A characteristic of T. is the presence in each jaw of one large, compressed, and sharp-edged premolar tooth. The canines are small.

TICKELL', THOMAS, a minor English poet, was born at Bridekirk, Cumberland, in 1666. After studying at Oxford, where he became Fellow of Queen's College in 1710, he obtained from Addison the office of under-secretary of state in 1717, and about seven years later was appointed secretary to the Lords Justices of Ireland. He died in 1740. T. is mainly remembered by his translation of the first book of *Homer*, his *Elegy on Addison*, and his contributions to the *Spectator*. The first of these has transmitted to modern times a curious question as to its authorship and the circumstances of his birth; for it happened to come out about the same time as Pope's translation, and the suspicious poet averred that it was really the work of Addison, and was issued with a hostile intention towards himself. Dr. Johnson, Goldsmith, and Macaulay agree in high admiration of the *Elegy*, while Steele maintained that it was only prose in rhyme. T.'s poems are collected in vol. xi. of Chalmers' *English Poets*, and an American edition appeared at Boston in 1854.

TIER'NEY, GEORGE, a London merchant's son, was born at Gibraltar, 20th March 1761, from Eton passed to Peterhouse, Cambridge, and graduated LL.B. (1784). Called to the bar, he published *The Real Situation of the East India Company* (1787), and in 1796 entered parliament, where he rose by his powers of debate to be leader of the Whigs. In 1798 he fought a duel with Pitt, on whose retirement from office in 1803 T. was appointed Treasurer of the Navy, subsequently becoming Secretary of State for India and President of the Board of Control (1806), head of the Opposition (1817), and Master of the Mint (1827). He died in London, 25th January 1830.

TIFFIN, in Seneca Co., O., on the Sandusky River. It has three railroads, and is principally engaged in manufactures. Pop. 8000.

TI'GER BEE'TLE (*Cincindela campestris*), a species of beetle belonging to the Pentamerons section of the order *Coleoptera*. The head is broader than the *prothorax*, the jaws are long and curved, and the legs are slender. The color is brownish, marked with lighter dots and stripes. The T. B. is common in sandy places, and on the shores of rivers and ponds. It runs swiftly, and is difficult to capture. *C. campestris* and *C. vulgaris* are familiar species.

TIGHE, MRS. MARY, an Irish poetess, born in Dublin, in 1774, and married her cousin, Henry T., of Woodstock, M.P., in 1793. Though her poem *Psyche, or the Legend of Love* was privately printed by C. Wittingham (Lond. 1805), it was only after her death, which took place March 24, 1810, that her writings were given to the world. The first edition was in 1811, and they have been frequently reprinted. The *Psyche* is written in the Spenserian stanza; and at least, by Leigh Hunt's admission, occasionally contains a fancy not unworthy of a pupil of Spenser. Her other poems are short occasional pieces, frequently of a religious cast. It is probably as the subject of Moore's lyric, 'I saw thy form in youthful pride,' and of Mrs. Heman's *Grave of a Poetess*, that Mrs. T. is destined to be longest remembered.

TILDEN, SAMUEL JONES, an American statesman, born at New Lebanon, Columbia Co., N. Y., Feb. 9, 1814, educated at Yale College, and became a lawyer in New York. In 1874 he was elected Governor of New York by the Democratic party, and in 1876 was nominated for the presidency by that party, but was defeated by R. B. Hayes, the Republican candidate.

TILLICOULT'RY, an industrial town of Scotland, county of Clackmannan, on the Devon, 2 miles E. of Alva and 9 N.E. of Stirling by rail. It is the seat of an important woollen trade, and has several large mills engaged in the production of shawls, plaids, and tartans. Coal and limestone are extensively wrought in the vicinity. There are five churches. Pop. (1881) 3732.

TILLODON'TIA, an order of Mammalia constructed by Professor Marsh to include certain peculiar extinct quadrupeds, the remains of which occur in the Eocene Tertiary rocks of the United States. The molar teeth in the T. have grinding crowns, and resemble those of *Ungulata*. Small canine teeth are developed, and each jaw has two very long incisors, similar to those of *Rodentia*, these growing, like the incisors of the last-named forms, from persistent pulps. The feet, like those of bears, are *plantigrade*, and possessed of five toes each. The femur has a third trochanter. Of this curious order the typical genus is *Tillotherium*, in which form the characters of ungulata, carnivora, and rodentia appear to be united. The average size of these remarkable extinct mammals was that of the Tapir.

TILTON, THEODORE, born at New York, N. Y., in 1835; educated at the public schools; and editor of the New York *Independent* for several years, and afterwards of other literary periodicals. He has published several works, the best known of which is *Tempest Tossed*. He has also published a volume of poems. In the year 1874 he sued the Rev. Henry Ward Beecher of Plymouth Church, Brooklyn, for $100,000 damages for the seduction of his wife, but failed to secure a verdict.

TIME. According to Clerk Maxwell, the idea of T. is 'the recognition of an order of sequence in our states of consciousness.' By the exercise of memory, the events in one's experience may be arranged chronologically, and by intercourse with others, and comparison with natural phenomena which recur in a uniform rythmic manner, all events whatever may be systematically arranged according to their place in T. The measurement of T. is involved in the statement of Newton's First Law. Our ordinary units depend upon the motion of the earth; but it would be possible to get a more general unit, say the T. of vibration of a wave of light of a definite wave length and refrangibility.

TIN'AMOU (*Tinamotis*), an aberrant group of *Rasorial* or *Gallinaceous* birds, occurring in S. America. They have a very short, even rudimentary tail. The elegant T. (*T. elegans*), the familiar species, attains the size of a large grouse. The neck is long, and the color is a greyish buff on the head and neck, the head being crested, while the back is of a buff and blackish brown. The bird feeds on grain-seeds. It is easily captured.

TINNEVELL'Y, the chief town of the district of the same name in the Madras Presidency, British India, 50 miles N. from Cape Comorin, and 513 miles S.W. of Madras by rail; pop. (1871) 21 044. It almost adjoins the military station of Palamcottah. The *district* of T., the most S. in the peninsula, has an area of 5176 sq. miles; pop. (1871) 1,693,959. About 100,000 are native Christians, of whom the Roman Catholics live in fishing villages along the coast, while the Protestants are collected in towns. The crops are rice, cotton, and tobacco; the manufactures, jaggery sugar from the date palm, cotton cloth and muslin. The chief port is Tuticorin.

TIPPECANOE, BATTLE OF, an engagement between an American force under Gen. Harrison and a body of Indians, Nov. 5, 1811, which resulted in the complete defeat of the latter. It was from this battle that Gen. Harrison was afterwards called, in political life, 'Old Tippecanoe.'

TIRAILLEURS (Fr.), skirmishers or sharpshooters. The name does not occur in the French army before the year 1792. It was given to certain bodies of French marksmen during the first campaigns of the revolutionary war, whose business was to annoy the front of an advancing or the rear of a retreating enemy.

TITANOTHE'RIUM, an extinct genus of *Mammalia*, the remains of which occur in Miocene deposits of N. America, and which is included by Marsh in the Ungulate family *Brontotheridæ*. These animals were large, had long skulls, small incisor teeth, and very large horn cores.

TITUSVILLE, in Crawford Co., Pa. It has three railroads; is engaged in the oil trade and is the location of a number of refineries. It manufactures engine boilers, oil, flour and fruit barrels, artesian and oil well machinery, brooms, furniture, and hemlock bark extract. Pop. 9046.

TODD, HENRY JOHN, D.D., an industrious English author, born in 1763, studied at Hertford College, Oxford, where he graduated (1786), took orders, and became successively vicar of Milton, near Canterbury (1792), rector of All Hallows, Lombard Street, London, and keeper of the MSS. at Lambeth Palace, and rector of Settrington, Yorkshire (1820), where he died, 24th Dec. 1845. Among his voluminous works the most valuable are his elaborately annotated editions of Milton and Spenser, his *Illustrations of the Lives and Writings of Gower and Chaucer*, and his expanded edition of Johnson's *Dictionary*.

TODD, JAMES HENTHORN, D.D., a distinguished Irish scholar, was born at Dublin, Ireland, April 23, 1805, and graduated at Trinity College, Dublin, of which he became a fellow in 1831. Entering the Church, he was appointed professor of Hebrew (1849), and librarian of Dublin University (1852); was twice chosen Donellan lecturer, became treasurer and precentor of St. Patrick's Cathedral (1864), took a leading part in founding the Irish Archæological Society, and for five years was president of the Royal Irish Academy. He died at Rathfarnham, near Dublin, 28th June 1869.

TODD, JOHN, D.D., an American clergyman, born at Rutland, Vt., Oct. 9, 1800; educated at Yale College (1822) and Andover Seminary (1826), was pastor of churches at Groton, Mass., Northampton, Mass., Philadelphia, Pa. (First Congregational), and Pittsfield, Mass.; and subsequently helped to found Mount Holyoke Seminary, an institution for the education of young ladies. He published numerous works, among which the following may be mentioned: *Student's Manual*, *Truth made Simple*,

Summer Gleanings and *Future Punishment*. Died at Pittsfield, Mass., in 1873.

TODMOR'DEN, a market town on the borders of Lancashire and Yorkshire, 9 miles N.N.E. of Rochdale by rail, is picturesquely situated in a hill-girt valley, watered by the Calder. It contains fine Anglican churches and numerous chapels, an Oddfellows' hall, a masonic hall, and a new town-hall (1875) in the Corinthian Order, in front of which stands a bronze statue by Foley of the late John Fielden, M.P. Besides enormous cotton-mills, there are manufactories of calicoes, fustians, dimities, and bobbins, iron foundries, and machine works, &c. T. publishes two weekly newspapers. Pop. (1881) 23,861.

TÖK'ÖLY, EMERIC, COUNT, born at the castle of Käsmark, in the Hungarian comitat of Zip, in 1656, on the death of his father, a Protestant noble and insurgent (1671), fled to Transylvania. Here Prince Apafi gave him the command of troops, with which, in 1678, joining the Magyar patriots, he ravaged Moravia, took Kaschau (1682), and marched with the Turks upon Vienna. Treacherously arrested by Kara Mustapha (1685) and sent to the Sultan at Adrianople, T. was released in 1686 and furnished with 9000 Turkish soldiers for further operations against Austria. Created Prince of Transylvania, he defeated Heusler at Yernesi (1689), but was compelled to retreat before the Prince of Baden into Wallachia. He later shared in almost all the Turkish operations against the Austrians, and, excluded from the amnesty that followed the Peace of Karlowitz (1699), lived at Constantinople, dying on his estate of Ismid, 13th September 1705.

TOL'TECS, a Mexican race who are supposed to have been supreme in Central America from the 7th to the 11th centuries. They were completely obliterated by the Aztecs and Tezcucans, who held the country when the Spaniards first landed. The latter races were of a martial spirit, but they were indebted for their arts, their civilization, and their religion to their milder predecessors. The T. present striking analogies to the Etruscans, and in a less degree to the Egyptians and Assyrians. They were great builders, and their religion was a mystic system of great complexity, intimately connected with the study of astronomy, and interpreted by a priesthood, who formed an exclusive caste. See Prescott's *History of the Conquest of Mexico*, book i.

TOMBIG'BEE, a river which rises in Mississippi, and after a S. by E. course of 450 miles through that state and Alabama, joins the Alabama River 45 miles above Mobile, after which the united stream is called Mobile River. The T. is navigable for 410 miles from Mobile Bay.

TOMMASE'O, NICCOLO, a prolific Italian writer, was born at Sebenico in Dalmatia in 1803. After a course of study at Padua, he worked at Florence for the *Antologia di Firenze*, and in 1333 went to France, and after a stay of some years to Corsica. In 1838 he came to Venice, where, in consequence of a petition to the Emperor for a milder exercise of the censorship, he was arrested together with Daniel Manin (January 18, 1848). Liberated by the people on the 17th March, he eagerly entered into the struggle for independence, and was appointed, under the provisional government of Manin, minister of public worship. On the downfall of the Venetian Republic (August 1849) he retired to Corfu, where he prosecuted his arduous studies, though he had become almost blind in consequence of a severe illness. In 1854 he returned to Turin, and in 1859 settled at Florence, where he died May 1, 1874. As a writer T. was distinguished by profound and wide learning, and by the rare union of Catholic feeling with liberalism and patriotism.

TOMPKINS, DANIEL D., an American politician, born at Scarsdale, N. Y., June 21, 1774, and graduated from Columbia College in 1795. He began to practice law in New York City in 1796, and soon became prominent in politics. He was a member of Congress 1804–5, governor of New York 1807–17, was elected Vice-President of the U. S. in 1816, and again in 1820. Died on Staten Island, June 11, 1825.

TONAWANDA, a town of Erie Co., N. Y., on the Niagara River, the Erie Canal, and the New York Central and Lake Erie & Western railroads. It is engaged in manufacturing lumber and other articles, and is one of the largest lumber distributing points in the United States. Pop. 3864.

TONE, THEOBALD, WOLFE born in Dublin, Ireland, 20th June 1763, was educated at Trinity College, and going to London to study law, was called to the bar at the Middle Temple (1789). The outbreak of the French Revolution drew him to politics, and having promoted the fraternization of Irish Catholics and Dissenters, he founded in 1791 the society of United Irishmen. The discovery of his intrigues with France drove him a fugitive to the United States (1795). Thence crossing to France, he sailed in the squadron, dispatched by the Directory to Bantry Bay (1796); next served a year in the Bavarian army; till, joining once more a French expedition to Ireland, he was taken prisoner, and brought to Dublin, where, sentenced to death by a court-martial, he committed suicide in prison, 19th November 1798. See his *Autobiography* (1826), and Madden's *Lives of the United Irishmen*.

TONK (*Tank*), the capital of the native state of the same name in Rajputana, India, 218 miles S.W. of Delhi, and 289 N. of Mhow. It is of considerable size, with a wall and mud fort. The *state* of T. comprises six scattered districts. Area, 2730 sq. miles; pop. 320,000. It is the only Mohammedan state in Rajputana, and the chief is styled Nawab.

TÖNN'ING, or TÖNN'INGEN, a seaport of Prussia, province of Schleswig-Holstein, at the mouth of the Eider, 30 miles S.W. of Schleswig by rail. It has a fine harbor, a beautiful market-place, and an excellent school of navigation. T. carries on a large trade with England in cattle and Danish farm produce. Pop. (1875) 3130.

TÖNS'BERG, the oldest town in Norway, on a fjord separated from Christianiafjord by the islands Tjömö and Nötterö, and connected therewith by the *stenskanal*, cut through the town. T. has a 'Middleskole,' and large freight trade. Pop. (1875) 5100.

TON'SON, JACOB, one of the great publishers of the Dryden and Pope period, 'the left legg'd Jacob' of the latter poet, was born in 1656. He commenced business in Chancery Lane, London, in 1677, removed to Gray's Inn in 1697, and thence in 1712 to the Shakspeare's Head, opposite Catharine Street in the Strand. He retired from business in 1720, and died March 18, 1736. T. is worthy of remembrance as Dryden's regular publisher, as the originator of the miscellanies which bear his name, as having brought out the first good editions of Milton and the first complete octavo edition of Shakspeare, and as the secretary of the Kit Cat Club, which used to meet in his villa at Barn Elms on the Thames.

TOOMBS, ROBERT, born in Georgia, July 2, 1810, and was educated at the University of Georgia and Union College, and pursued law studies at the University of Virginia. He began to practice law at Washington, in his native state, and rapidly achieved success. In 1844 he was elected to Congress, where his brilliant powers as a debater, soon won for him a prominent place. The secession agitation found him in Congress, but he resigned in 1861, and upon his return home was elected to the Confederate Congress at Montgomery. He was for a time secretary of state under Jefferson Davis, and afterwards entered the Confederate army, where he rendered gallant services. At the close of the war he lived abroad for a time, but in 1867 returned to the U. S. and resumed the practice of law.

TOP'LADY, AUGUSTUS MONTAGUE, an English theologian and hymnist, was born at Farnham, Surrey, in 1740, and educated at Westminster and Trinity College, Dublin. After holding a curacy for some years in Somersetshire, he was presented in 1768 to the vicarage of Broadhembury, Devonshire. He died in London, August 11, 1778. His works were published in 6 vols. 8vo, in 1825; new ed. in 1 vol. 1837, with a memoir. Though a voluminous writer—and a strenuous defender of Calvinism against John Wesley—T. is now hardly known except as the author of the hymn, *Rock of Ages*, one of the most exquisite expressions of evangelical faith and fervor to be found within the compass of the English tongue. A Latin version by Mr. Gladstone (*Translations by Lord Lyttleton and the Right Hon. W. E. Gladstone*, Lond. 1861) has added fresh beauty to the original.

TORFAENS (Latinized form of *Torfason*), THORMODR, a Danish historian, was born at Engö, Iceland, May 27, 1636. In 1662 he was sent by Frederik III. to Iceland to collect MSS. of sagas, and he was afterwards successively appointed royal antiquary (1667), and historiographer-royal (1682). He died at Karmö, near Stavanger, Norway, January 31, 1719. Of his many historical works the chief are *De Rebus Gestis Faröensium* (1695), *Series Dynastarum et Regum Danioe* (1702); *Historia Vinlandiæ Antiquæ* (1705); *Groenlandia Antiqua* (1706); and *Historia Rerum Norvegicarum* (4 vols. fol. 1711).

TORREY, JOHN, LL.D., an American scientist, born at New York, N. Y., in 1798; educated at the New York College of Physicians and Surgeons (1818); professor of chemistry and geology in the U. S. Military Academy, at West Point (1824–27); subsequently a member of the faculty of the college of physicians and surgeons, New York, and afterwards of Princeton College; and in 1853, become chief assayer of the United States. Died at New York, March 10, 1873. He was the author of several works treating of botanical themes.

TOR'SION, in mathematics, is the rate at which the osculating plane rotates per unit of length of the curve, where by *osculating plane* is meant the plane containing the tangent and the radius of curvature. A plane curve has no tortuosity; hence a *tortuous* curve, called by some a curve of double curvature, cannot lie in a plane. In mechanics the term is applied to the force with which a body, such as a thread, wire, or slender rod of metal, resists a

twist. Experiment shows that within certain limits the T. is proportional to the angle through which the body is twisted, and that these limits depend upon the elasticity of the material. If a metallic wire stretched by a weight is twisted through a moderate angle, and then left to itself, it will begin to untwist and then to retwist, and so on in a series of perfectly isochronous and regular oscillations. The measure of the T. depends on the time of oscillation.

TONGU', the chief town of the district of the same name in British Burmah, on the right bank of the Sittang river, down which it exports timber and rice. Pop. (1872) 10,195. It was the capital of the Pegu dynasty, which attained great power in the 16th c.; and was chosen in 1858 for the exile of Behandur Shah, the banished Mogul Emperor of Delhi, and is still the residence of his son.—The *district* of T. lies on the frontier N. of Rangoon and E. of Prome. Area 6354 sq. miles; pop. (1872) 86,166. It is the home of the aboriginal tribe of Karens.

TOUR'ACO (*Turacus*), a genus of African birds belonging to the *Conirostral* division of the *Insessores* or perchers. The T. is allied to the plantain-eater, and has a short bill, the fourth, fifth, sixth, and seventh quills being longer than the others. The White-Crested T. (*Turacus albocristatus*) is the best-known form. It attains the size of a crow, is olive-green on its upper parts, the prominent crest being green with a white edge. The T. is wary and inquisitive. It inhabits trees, and runs quickly amongst the branches.

TOURGEE, Albion Winegar, an American author, born in Ohio, May 2, 1838; educated at Rochester University; served in the Union army during the war of the rebellion; opened a law office at Greensboro', N. C., at the close of the war; subsequently removed North, and since then has devoted himself to literary effort. He has published *Bricks without Straw*, *The Fools Errand*, *Figs and Thistles*, &c. These works, although in the form of novels, are, in reality, a discussion of the Southern Problem, and as such have attracted much attention, and have met with large sales.

TOWNSEND, George Alfred, a brilliant American journalist and author, born at Georgetown, Del., in 1841; early in life engaged in journalistic work; acted as war correspondent of the New York *Herald* during the Civil War, his letters attracting much attention by their general literary merit; traveled abroad, and, on his return, was Washington correspondent for several papers, writing under the name of Gath; subsequently removed to New York. He is the author of a volume of poems and other works.

TOWSON, Nathan, born in Maryland, in 1784; entered the army, and served with marked distinction in the war of 1812, taking part in the battles of Queenstown, Stony Creek, Chippewa, and Niagara, and rising to the rank of major-general, and also serving in the Mexican war. Died at Washington, D. C., July 20, 1854.

TOXOC'ERAS (Gr. 'bow-horn'), a genus of extinct *Cephalopoda* or cuttlefishes belonging to the family *Ammonitidæ*, and having a bow-shaped or armate shell. Species of T. occur in rocks ranging from the Lower Oolites to the Gault. The most typical development is found in the Cretaceous rocks.

TOX'ODON (Gr. 'bow-toothed'), an extinct species of Mammals forming the type of the order *Toxodontia*, the remains of which are found in recent deposits in S. America. The Toxodonts, of which only two genera (*Toxodon* and *Mesodon*) are known, present a singular combination of the characters of Ungulata, Rodentia, and Edentata. The skull is large, and the molar and premolar teeth are strongly bent or folded. These teeth were rootless, and grew from permanent pulps. The lower jaw had small canine teeth, occurring, like the canines of the horse, between the incisors and premolars. No traces of limbs have been found in a fossil state.

TRANSBAIKA'LIA, a province of the Russian Empire, E. Siberia, lying S. and E. of Lake Baikal. Area 240,774 sq. miles; pop. (1873) 447,568, among whom more than a third are heathen Mongols, Tungusians, &c. T. is a diversified mountain-land, richly wooded, with fine pasturage. Its metallic wealth is great, consisting of silver, lead, gold, copper, tin, coal, and asphalt. The center of the mining industry is Nertchinsk, the chief town is Tschita.

TRANSPLANTA'TION OF TISSUES. Modern surgery has, within recent years, been very fertile in numerous discoveries, and especially as regards the T. of T. Professor Nussbaum of Munich, in 1875, described a new operation for the loss of bone which he denominates *transplantation of bone*. It consists of cutting off from the rest of the bone a portion of its external shell, covered by the periosteum, and leaving this shell of bone attached to the remainder by means of the periosteum covering its terminal extremity. This semi-attached bone is displaced into the gap in the same way as a flap of skin is twisted in a plastic operation, and fixed in the indurated soft tissues of which the gap is formed. The operation was first performed in a case of non-union of the ulna, the result of loss of bone from a gunshot fracture. Attempts have also been made to *transplant* periosteum which may form the nidus of bone.

The transplantation of skin may be effected by displacement, or by torsion. The first mode is effected by dissecting up a piece of skin, of the required size and shape, a portion of it being left attached. The loose portion is then shifted into the part where it is intended to lie. In the method by torsion, the position of the flap of the skin is changed, and the neck of skin, forming the attachment, is made as slender as is consistent with the maintenance of vitality. In both cases the edges of the transplanted skin are brought into close contact by means of stitches, with the cut edges of the skin where union is desired. Transplantation of skin can be effected from one part of the body to another, as from the arm to the nose, or from the thigh to the hand. *Transplantation of skin*, by grafting, was invented by M. Reverdin of Geneva in 1869, and was introduced into British surgery by Mr. Pollock in 1870. This operation is peculiarly adapted to cases where large granulating surfaces are exposed, as in cases of extensive burns. It is essential that the granulations should be perfectly healthy, and that all irritation in the sore should have ceased. The operation may be performed with a pair of fine forceps and sharp curved scissors. A small portion of skin, hardly larger than a pin's head, is snipped off with the scissors.

The whole thickness of the skin should not be cut through, but only a small portion of it, so as to make sure of removing the *rete mucosum*, as the growth of the graft seems to depend on the cells of the *rete Malpighii*. The grafts are placed firmly on the granulations, about an inch apart, and are covered with oil silk, moistened with oil to prevent its sticking when removed, and the whole is fixed with strapping and covered with cotton wool. The dressing should be renewed in three or four days. The grafts first change into little, round, vascular-looking buds; and in a short time the new cuticle is seen extending in all directions from the bud. That the new skin is due to the graft, is evident from the fact that a graft from a negro placed on a European produces a dark-colored skin; and a graft from a European transplanted on a negro produces a white portion of skin. Very recently T. of T. has been introduced into dental surgery.

TRAZ-OS-MON'TES ('beyond the mountains'), a province in the N.E. of Portugal, bounded N. and E. by Galicia and Leon (Spain), W. by Entre Douro e Minho, and S. by the Douro, which separates it from Beira. Area, 3999 sq. miles; pop. (1875) 374,837. Besides forming the southern frontier, the Douro follows great part of the W. boundary, and the province is watered by its affluents, the Sabor, Tua, and Tamega. T. is the loftiest part of Portugal; in the N. it is entered by the mountains of Leon (culminating in Serra de Monte Zinho, 9080 feet), and throughout has a wild, highland character. The district of Alto-Douro is noted for its port wine, while the uplands yield sumach and the valleys wheat, rye, hemp, flax, maize, oranges, almonds, &c. Silk is cultivated to some extent, and there are iron mines and mineral wells. The chief exports are mules, wool, silk, and wine. The capital is Bragança.

TREBIN'JE, a town (formerly capital) of Herzegovina, on the Trebinschitza, 17 miles inland from Ragusa. It is the seat of a Catholic bishop, and has a garrisoned castle. Pop. 10,000 (or according to Roskiewicz, 3000). During the war of the Austro-Hungarian occupation, Suleiman Pasha was shut up at T. with 1500 men, and an equal number of Bosnian troops joined the insurgents here, 20th September 1878.

TREE-CRAB (*Birgus*), the name applied to certain crabs, which are ranked among the 'land-crabs.' *B. latro* is a familiar species. It breaks open the shell of the cocoa-nut and of other fruits by repeated blows of its great claws. The T.-C. can live for long periods out of water, but deposits its eggs in the sea, to which it makes periodical journeys.

TREE KANGAROO (*Dendrolagus*) is so named from its arboreal habits. It belongs to the kangaroo family (*Macropodidæ*), but differs from the true kangaroo in having its fore-legs nearly as long as the hinder members. The tail is not used to support the body as with the ordinary kangaroo, and the claws are very long and curved. The T. K. occurs in New Guinea.

TREITSCH'KE, Heinrich Gotthard von, an able German publicist and historical writer, born at Dresden, September 15, 1834, studied at Bonn, Leipzig, Tübingen, and Heidelberg, became *privat-docent* in history at Leipzig in 1858, and 1863 professor at Freiburg, resigned his chair in 1866 in consequence of the attitude of Baden in the German crisis, and went to Berlin, where he undertook the management of the *Preussischen Jahrbücher*, to which he had contributed since 1858. In the autumn of 1866 he was called as a professor to Kiel, and next year accepted a chair in Heidelberg, which he vacated for another at Berlin in 1874.

TREVEL'YAN, Sir Charles Edward, Bart., K.C.B., a son of the late Archdeacon T. of Taunton, was born in England in 1807, educated at the Charterhouse and Haileybury College, and entering the East India Company's Civil Service, held important posts under Lords Auckland and Bentinck. His vigorous action promoted the abolition of Indian transit and town dues, and the introduction of educational institutions on a European model. In 1840 he was appointed Assistant-Secretary to the Treasury, and in 1848 was made K.C.B. for his attempts to relieve the distress caused by the Irish famine. With Sir Stafford Northcote and others he was long engaged in the revision of the civil establishments which led to the Civil Service being thrown open to public competition. He was Governor of Madras from 1859 to 1860, when he was recalled for protesting against the new taxes then imposed by the Government of India, although the Imperial government accorded him a highly eulogistic vote of thanks. In 1862 he became Financial Minister in India, a post in which he inaugurated important fiscal reform and a vast extension of public works, and which he resigned on account of ill-health in 1865. On his return he published two able pamphlets on army reform, a subject on which he had given evidence before the Royal Commission of 1857. Having subsequently devoted his attention to metropolitan charities, he was created a baronet in 1874. T. married Miss Hannah More Macaulay in 1834. He died 23d March 1879.—George Otto T., son of the preceding, was born at Rothly Temple, Leicestershire, 20th July 1838, and passing from Harrow to Trinity College, Cambridge, graduated as second classic. He entered the East India service by competition, but soon returned from India and was elected liberal representative of Tynemouth in 1865, and of the Scottish Border Burghs in 1868. In the second Gladstone administration he was appointed Civil Lord of the Admiralty (December 1868), but resigned office in July 1870, being opposed to the Educational Bill of the ministry. He strongly advocated, in and out of Parliament, a sweeping army reform, including the abolition of purchase, effected in 1871. The Volunteer movement had his active support, and he opposed the Regimental Exchanges Bill of 1875. He became Secretary for Ireland, May 1882, in succession to Lord Frederick Cavendish, who was murdered in the Phœnix Park, Dublin.

TREVI'SA, John, born in Cornwall, England, about the middle of the 14th c., was educated at Queen's College, Oxford, where he was a friend of Wiclif's, became vicar of Berkeley in Gloucestershire, and canon of the collegiate church of Westbury. He is said to have died in 1412. T. spent most of his leisure in turning Latin books into English. His chief works are a translation of Higden's *Polychronicon* (1387), one of the earliest specimens of English prose, of Occam's *Dialogue between a Soldier and a Clerk*, and of *Bartholomæus de Proprietatibus Rerum*, which last, a very mine of rare English words, stands in the list of proposed reprints of the Early English Text Society. Caxton said that T. had also translated the Bible; but his version, if it ever existed, is not known to be extant.

TRIBE'NI, 'the confluence of three rivers.' Such a spot is peculiarly sacred in Hindu mythology. The most frequented places of pilgrimage which bear this name are (1) in the district of Hoogly, Bengal, at the junction of the Hoogly river with the Jamuna and the silted-up bed of the Saraswuttee; (2) the town of Allahabad, where the Ganges and Jumna meet, and the third stream is imaginary; (3) where the Gunduck river and two of its affluents debouch from the mountains of Nepal on to the plains in the British district of Chumparun.

TRIGG'ER-FISH (*Balistes*), a genus of fishes belonging to the order *Teleostei* and to the sub-order *Plectognathi*, and deriving their popular name from the peculiar nature of the first ray or spine of the first dorsal fin. This ray is very strong, and remains in an erect position until the second ray is depressed, when it falls like the trigger of a gun. The T. occurs in tropical seas, and is allied to the urchin-fish.

TRIKU'PIS, Spirid'ion, a Greek statesman and historian, was born at Missolonghi in 1791, and in 1810 was sent to study in London by Lord North, who as Governor of the Ionian Isles chose him for private secretary. Throughout the Greek War of Independence, excepting the presidency of Capo d'Istria, he filled a number of important posts, and under Otto I. was three times envoy to London (1835–38, 1841–43, 1850–62), minister of foreign affairs and public instruction (1843), and president of the senate (1844–49). On Otto's deposition T. withdrew from politics, dying at Athens, February 24, 1873. His *Historia tes Hellenikes Epanastaseos* (4 vols. Lond. 1853–57) is perhaps the chief literary product of modern Greece, and T. is also remembered for his funeral oration on Byron, and by a spirited Cleph war-song, *Ho demos* (Par. 1821). His son, Constantin, belonging to the Radical party, was president of the council (1875–76), and held the portfolio of foreign affairs in Comoundouros' ministry.

TRIMOR'PHISM. In certain species of plants two different combinations of reproductive organs occur, long stamens and short styles on some individuals and the reverse on others. This is called *dimorphism*, and we have examples in the flax and the primrose. T. is the existence of three different forms, as in the purple loosestrife. Fertilization, as a rule, takes place between the male and female organs of the *same height*, consequently securing *cross-fertilization*.

TRING, a market town of Hertfordshire, 31¾ miles N.W. of London by rail, on the Grand Junction Canal, has a Perpendicular parish church, 6 chapels, a market-house, a mechanics' institute, assembly rooms, &c., whilst in the neighborhood is T. park, a seat of the Rothschild's, built for Nell Gwynne by Charles II. Straw-plaiting, sild-throwing, canvas-weaving, and brewing are the chief industries. Pop. (1881) 4354.

TRINITY COLLEGE, an American educational institution, located at Hartford, Conn., and controlled by the Protestant Episcopal Church. It has superior buildings, a fine library, and large endowment.

TRIPET'T'Y, or TRIPATORE', a town in the district of N. Arcot, Madras Presidency, British India, on the right bank of the river Palar, 137 miles S.W. of Madras by rail. It is celebrated for the fine pagodas built on the neighboring hills, to which pilgrims flock in thousands from all parts of India. As a shrine, it is only second to that of Juggernauth in Orissa; and the high priest is known to derive an immense income from votive offerings. T. has a special manufacture of brass work inlaid with copper. Pop. (1871) 10,423.

TRIPLE TIME, in music, is a common measure of time, in which there are three beats to the bar. In compound T. T. there are six beats, the emphasis falling on the first and fourth.

TRI'TON, a genus of *Amphibia* vertebrates, including the water-newts of ponds and ditches. The *T. aquaticus*, *T. cristatus*, *T. Bibronii*, and *T. marmoratus* are familiar species. The name is also given to a genus of Gasteropodous molluscs, of which the *T. variegatus* or Sea Trumpet, the *T. anus* or Wrinkled T., and the *T. distortus* or Twisted T., are examples.

TRIVAN'DRUM, the capital of the native state of Travancore, in the extreme S. of the Indian peninsula, 50 miles N.W. of Cape Comorin, and 2 from the Malabar coast. In the center is a large fort, which contains a celebrated pagoda, the royal palace, and the courts of law; about 2 miles distant is the Residency of the British Political Agent. There is an excellent high school, hospital, and observatory, all under European superintendence. Among the inhabitants are many native Christians, mostly Roman Catholic, and also descendants of early Dutch and Portuguese settlers.

TRIV'ET, Nicholas, was born about 1258, studied at Oxford and Paris, entered the Dominican order, and died in 1328. His chief work is a Latin chronicle on the six English Kings of the House of Anjou (1136–1307). It was first published in 1719 by Anthony Hall, and again in 1845 by Thomas Hog for the English Historical Society. T. has considerable merit as a historian. He is careful and trustworthy in his use of authorities, writes well and breathes a religious spirit.

TROCADE'RO, a fort of Spain, province of Cadiz, 4 miles S.S.E. of Cadiz, captured by the French August 31, 1823. This victory has been commemorated in the name of the *place* in Paris opposite the Champs de Mars, and in that of the permanent building in connection with the Exhibition of 1878.

TRO'CHU, Louis Jules, the defender of Paris against the Germans, was born at Le Palais, in Morbihan, May 12, 1815. In 1835 he entered the special military school at Paris, in 1840 became staff-lieutenant, and in 1841 accompanied the 6th Light Infantry to Algiers. In 1842 adjutant of Lamoricière, and in 1846 of Marshal Bugeaud, he became in the June of 1852 Director of the Staff in the Ministry of War at Paris.

In the Crimean war he was adjutant of Marshal Saint-Arnaud, and, after his death, of General Canrobert; became in November 1854 General of Brigade, and at the head of the First Brigade of the First Army Corps covered himself with glory at the storming of the Malakoff, September 8, 1855. At the battle of Solferino in 1859 he led a division, and after the peace entered the war ministry, where he was destined as the successor of Niel. His pamphlet, *L'Armée Française* (1867), however, which revealed the weakness of the French army and advocated the adoption of the Prussian system, cost him the favor of the Emperor. On the outbreak of the German war he was summoned by Napoleon to the camp at Châlons, and appointed Governor of Paris, and on the popular revolution which followed the disaster at Sedan he became Commander-in-Chief of the army of defence in Paris. T., however, proved a man of plan more than of action, and on the 22d January 1871 he resigned his military command to General Vinoy, and in February his civil authority to the National As-

sembly of Bordeaux. In March 1872 he brought an action for libel against the editor of *Figaro*, in which he was unsuccessful, while his conduct after September 4, 1870, was subjected to much sharp criticism from the press, in consequence of which he resigned his place as a member of the National Assembly in July, and retired into private life at Belle Isle.

TROSS'ACHS (Gael. 'bristled territory'), a romatic defile forming an approach to the W. Highlands of Scotland, is situated in Perthshire, some 8 miles W. of Callander, and extends for about a mile between Lochs Achray and Katrine. The pass, which winds between Ben A'an on the N. and Ben Venue on the S., is confined by lofty rugged precipices, feathered to their summits with birch, pine, and other trees; in the words of Scott, whose name will be associated forever with the district—

> 'Crags, knolls, and mounds, confusedly hurl'd,
> The fragments of an earlier world.'

TROWBRIDGE, John Townsend, born at Ogden, N. Y., in 1827, took up his residence in Boston, Mass; and is known to the American public as a brilliant story-writer. His best-known works are *Father Bright-hopes*, *The Three Scouts*, *Fast Friends*, and *The Book of Gold and other Poems*.

TRUMBULL, Benjamin, D.D., an American clergyman, born at Hebron, Conn., in 1735; educated at Yale College (1759); and in 1760 became pastor of a Congregational Church at North Haven, Conn., which position he continued to hold until his death, Feb. 2, 1820. He was a chaplain in the Continental army. Among his works are *Complete History of Connecticut*, *General History of the United States*, and *Discourses on the Divine Origin of the Holy Scriptures*.

TRUMBULL, Jonathan, LL.D., an American patriot, born in Connecticut, June 10, 1710; educated at Harvard College (1727); engaged in mercantile pursuits; was deputy-governor of the colony (1767–68), and governor (1769–83). He was one of the most strenuous supporters of the Colonial cause during the war of the Revolution, and the well-known expression 'Brother Jonathan' is supposed to have had its origin from his name. Died at Lebanon, Conn., in 1785.

TRUMPET, Sea (*Triton variegatus*), a species of Gasteropodous shells, also named the Conch Shell, attaining the length of a foot, and common in the South Seas, where it is used by the natives as a trumpet. The S. T. is of a white color, streaked with brown and yellow. The outer lip is large and ribbed.

TRUMP'ETER (*Psophia*), a genus of *Grallatorial* or Wading Birds inhabiting S. America, and represented by the *P. crepitans* or Golden-breasted T. and other species. It is so named from the deep, hollow sound it emits. The T. is readily tamed, and becomes a household favorite. The head and neck are glossy black, the back is grey, and the wings and under parts black. The feathers of the back are long and silky. The body is relatively small when compared with the legs. The bill is vaulted towards the tip, which overhangs the lower jaw. The fourth, fifth, and sixth quills are the longest, and the tail and hinder toe are short.

TSCHI'TA, or CHI'TA, the capital of the Russian province of Transbaikalia, Siberia, on the river Ingoda, an affluent of the Amoor, at the base of the Yablonoi Mountains, 255 miles S.W. of Nertchinsk. It has great fairs, and is an important place of trade. Pop. (1873) 2598.

TUBIP'ORA, a genus of *Sclerodermic Corals*, belonging to the order *Alcyonaria* and family *Tubiporidæ*. It is represented by the *T. musica*, or organ-pipe coral, the 'pipes' of the coral representing the *thecæ* or coral-cups. No *septa* or internal partitions are developed. The coral itself is dark red in color, and the polypes are green, and have eight pinnate tentacles surrounding the mouth. The tubes or pipes of the coral are united by cross partitions of external nature, named *epithecæ*.

TUBULA'RIA, a well-known genus of Zoophytes or *Hydrozoa*, belonging to the order *Corynida*. *T. indivisa* is a familiar British species, the polypites being enclosed each in a straw-colored tube. The polypites of T. are provided with two sets of tentacles, one set being much larger than the other, and the generative buds being produced at the bases of the tentacles.

TUCKERMAN, Henry Theodore, a brilliant American author, born at Boston, Mass., in 1813; traveled extendedly in foreign lands and devoted his life to literary pursuits. The following are among his works: *The Italian Sketch Book*, *Rambles and Reveries*, *The Optimist*, *America and her Commentators*, and *Book of Artists*. The latter part of his life was spent in New York, where he died, Dec. 17, 1871.

TUFT'S COLLEGE, an American educational institution, at Medford, Mass., controlled by the Universalists. It was named in honor of Charles Tufts, who gave liberally towards its founding in 1853. It has fine buildings, and an endowment of more than a million dollars.

TUMKUR, the chief town of the district of the same name, in the State of Mysore, India, 43 miles N.W. of Bangalore. It is prettily situated, and surrounded by fruit-trees. Pop. (1871) 11,170.—The *district* of T., which averages 2500 feet above the sea, has an area of 3606 sq. miles; pop. (1871) 632,239. The crops are *ragee*, rice, cocoa-nut, and areca palms. The through traffic, in the hands of *lingayat* merchants, is considerable. The manufactures are cotton cloth, blankets, iron and steel, brass ware, and earth-salt.

TU'NING, the correct adjustment of the sounds of a musical instrument. Such instruments as the flute and horn are tuned without difficulty, as, if the pitch is altered by accident, it affects every note, and may easily be rectified by varying the length of the pipe. The notes of the organ and pianoforte, however, are unconnected and independent, and require careful adjustment from time to time. Stringed instruments, such as the violin and harp, require T. on every occasion on which they are used.

TUNSTALL, a town of the Staffordshire Potteries, England, 2 miles N.N.W. of Burslem, on the Grand Trunk Canal, has two churches, Christchurch and St. Mary's (1859) in First Pointed style, a town-hall, literary institution, &c. Earthen-ware and porcelain are largely manufactured, and there are also extensive iron-works, brick-fields, and collieries. Pop. (1811) 1677; (1871) 13,540; (1881) 14,244.

TURKISH BATH', a popular form of vapor bath, in which the patient, after being subjected for some little time to a considerable temperature in a vapor chamber, is vigorously rubbed down, and is then conducted through a series of cooling chambers until he has regained his normal temperature. All secretions and accretions are thus completely removed from the skin, which is left free to perform its functions healthily.

TÜRR, General Stephan, was born at Baja, in Hungary, 10th August 1825, became a lieutenant in the Austrian army in 1848, and served his first campaign in that year in Italy under General Radetzky. In January 1849, in obedience to the command of the revolutionary government of Hungary, he deserted to the Piedmontese, and was appointed Colonel of the Hungarian legion in the service of the latter. After the disaster of Novara he passed into the duchy of Baden, and served in the revolutionary army, which, however, was soon defeated. The Hungarians took refuge in Switzerland, the government of which aided many to emigrate to the United States. T., however, remained in London on a pension granted by the Sardinian government.

On the outbreak of the war with Russia, he went to the Crimea, took part as a volunteer in several battles, and received a commission from Colonel M'Murdo. Despatched in 1855 to the Danubian provinces to purchase horses, T. was arrested at Bucharest by the Austrians as a deserter, sent to Vienna, tried by a court-martial, and condemned to death. On the vigorous remonstrance of the British government his sentence was commuted to perpetual banishment. In the Italian war of 1859 he was a member of Garibaldi's staff, and in the war in Sicily his aide-de-camp, and before Palermo was appointed a general of division. T. was appointed by Victor Emmanuel in 1861 general of division in the army of Italy, and Commandant of Naples. In the same year he married the Princess Adeline Wyse Bonaparte. He resigned his command in 1864, and in 1869 returned to Hungary.

TURRETI'NI, is the name of a celebrated family of Genevan theologians, descended from a Gonfaloniere of Lucca, whose son, Francisco, had to take refuge in Geneva on account of his religion in 1579, and there died.—Benedictus T., his son, was born at Zürich, 9th November 1588, became pastor at Geneva in 1612, and professor of theology in 1618; represented the Genevan Church at the Synod of Alais in 1620, and in the following year concluded successfully an alliance between Geneva, the States-General of Holland, and the Hanseatic towns. He died 4th March 1631, leaving behind him many theological writings.—Franciscus T., son of the preceding, was born 17th October 1623, studied at Geneva, Leyden, Paris, Montaubon, and Nismes; became pastor, and in 1653 professor of theology in his native city, where he distinguished himself as an opponent of Amyraldism, and a staunch upholder of the decisions of the Synod of Dort, ultimately formulating his views in 1670 in conjunction with several Swiss divines, in the Klostic *formula Consensus*. He died 28th September 1687. His most celebrated work is the *Institutio Theologiæ Elenchticæ* (Geneva 1679–85).—Joannes Alphonsus T., his son, born 13th August 1671, abandoned the strict Calvinism of his ancestors in favor of a mode of thought resembling the contemporary Latitudinarianism of England, and endeavored to unite the various sections of the Protestant Church on a more liberal basis. It was chiefly owing to his efforts that the Genevan Church resolved in 1706 to make the signing of the Formula Consensus, drawn up by Francisco T., optional in the case of candidates for the pastorate. T. studied theology at Geneva and Leyden, visited the English universities,

where he formed several personal friendships, and spent some time in Paris. In 1697 he was appointed to the chair of ecclesiastical history at Geneva, from which in 1705 he was transferred to that of systematic theology. He died at Geneva, 1st May 1737. Of his numerous works the most important are *Cogitationes et Dissertationes Theologicæ* (Gén. 1703. 1737); *De Veritate Religionis Christianæ* (Gén. 1721–23); and *Hist. Eccl. Compendium* (Gén. 1700, 1734), often re-edited and translated. A very full account of the family is given in Herzog's *Realencyklopaidie*.

TUSCON, a city of Arizona, on the Santa Cruz River and the Southern Pacific Railroad. It is surrounded by an agricultural and stock raising country, and is the center of a considerable trade. Mining and the reduction of gold, silver, and copper ores, is carried on to a great extent in this section. It is the largest town in the Territory. Pop. 10,000.

TUSS'ER, THOMAS, best known as the author of *Five Hundred Pointes of Good Husbandry*, was born probably about 1515, at Rivenhall, near Witham, in Essex, England. From his rhyming autobiography it would appear that he served as a chorister first at Wallingford Chapel, and afterwards at St. Paul's, had the honor of being flogged if not instructed by Nicholas Udall at Eton, was attached for a number of years to the court, probably in the capacity of a musician, and at a later date kept a farm for some time in Suffolk. He probably died at London somewhere between 1580 and 1585. His will was privately printed in 1846 at Great Totham, Essex. The *Five Hundred Points* were first published in 1573, having been preceded by *A Hundred Good Points*, which had seen at least five editions since its appearance in 1557. In rude rustic rhymes, which have hardly a claim even to the name of verse, he inculcated a good amount of sound agricultural wisdom; and the book is still of interest for the glimpses it affords of the country life of the times, as well as for occasional passages of quaint and vigorous expression. The best editions are Dr. Mavor's (1812), Arber's (1870), and the English Dialect Society's (1878).

TUTICORIN, a town in the district of Tinnevelly, Madras, British India, near the S. extremity of the peninsula, 70 miles N.E. of Cape Comorin, and 513 S.W. of Madras by rail. Pop. (1871) 10,565. In the roadstead here, where ships ride safely 2½ miles from the shore, is conducted all the sea-borne trade of the district. In 1874–75 the exports were valued at £890,337; the imports at £406,453. There is a pearl-fishery in the neighborhood. T. has acquired increasing importance as the terminus of the S. Indian Railway. The Prince of Wales disembarked here from Ceylon in 1875, and proceeded N. in the first train that opened the line.

TWEED, WILLIAM MARCY, a notorious American politician, born in New York, April 3, 1823. In 1850 he entered politics, and, after holding various positions of public trust, was, in 1869, chosen grand sachem of Tammany Society. He then organized a political ring that robbed New York City of millions of dollars, and for a time held almost absolute political power in the State of New York. He was arrested and tried in 1872, and sent to the penitentiary. In a civil suit against him, the City of New York secured a verdict against him for $6,537,117,38. Died April 12, 1878.

TWICK'ENHAM, a town of Middlesex, on the W. bank of the Thames, is 10 miles W.S.W. of Hyde Park Corner, and has three stations on the South-Western Railway. St. Mary's, with an ancient tower but red-brick nave rebuilt in last century, contains Pope's monument, erected by Bishop Warburton in 1761; and other churches are Holy Trinity (1840; reseated 1877) and St. Stephen's (1874–76). The public buildings include a handsome town-hall, a library and reading-room, the Royal Naval Female School (1856), and the Metropolitan and City of London Police Orphanage, to which a new wing was added in 1878. The site of Pope's famous villa is covered by modern residences, and Orleans House was converted (1877) into a club; but Strawberry Hill, which its builder, Horace Walpole, pronounced 'the prettiest bauble, set in enamelled meadows with filigree hedges,' remains for a monument of Gothic in the 17th c. Pop. (1801) 3138, (1881) 12,479, an increase due to the number of new villas, which, reaching to Richmond Bridge, constitute T. a suburb of Richmond.

TWIGGS, DAVID EMANUEL, an American general, born in Georgia, in 1790; entered the army in 1812 and served with distinction in the war of that year, rising to the rank of brigadier-general; served in the Mexican war with equal distinction, and was presented with a sword by Congress, for his gallantry at the battle of Monterey. In 1861 he was dismissed from the service for having surrendered large quantities of government property to the authorities of the State of Texas, at that time in a state of rebellion against the national government. Died at Augusta, Ga., in 1862.

TYCOON (Chinese 'great lord'), or more correctly Shiogun, the title of the hereditary military despots who ruled Japan from 1192 to 1868, when the revolt of the Daimios swept away the last of the race and reinstated the Mikado in power. The T., who resided at Yeddo, did homage to the *roi-fainéant* at Miako, but ruled unrestrictedly. Hence Europeans carried away the impression that the T. was the real emperor and the Mikado a 'spiritual ruler.'

TYNG, STEPHEN HIGGINSON, D.D., a prominent American clergyman of the Episcopal church, born at Newburyport, Mass., March 1, 1800, and graduated from Harvard College in 1817. He entered the ministry in 1821, and after filling several pulpits, in 1845, became rector of St. George's, New York city, which position he held until recently. He was noted for his eloquence and catholicity of spirit, and succeeded in building up one of the strongest parishes of his denomination. He published *Lectures on the Law and Gospel* (1832), *Recollections of England* (1847), *The Prayer-Book Illustrated by Scripture* (1863), and others.

TYRCONN'EL, RICHARD TALBOT, EARL OF, born in Ireland in 1625, was in early life noted for his unscrupulous character, went to England at the Restoration, but was banished in 1677 for a conspiracy against Charles II. He was created by James II., on his accession, Earl of T., and was in 1686 made commander of the forces in Ireland. In January 1687 he succeeded Clarendon as Lord-Lieutenant, when he commenced a policy which in a few months completely overthrew the English ascendancy, every Protestant judge and magistrate being replaced by an Irish Catholic, and the army being completely purged of its Protestant officers and men, while several new regiments were formed of the most ignorant and bigoted recruits. When the Revolution took place, T., to gain time for maturing his plans, intrigued with William for two months, but at the beginning of 1689 hoisted a flag, embroidered with the words 'Now or Never,' from Dublin Castle, and in a short time had an army of 50,000 men. After the defeat on the Boyne, T. went to France, returned with French forces in the spring of 1691, but died at Limerick, July 14th, 1691. T. was married to Frances Jennings, a sister of the famous Duchess of Marlborough. His name was execrated in England, and is celebrated in the famous contemporary doggerel ballad *Lilli Burlero*, which 'whistled a deluded prince out of three kingdoms.'

TYROLIENE', a song accompanied with dancing, originally a Tyrolese melody. The T. introduced by Rossini in *William Tell* was the first of the kind which was not a Volkslied.

TYR'WHITT, THOMAS, son of Dr. T., canon of Windsor, was born in London, England, 29th March 1730, educated at Eton and Queen's College, Oxford, and elected to a fellowship at Merton. He was Clerk of the House of Commons (1761–67), was appointed curator of the British Museum (1784), and died 15th August 1786. Besides several treatises on classical subjects, T. wrote *Observations on Some Passages in Shakspeare, The Canterbury Tales of Chaucer* (1775–78), and *Poems supposed to have been written at Bristol in the 15th c. by Rowley and others, with a Preface and Glossary*, to which he added an appendix proving that Chatterton was the author. T. merits remembrance mainly for his services as an editor of Chaucer. He was the first who sought to expel from the biography of the poet everything that did not rest on documentary evidence; his collation of the Chaucerian MSS., though not particularly discriminating, was extremely laborious; his arrangement of the 'Tales' is excellent; and his 'Dissertation' and 'Notes,' with all their linguistic imperfections, are of great and enduring value for the interpretation and illustration of the 'Father of English Poetry.'

U.

UCAY'ALE, or UCAY'ALI, a great river of Eastern Peru, and one of the main affluents of the Amazon, of which it was formerly regarded as the head-stream. This honor is now accorded, however, to the Maranon, which, though shorter than the U., is twice as broad as the latter at their confluence. The U. rises in the mountains of Southern Peru, some of its feeders having their sources only 150 miles from the Pacific on the one hand, and 100 miles from Lake Titicaca on the other. In its upper course the U. is known as the Apurimac, and below the junction of the Mantara, in 12° S. lat., it is called the Tambo. After receiving the united waters of the Urubamba and Camisea in 9° S. lat., it becomes known as the U. Its entire course is about 1200 miles in length. The U. has been navigated by steamers for a great part of its course, and a steamer has penetrated by the Pachitea, a tributary on its left bank, to within 220 miles of Callao. The Apurimac is not navigable; but with this exception, and that of a fall on the lower Urubamba, the U. and its principal tributaries are most valuable highways to the heart of a region abounding in vegetable and mineral wealth.

UCHEES, a tribe of American indians, originally occupying that section of country watered by the Savannah river, but now located on a reservation in the Indian Territory, and constituting a part of the Creek confederacy.

U'DALL, NICHOLAS, the author of the first English comedy, was born in Hampshire about 1505 or 1506. Having received his education at Oxford, he chose the profession of a schoolmaster, and in 1534 he passed M.A. and obtained the post of headmaster of Eton, which he held till 1541, when he was dismissed. He afterwards resigned the vicarship of Braintree in Essex, which he had enjoyed along with his mastership; but he continued both to teach and preach, and in 1551 we find him admitted a prebendary of Windsor, and in 1554–55 appointed headmaster of Westminster school. He died in 1556. U.'s comedy of *Ralph Roister Doister*, which was probably written for the Eton boys, is a perfectly harmless piece, with a fair amount of vivacity in its execution and ingenuity in its plot, the hero being led into various awkward situations in the course of his suit to Dame Custance, partly by his own stupidity, and partly by the malicious suggestions of Matthew Merrygreek. The play is in rhyme, and has thirteen *dramatis personæ*.

Hallam notices that the choice of a city-gallant for 'hero' probably determined in some measure the prevalent subject of English comedy all through the Elizabethan age. The exact date of its composition has not been determined; it is quoted in the 3d edition of Sir Thomas Wilson's *Rule of Reason* (1553), but *not* in the 2d edition (1552). There is but *one* copy of U.'s comedy in existence, having no title-page; but it was probably printed in 1566. It is now in the library of Eton College. Of the other productions of U.'s pen it is enough to name *Flowres for Latin Speakynge* (portions of Terence done into English, 1533), translations of part of Erasmus's Paraphrase of the New Testament, and of Peter Martyr's tract on the Eucharist, and a few Latin letters and poems. See Wilson's *Arte of Logike* (1567), Bliss's edition of Wood's *Athenæ Oxonienses*, and the preface to Arber's reprint of *Roister Doister* (1869).

UE'BERWEG, FRIEDRICH, a German philosophical writer, born 22d January 1826, at Leichlingen in Rheinpreussen, studied philology at Göttingen under K. F. Hermann, and philosophy at Berlin under Beneke, and was successively a teacher at Elberfeld (from 1851), *privat docent* at Bonn, extraordinary (1862) and ordinary (1867) professor of philosophy at Königsberg, where he died, June 9, 1871.

U'KERT, FRIEDRICH AUGUST, a German historian born at Eutin, October 28, 1780, studied at Halle and Jena, and was successively inspector at the Gotha gymnasium and librarian at the ducal library. He died May 18, 1851. His chief writings are *Geographie der Griechen und Römer* (3 vols. Weim. 1818–46), and *Ueber Dämonen. Heroen und Genien* (Leip. 1850).

ULIASUTAI, the capital of the Chinese province of Shen-si, in Mongolia, on the line between Si-Ngan-Foo and the Russian frontier. It is an important depôt for the central Asiatic trade with China, and is defended by a garrison of Chinese. The pop., partly Chinese, partly Mongolian, is greatly increased during the fair by the Mongolian nomads, who pitch their tents in the vicinity. Owing to the occasional eruption of the Dzungar rebels from Urumsti, the Russians have failed to open a trade at U., though they tried repeatedly since 1868.

ULL'MANN, KARL, a Protestant theologian, born March 15, 1796, at Epfenbach in the Palatinate, studied theology at Heidelberg and Tübingen, and became extraordinary professor (1821) of theology at Heidelberg, and ordinary professor at Halle (1829) and at Heidelberg (1836). In 1828 U. started with Umbreit the *Theologische Studien und Kritiken*. In 1853 he was made a member of the 'Oberkirchenrath' of Baden, of which he became 'Direktor' in 1856 at Karlsruhe, where he died, January 12, 1865.

UMAN, a town in Russia, government of Kiev, on the Umanka, an affluent of the Bug, 110 miles S.S.E. of Kiev. It has five churches and a synagogue, and has an active trade in farm produce. (Pop. (1870) 15,393.

UMBEY'LA, a mountain-pass on the N.W. frontier of British India, leading N. from the district of Peshawar. The total length from the plain to the village of U., just beyond the crest, is about 11¼ miles. The pass only permits an advance in Indian file, and is everywhere commanded by mountains 4000 feet high. It is celebrated as the scene of the U. campaign of 1863. Continual raids had rendered it again necessary to attack the fanatical colony of Mohammedans—Pathans and Hindustanees—who had in 1858 been expelled from Sitana. It was expected to be a mere expedition of three weeks, but Sir Neville Chamberlain, at the head of 9000 men, was practically blockaded in the U. pass from October 18 to December 16. The English casualities were 847 killed and wounded, while the enemy are said to have lost 3000. At last they broke up, owing to internal dissensions, and the rebel settlement at Mulkah, the object of the expedition, was burned. See *The Indian Mussulmans*, by W. W. Hunter (1872).

UM'BONATE, a term in botany, meaning 'round,' with a projecting point in the center, like the boss or *umbo* of an ancient shield; as the pileus of many species of *Agaricus*.

UM'BREIT, FRIEDRICH WILHELM KARL, a German theologian, born at Sonneborn, near Gotha, April 11, 1795, studied at Göttingen, and in 1820 was appointed professor of philosophy at Heidelberg, where with Ullman he founded (1828) the *Theologische Kritiken und Studien*, and in 1829 was transferred to the theological faculty. He died April 26, 1860.

UMBRELL'A BIRD (*Cephalopterus ornatus*), a species of *Conirostral* birds, allied to the Fruit Crows, and so named from the peculiar form of the crest borne on the head. This crest is composed of long and slender feathers, which slope backwards when at rest. In the erect position the shafts of the feathers radiate like the ribs of an umbrella, completely covering the head, and forming a dome of a beautiful blue color. The breast bears a prominent 'tuft' of feathers, which appear to spring from a fleshy growth. The U. B. is a native of S. America, and has a local distribution. It attains the size of a crow, and its general color is a rich glossy black.

U'MRER, a town in the district of Nagpur, Central Provinces, British India, 28 miles S.E. of Nagpur. Pop. (1872) 11,394. It has a considerable trade, being chiefly noted for its cotton goods with embroidered silk borders. There are 1150 looms, employing twice that number of journeymen, who receive from £1 to £2, 10*s*. per month.

UNAU (*Cholœpus*), a well-known species of sloths or *Bradypodidæ*. Its fore feet are two-toed, and it has twenty-three pairs of ribs, this being the largest number found in the class *Mammalia*.

UN'DERCLAY, the bed of fire-clay which is almost invariably found beneath a seam of coal, and contains usually the peculiar fossil plant known as *Stigmaria*. It is now looked upon as the old soil in which the plants that formed the coal originally grew.

UNDERHILL, JOHN, born in England, and removed to America in 1630; and in 1637 led a force which helped to defeat, and break the power of, the Pequot Indians, by the destruction of their forts at Mystic, Conn. Banished from Boston, on account of his religious views, he visited England, but returned to America, and was governor of Exeter and Dover, in 1641. Died at Oyster Bay, Long Island, in 1682.

UNION CITY, a town of Pennsylvania, 23 miles S.E. of Erie by rail, has 4 churches, 3 banks, and 3 newspapers. It has 2 flour-mills, 2 carriage and several furniture and other wood works, and a large tannery. Pop. (1880) 2171.—U. is also a town of New Jersey. Pop. (1880) 5849.

UNION THEOLOGICAL SEMINARY, founded in New York, N. Y., in 1836. It has recently removed from University Place, to new and elegant buildings on Park Avenue, in the upper part of the city. It is the possessor of one of the finest theological libraries in America, and numbers among its instructors, such eminent scholars as Roswell D. Hitchcock, Philip Schaff, and William G. T. Shedd.

U'NIT. Every quantity consists of two parts, a numerical and a denominational part. The former is a number whole or fractional, the latter is the name of a thing of the same kind as the quantity to be expressed, and of a certain definite magnitude. Thus three feet, twenty pounds, and sixty seconds, are examples of quantities whose *numerics* are three, twenty, and sixty respectively. The denominational parts, which are necessary for the complete determination of the quantities, are the foot, the pound, and the second. When the numeric is *one*, the quantity is the standard quantity itself, and a quantity of which the numeric is unity is called a *unit*. In the examples given above, the foot, pound, and second are evidently the chosen units. We may use different units of the same kind, as when we speak of one yard, three feet, or thirty-six inches. Here all these express the same quantity, but the numerics are different, because different units are chosen.

To express in terms of one U. a quantity which is given in terms of another, we must multiply the original quantity by the number of times which the former U. is contained in the latter. Thus, since there are twelve inches in a foot, to express three feet in inches we must multiply the numeric by twelve, expressing the quantity as thirty-six inches. If any quantities of the same kind are to be compared, we must express both in terms of the same U. Many quantities can be expressed in terms of units of a different kind. In this case we make use of derived units. Thus taking the U. of length as a foot, areas are expressed in terms of the square whose side is unity, and volumes in terms of the cube whose side is unity. Velocities being expressed as so many feet per second involves the time U., and by defining U. velocity as U. space described in U. time, the mathematical treatment of velocities is much simplified. The measurement of force involves, besides the length and time units, another U.—that of mass; and in terms of these fundamental units all physical quantities by proper definition can be expressed.

UNITED STATES MILITARY ACADEMY, at West Point, on the west bank of the Hudson river; founded by Congress, in 1802. It gives its students a thorough military education in every branch of the art of war. Cadets are appointed by the Secretary of war, at the request of Congressional representatives, one being allowed to each district. Besides these there are ten appointments, which are controlled by the President. A four years' course of study is pursued.

UNITED STATES NAVAL ACADEMY, at Annapolis, Md., established in 1845. It provides a four years' course of study, and thoroughly educates for the naval service.

U'NITIES. The law of the *Three U.* of *Place*, *Time*, and *Action*, which ruled supreme in the classical period of the French drama, demanded that there should be no shifting of the scene from place to place, that the whole series of events should be such as might occur within the space of a single day, and that nothing should be admitted irrelevant to the development of the single plot. The introduction of the law was due to Richelieu, who, being, pleased by Mairet's *Sophonisbe*, in which the U. were observed, secured their formal enactment by the Abbé d'Aubignac in his *Pratique du Théâtre*. The restrictions were accepted by Corneille, Racine, and Voltaire, and in short continued in force till the rise of the Romantic school; though Corneille himself, in his essay on the subject, admitted that the unity of place at least had no support from Aristotle or Horace, whose authority had been claimed by D'Aubignac. For a time the validity and value of the law were matters of keen debate.

UNYANYEM'BÉ, a town in Central Africa, capital of a district of the same name, forming part of the country of Unyamnesi. The town of U. is an important settlement of Arab traders, for whose protection a garrison was maintained till lately by the Seyyid of Zanzibar. The houses are substantial, and the Arabs cultivate wheat, onions, and fruit-trees imported from the coast, which is 400 miles distant, The climate is very deadly to Europeans. Pop. 5000. The name U., according to Cameron, signifies 'country of the hoes,' *i.e.*, cultivated country.

UNYO'RO, a kingdom of Central Africa, included between Lake Albert Nyanza, the Victoria Nile, and the kingdom of Uganda. The southern and eastern portions are nearly a dead flat, covered with long grass and thick forests of small trees; but the northern and western districts possess a rolling surface and a park-like vegetation. The promontory of Usongara, on the Albert Nyanza, contains a vast salt-field, whence the surrounding lands are supplied. Cattle constitute the chief wealth of the natives, and ivory, which is very plentiful, is the principal trade medium. The climate is moist, and extremely unhealthy for Europeans. The capital, Mrooli, is situated at the junction of the Kafur River with the Victoria Nile, and is a large place, chiefly remarkable for the extreme filthiness of its streets and dwellings, the king's palace being no exception to the rule. See the works of Speke, Baker, and Stanley.

UPHAM, CHARLES WENTWORTH, born at St. Johns, New Brunswick, May 4, 1802; educated at Harvard College (1821) and Harvard Divinity School (1824); pastor of a Unitarian church at Salem, Mass.; compelled by a loss of voice to leave the ministry, in 1844; and afterwards devoted himself to literary pursuits. U. was elected to Congress (1853), and during his life held several lesser political positions. Among his works are *Lectures on Witchcraft*, *Life of J. C. Fremont*, and *Prophesy as an Evidence of Christianity*. Died at Salem, Mass., June 15, 1875.

UPHAM, THOMAS COGSWELL, D.D., born at Deerfield, N. H., in 1799; educated at Dartmouth College (1818) and Andover Theological Seminary (1821); was pastor of a church (Congregational) at Rochester, N. H. (1823–24); and in 1825 was made professor of mental and moral philosophy at Bowdoin College, which position he held for 32 years. Died in New York, N. Y., April 2, 1872. The following are among his most notable works: *Elements of Mental Philosophy; Life of Faith; Philosophical and Practical Treatise on the Will;* and *Method of Prayer*.

URAS'TER, a genus of *Echinodermata*, belonging to the order *Asteroidea*, and including the common star-fish of British coasts (the *Uraster rubens*), along with other species. The disc or body is small, and the arms usually five. The genus U. appears in a fossil condition first in the Oolitic rocks, and has persisted from that period to the present day.

URBANA, in Champaign Co., O., a railroad and trade center. Pop. 6252.

URFÉ, ANNE D', born in Le Forez of an ancient family in 1555, succeeded his father as bailiff of his native country (1574), and having formed an unhappy union with Diane de Château-Morand (annulled in 1598), took orders in 1603, and died in 1621 a canon of Lyon, vicar-general and prior of Montverdun. The five sonnets published from his *Diane* (1572), and the first book of his *Hymnes* (1608), leave us well content that the bulk of his poems have remained in manuscript.—HONORÉ D'U., his far more celebrated brother, was born at Marseille, Feb. 11, 1568, and studied at the College of Tournon. A brave adherent of the League, he was twice taken prisoner, in prison commencing his *Epistres Morales* (1598); in 1600 he married his brother's wife, his seven years' senior, that thereby her wealth might not be lost to the family. He fared no better than his brother, and, disgraced at court, retired to Piémont, whence in 1610 he issued part of his famous romance, *L'Astrée*. Modeled on Tasso's *Aminta* and the *Pastor Fido* of Guarini, this work, with its medley of prose and verse, of shepherds, knights, and enchanters, of history and mythology, had a great but now scarce intelligible success. La Fontaine tells how he read it in childhood, and came back to it when his beard was grey. Its second and third parts appeared in 1612–19, the two last were published posthumously by the secretary of d'U., who died at Villefranche in Piémont, June 1, 1625.

URMIA, a prosperous town of Persia, province of Azerbijan, in a fertile plain, 12 miles W. of Lake U., and 112 miles S.W. of Tabriz. The plain of U. is 50 miles long and 18 miles wide, and is populous and fertile, being well watered by the streams that descend from the Kurdish mountains. The town is girt with a mud wall and moat, and is surrounded for 12 miles round with gardens intermingled with melon, citron, and tobacco grounds. Pop. 35,000 (2000 Jews).

URMIA, LAKE OF, a salt lake in Azerbijan, Persia, 3900 feet above sea-level, with a length of 90 miles, a breadth of 30 miles, and a circumference of not less than 250 miles. It contains 6 large and about 50 smaller islands, and receives 14 streams, of which the largest are the Jagatu, Tatau, Sefichai, and Ajichai. It has no apparent outlet. The depth for 2 miles does not exceed 3 feet, the average depth is under 12 feet, the greatest depth ascertained 45 feet. The water is so largely impregnated with salt that no fish can live in it, and the banks are covered with a thick saline incrustation, from which a salt of beautiful transparency is obtained for commerce.

UR'QUHART, THOMAS, SIR, a Scottish author, best known as the translator of Rabelais, was born probably in 1605. He spent some time in foreign parts while as yet his 'brains were unripened for eminent undertakings,' visiting Spain, France,

Italy, and Sicily. In 1639 he was present in Scotland at the battle called the Trott of Turiff, and he shortly afterwards entered the service of Charles I., by whom he was knighted in 1641. On his father's death in 1642, he handed over his Scotch estates at Cromarty to trustees and went abroad; but in 1645 he was obliged to come back to Scotland to look after his affairs, and spent some years in a contest with his creditors. After the execution of Charles I. he joined the royalists, and in March 1649 he was declared a rebel by the Estates at Edinburgh. At the battle of Worcester he was taken prisoner, but he was afterwards released; and after a vain attempt to recover his rightful position in Scotland he escaped to the Continent, where he is said to have died in a fit of laughter at the news of the restoration of Charles II. His translation of the first two books of Rabelais, which appeared in 1653–64, and has been frequently reprinted, is a masterpiece in its style; but his other works are mainly interesting for the strange picture they afford of the writer's mental peculiarities. They were reprinted in one volume of 412 pages for the Maitland Club in 1834:—*Epigrams, divine and moral* (1641); *The Trissotetras, or the Most Exquisite Table for Resolving all Manner of Triangles* (1645); *Pantochronochanon, or a Peculiar Promptuary of Time*, tracing the descent of the Urquharts of Cromarty from the Creation (1652); *Ekskybalauron, or the Discovery of the Most Exquisite Jewel* (1652), written as a vindication of the honor of Scotland, and remarkable for the sketches of Chrichton and other eminent Scotchmen; and *Logopandecteision, or an Introduction to the Universal Language* (1653).

URUGUAY', a large river of S. America, rises in Brazil in 28° 40′ S. lat., only 100 miles from the Atlantic, and flows successively N.N.W., S.S.W., and S. till it unites with the Parana, to form the Rio de la Plata. The total length of the U. is about 900 miles, but shoals and rapids prevent large vessels from ascending it beyond Concordia, 200 miles from its mouth. It has a rapid current, and a volume nearly as great as that of the Parana, to whose turbid waters its clear stream presents a marked contrast at their junction. For nearly three-fourths of its length the U. separates the Argentine Republic from Brazil and the republic of U. See *The Paraná, the U., and La Plata Estuaries*, by J. J. Revy (1874).

USAMBA'RA, a country of E. Africa, lying between 4° 20′—5° 25′ S. lat., and 38° 20′—39° 10′ E. long. Its most southerly point is only 50 miles N.W. of the city of Zanzibar. U., which has been called 'the Switzerland of Africa,' is a mountainous country traversed by four parallel ranges running N. and S., and forming a part of the great coast-range which stretches from Abyssinia to Natal. The mountains, which are of volcanic origin, reach a maximum height of 6000 feet, and are usually clothed with trees to their summits. The country is well watered, the soil extremely fertile, the vegetation luxuriant, and the scenery of the loveliest description. A level plain 30 miles wide separates the mountains from the sea. Rice, maize, semsem seed, india-rubber, and tobacco are exported, and cotton of good quality is also indigenous, but is not cultivated. The country, lying on the shortest route to Lake Victoria Nyanza, is likely to rise in importance as the civilization of Eastern and Central Africa advances. See the *Proceedings of the Royal Geographical Society for* 1879.

V.

VAGI'NA, the membranous canal leading from the *uterus* or womb to the external genitalia. The V. in lower mammals, such as the *Ornithorhynchus*, opens into a *cloaca*, while in the kangaroos and other *Marsupialia* it opens into a canal named the *ugo-genital canal*, which receives the efferent ducts of the urinary organs. In higher quadrupeds the V. is distinct both from the *rectum* and the urinary ducts. In the human subject it attains a length of about 4 inches measured along its anterior wall and 6 inches measured on its posterior surface. It lies between the bladder and rectum; constricted at its commencement it becomes dilated towards its uterine end. The coats of the V. number three—an external or muscular layer, a layer of erectile tissue, and an inner or mucous layer. The mucous layer is thrown into folds or *rugæ*, which permit the distension of the canal in the process of *parturition*.

VAIGATCH', an island in the Arctic Ocean, 67 miles long by 26 miles broad, belonging to the Russian government of Archangel, separated by the V. or Yugor Strait from the Continent, and by the Kara Strait from Novaia Zemlia. Its northmost point is under lat. 70° 29′ W. V. is mountainous, especially in the middle. The vegetation is very poor; only on the southern declivities of the mountains are found the sorrel, wild onion, spoonwort, and forget-me-not. V. is rich in furred animals (red and blue foxes, reindeer, polar bears, and wolves), sea-birds, and sea-animals; and in summer the few Samoyedes who live permanently on V. are visited by bands of Russian, Syryane, and Samoyede hunters.

VAILLANT, Jean-Baptiste, Philibert, Comte, a French marshal, was born at Dijon, December 6, 1790, and after studying at the École polytechnique entered the army in 1809 as sub-lieutenant of engineers. He accompanied the grand army in the Russian expedition, and had the misfortune to be taken prisoner. From 1826 to 1830 he served as chief of a battalion in Algiers, and in 1832 he distinguished himself at the siege of Antwerp. In 1837 he returned to Algiers to superintend the fortifications, and in 1840 the reconstruction of the fortifications of Paris was entrusted to him along with Marshal Dode de la Brunerie. His last important achievement was the siege of Rome in 1849, which led to his receiving the marshal's baton in 1851. In 1854 he was War Minister. V. died at Paris, June 4, 1872.

VALE'RIUS MAX'IMUS, a Roman historian, wrote between 29 and 32 A.D. the extant *Factorum Dictorumque Memorabilium libri ix. ad Tiberium Cæsarem Augustum*, a large collection of historical anecdotes arranged under miscellaneous heads. The style of V. M. is forced and cumbrous; 'his Latinity,' said Erasmus, 'is no more like Cicero's than a mule is like a man.' Of this work we also possess two abridgements, by Julius Paris and by Januarius Nepotianus, published by Mai in 1828. The *editio princeps* of V. M. is by J. Mentelin of Strassburg, 1470. The best editions are by Aldus Manutius (Ven. 1534), Lipsius (Antw. 1585), Kempf (Berl. 1854), and C. Halm (Leip. 1865).

VALKYR'JUR [from old Norse *val-r* (Old High Ger. *wal*), 'corpses,' and *kjöra* (Dan. *kaare*, Ger. *küren*), 'choose'], in Northern Mythology are the beautiful 'maids of Odin,' goddesses of fate allied to the Norns. They numbered either nine or thrice nine, and in three bands went forth on horseback and clad in full armor, through air and water, over the wide world to *choose* for Odin the *Valr* or *Einherjar* ('single champions') worthy of Valhalla. At home in Valhalla the V. were the cupbearers of the Æsir and the Einherjar. The belief in the V. toward the close of the heathen period may be seen in the *Njalsaga's* description of Daurrud's vision on the day of the battle of Clontarf. Twelve women came riding through the air and entered a hillside. Through an opening Daurrud saw them there weave a web of men's entrails, with a sword for batten and arrows for shuttles. They sang the while a song: 'The web, the web of war is weaving for the fight: bloody shall be the fray; a king shall conquer: a mighty king and great chieftains shall be slain.' Another moment, and the web was slit in two. With one-half six of the V. hurried to the N. and vanished, while six sped southward with the other half. The incident has been finely told by the poet Gray in his ode, *The Fatal Sisters*.

VALLANDINGHAM, Clement L., an American politician, born at New Lisbon, O., in 1822, and began the practice of law in 1842. During the civil war, he ardently sympathized with the South, and in 1863, on account of treasonable utterances, was placed under arrest by order of Gen. Burnside. He was tried by court-martial, and sentenced to confinement during the war. Subsequently, by order of President Lincoln, he was sent beyond the lines; but, being dissatisfied with his treatment at the hands of the Confederates, he went to Canada, and while there was nominated for governor of Ohio, but was defeated by 100,000 majority. At the close of the war, he returned to Ohio, and was killed at Lebanon, O., June 17, 1871, by the accidental discharge of a pistol.

VALLE'JO, a city and seaport of California, on an arm of San Pablo Bay, and on the California Pacific Railway. It has a spacious harbor, a street railway, and several flour-mills, ship-yards, iron-foundries, machine-shops, and broom-factories. V. exports large quantities of grain, and supports six churches and one weekly and two daily newspapers. Pop. 5987.

VALPARAISO, in Knox Co., Ind., on the Wabash River. Three railroads pass through it and it is the termination of one. It is engaged in manufacturing lumber, staves, and woodenware; and is a shipping point for large quantities of grain, pork, and cattle. Pop. 8500.

VAL'PY, Richard, D.D., born on the island of Jersey, 7th December 1754; from the college of Valognes (1764–69) in Normandy proceeded to Southampton Grammar School, and thence to Pembroke College, Oxford. Ordained in 1777, he held a living at Bury-St.-Edmunds, and from 1781 to 1830 was head-master of Reading Grammar School, which he raised to a state of high efficiency. He died at Kensington, 28th March 1836. His Greek and Latin Grammars enjoyed in their day a great reputation; and his brother Edward V. (1764–1832), head-master of Norwich School from 1810, was also well known by his *Elegantiæ Latinæ* (1803; 11th ed. 1836), an edition of the Greek Testament (3 vols. 1810), and other works.

VAN BUREN. John, a son of Martin (See Buren, Martin Van, Chambers' En.), born at Hudson, N. Y., in 1810; educated at Yale College (1828), and became a lawyer; visited England with his father, who had been appointed Minister to that country; was made attorney-general of New York (1845) and for many years played an important part in the politics of his native state. Visiting Europe in 1866, he died upon the return voyage, Oct. 13, of that year.

VAN CORTLANDT, Philip, born in New York, N. Y., in 1749; studied land-surveying; entered the Continental army, at the outbreak of the Revolution; served on the frontier against the Indians (1778); participated in several of the engagements of the war; was promoted to the rank of brigadier-general for gallant services at Yorktown; and, after the close of the struggle, held several political positions, being a member of Congress from 1793 to 1809. Died at Croton, N. Y., in 1831.

VANDERBILT, Cornelius, born of humble Dutch parentage at Staten Island, New York, 27th May 1794, after a meagre education turned waterman at an early age, and from his seventeenth year ran a ferry-boat of his own between New York and Staten Island. Thus and as schooner-master he had acquired $9000 by 1817, when, entering the service of Thomas Gibbons, he became captain of a New York and New Brunswick steamer, and a hotel keeper at the latter place. In 1829 he started steamboats of his own upon the Hudson in 1851, opened the Nicaraguan steam line to California, and in 1855, having visited Europe two years before, established the Havre-New York service. His gift to the Government of a splendid steamer (1862) earned him the thanks of Congress, and subsequently engaging in railroad enterprise, he became the president of four railway companies. One of the wealthiest of the citizens of the U. S., he presented $1,000,000 to the Central (now Vanderbilt) University of the Methodist Episcopal Church, which, founded at Nashville, Tennessee, in 1872, and opened in 1875, possesses the four departments of theology, law, medicine, and philosophy, and has 26 instructors and over 300 students. V. died at New York, 4th January, 1877. William Henry, one of his sons, who was born in New Brunswick, 8th May 1821, is now probably the wealthiest citizen of the United States.

VAN DORN, Earl, a Confederate general, born in Mississippi, in 1821, and graduated from West Point in 1842. He served during the Mexican war, and was promoted for gallantry at Cerro Gordo, Contreras, and Chapultepec, and was wounded at the capture of the City of Mexico. At the beginning of the civil war, he entered the Confederate service, and soon rose to the rank of major-general. He was defeated at Pea Ridge and Corinth. He was shot in Maury Co., Tenn., May 8, 1863, by Dr. Peters, a gentleman with whom he had had differences of a private character.

VANI'NI, Lucil'io (or, as stands on his title-pages, Julius Cæsar), owes his celebrity for the most part to his martyrdom in the cause of free thought. Born at Taurisano, near Otranto, in 1584, he studied at Rome, Naples, and Padua, and having joined the order of the Carmelites, wandered through Switzerland, Germany, the Netherlands, and France, preaching, teaching, debating, and attracting attention by his vivacious ability. From the threats of the Inquisition he fled to England; but, though he was admitted a member of the English Church by Abbot, Archbishop of Canterbury, his conduct was too independent for a proselyte, and for no other reason he was actually imprisoned in the Tower. His defence of Christian doctrine was supposed to be a mere pretext for the presentation of the counter arguments, and on the strength of some dubious passages he was accused of heresy, and in due course sentenced as an atheist to have his body burned and his ashes scattered to the four winds. His execution followed on February 19, 1619, and his memory has been blackened by the representatives of his clerical foes. In philosophy V. was an ardent follower of Averroes.

VAP'EREAU, Louis Gustave, a French littérateur and editor, born at Orléans, April 4, 1819, won (1838) the prize for philosophy in a competition between all the colleges of France, became private secretary (1842) to Victor Cousin, whom he assisted in his *Pensées de Pascal*, and after spending some years as a professor in a college at Tours returned to Paris, where he passed *avocat* (1854), but devoted himself to literature. His best-known work is the *Dictionnaire des Contemporaines* (1st ed. 1858; new ed. 1870), which is equally admirable for the fulness of its knowledge and the felicity of its criticism. Another important work of V.'s is his *Dictionnaire Universel des Littératures* (Par. 1876).

VARANUS, an important genus of Lacertilia or lizards, including the 'Monitors,' so named from the belief that they warned persons of the approach of crocodiles by a peculiar hissing noise. The family *Veranidoe* are represented by some of the largest members of the lizard group. They are found in Asia, Africa, and Australia. The V. *Niloticus* of Egypt attains a length of from 4 to 6 feet, and the *Hydrosaurus sulcator* of the East Indian Archipelago occasionally 8 feet. The head and belly are covered with small scales, and the tongue is protrusible and fleshy. The teeth are lodged in a common groove, and there are no palatal teeth. The tail is compressed in the water-living species, and has a double row of carinated scales.

VARNHA'GEN VON ENSE, Karl August, born at Düsseldorf, 21st Feb. 1785, passed his boyhood at Hamburg, where his father practised as a medical man. He studied medicine himself, but with it philosophy and ancient literature, at Berlin, hearing Fichte and A. von Schlegel, at Halle Schleiermacher, Wolf, and Steffens. With Chamisso he edited a *Musenalmanach* in 1803, the year of his meeting Rahel, with whom, on removing to Tübingen in 1808, he maintained by voluminous letters the friendship of the past five years. Entering the Austrian army (1809), he was wounded at Wagram, and visited Paris as Bentheim's adjutant in 1810; but in 1812, on Austria's joining in the Russian campaign, quitted her service, and next year accepted a captain's commission in that of Russia. Exchanging a career of arms for that of Prussian diplomatist, he married Rahel, 27th Sept. 1814, and having attended the chancellor Hardenberg to the Vienna Congress, and thence to Paris (1815), settled at Karlsruhe as resident minister. In 1819, however, a variance with his government recalled him to Berlin, where, busy with literature and bearing the empty title of *Geheim Legationsrath*, he chiefly resided down to his death there, 10th Oct. 1858. —V.'s wife, Rahel Antonie Friederike Levin, the daughter of a Jewish merchant, was born at Berlin in June 1771. Ill-health, and love affairs made hopeless by the stigma of her birth, saddened her earlier years, though hers was brightest of all the Jewish *salons*, the focus then of Berlin's intellect. Courted by all the chief authors, artists, and statesmen of those disordered times, she exercised by her broad sympathies and liberal culture a lively influence on the German mind; but in 1806 she left Berlin to wander awhile in France and Germany. The death of Marwitz at the battle of Montmirail (1813) removed V.'s rival in her affections; and Rahel, turning a Christian less from conviction than convenience, entered upon a union of pure and singular happiness, closed by her death at Berlin, 7th March 1833.

VA'SA, a family which held the throne of Sweden from 1523 to 1654 in the persons of Gustaf I., Erik XIV., Johan III. (1568–92), Sigismund, Karl IX., Gustaf II. Adolf, and Queen Christina. The name of V. has in recent times been claimed by the son of the deposed king Gustaf IV. Adolf, Prince Gustaf of Holstein-Gottorp, who was born in 1799, and died at Pillnitz, August 4, 1877.

VA'SO-MO'TOR SYS'TEM, the name given to those nerve-filaments derived from the *Sympathetic system* of nerves and which are distributed to the walls of the arteries. The V.-M nerves thus exercise a very direct influence on the blood-circulation, and appear to originate in the gray matter of the *medulla oblongata*. Division of the V.-M. nerves of the abdominal blood-vessels causes dilatation, and effects comparable to those following severe internal hæmorrhage.

VASS'AR COLL'EGE, 2 miles E. of Poughkeepsie, New York, was founded in 1861 by Matthew Vassar (1792–1868) for higher female education. A fine brick edifice, 500 feet long by 200 wide, it was erected at a cost of $200,000, and opened in 1865, its studies embracing the regular course of first-rate colleges, and the students receiving B.A. and M.A. degrees. V. C. is probably the most thoroughly equipped institution in the world for the education of the female sex.

VAT'ICAN COUN'CIL, the nineteenth œcumenical council of the Catholic Church, assembled at Rome, 8th December 1869, 719 prelates out of the 1037 invited having answered the summons

of Pope Pius IX., and of this number 276 were Italians. Its decrees on the 'dogmatic constitution of the Catholic faith,' aimed at rationalism, were unanimously adopted, 24th April; but those on the 'dogmatic constitution of the Church of Christ,' *i. e.*, the decrees of Infallibility, received (13th July) only 400 'placets,' against 60 'placets' *juxta modum*, and 88 'non-placets,' the last including Cardinals Rauscher, Schwarzenburg, and Mathieu, with Bishops Dupanloup, Strossmayer, and Hefele. On July 18, 110 recalcitrant prelates stayed away, and thus the Infallibility became a dogma by 533 affirmative against 2 dissentient votes. The council, having achieved its principal object, was indefinitely postponed, 20th October 1870, owing to the outbreak of the Franco-German War. See the recent works of Manning, Newman, and Gladstone; and J. Friedrich, *Geschichte des Vaticanischen Konzils* (Bonn. 1877). See COUNCIL in Chambers' En.

VAUGHAN, CHARLES JOHN, D.D., was born at Leicester in England, in 1810. From Rugby, where he was a pupil of Dr. Arnold's, he passed to Trinity College, Cambridge, graduated B.A. in 1838, became a fellow in 1839, and proceeded M.A. in 1841. As Chancellor's classical medalist he was in 1838 bracketed with Lord Lyttleton. In 1841 he became vicar of St. Martin's, Leicester, and from 1844 to 1859 was head-master of Harrow School, was appointed vicar of Doncaster, and in 1869 succeeded Dr. Robinson as Master of the Temple. In 1879 he accepted the deanery of Landaff. Dr. V. stands in high esteem for his fine spirit, his tireless activity, and his generous devotion to all the duties of his profession.

VAUGHAN, HENRY, an English poet, distinguished by the self-adopted title of the 'Silurist' (i. e., the Silurian, or native of South Wales), was born at Newton, near Skethrock, about 5 miles from Brecon, in the year 1621–22. Along with his twin brother Thomas he entered Jesus College, Oxford, in 1638. Their university course was disturbed by the Civil War; both were through family tradition keen royalists. Thomas at least took part in the conflict as a combatant, and Henry was sufficiently prominent to be imprisoned by the Parliamentarians. From Oxford Henry appears to have proceeded to London. We next find him practising medicine at Brecon; and in 1647 he settled down at Skethrock as village doctor. Of his after life little is known except by inference. He appears to have sufferred from serious illness and a 'peevish, inconstant state of health;' and if Mr. Grosart's conjecture be right, he was bereaved of a youthful and deeply-loved wife. He survived till April 23, 1695.

VAUGHAN, ROBERT, D.D., was born in Wales in 1795, and received his theological education at Bristol College. After discharging the pastoral office for six years at Worcester, he was called in 1825 to an Independent Chapel in Kensington. From 1830 to 1842 he was professor of history in London University (now University College), and in 1842, on the removal of the Lancashire Independent College from Blackburn to Manchester, he was called to the presidency. Owing to failing health he resigned the post in 1857. He died at Torquay, June 15, 1868. V. was the principal projector of the *British Quarterly Review*, and editor from its commencement in 1845 till 1866.—His son, ROBERT ALFRED V., was a young man of rare promise and attainment, who died in 1857 at the age of twenty-two. Of the literary power that was in him he has left proof in *The Witch of Endor and other Poems* (1844), and *Hours with the Mystics* (2d ed. 1860). See *Robt. V., a Memorial* (Lond. 1869), and J. G. Rogers' *Pulpit Memorials* (Lond. 1878).

VEC'TOR, in mathematics, is any directed quantity, and was first introduced as a fundamental conception clearly distinguished from that of mere magnitude by Sir W. R. Hamilton of Dublin in his calculus of quaternions. The simplest manner in which to represent such a quantity which involves both direction and magnitude is by means of a straight line in space; then the V. may be regarded as a *stepping* from one extremity of the line to the other. It then follows as an immediate consequence that, if we take any three points, A, B, and C, the step from A to C is equivalent to the step from A to B and the step from B to C taken in succession, a truth which is expressed in quaternion language thus —the V. AC is equal to the sum of the vectors AB and BC. The addition of vectors is therefore exactly the same process that has long been recognized in the composition of velocities and forces.

VELELLA, or SALLEE MAN, a species of *Coelenterate* animals in some degree related to the jellyfishes, but distinguished by the diagonal crest or sail borne on the upper surface of the organism, and which is used as a means of propulsion. The bulk of the V. (of which *V. vulgaris* is the common species) consists of the rhomboidal *pneumatophore*, or float bearing the diagonal crest, placed vertically. A single polypite depends from the flat structure, with reproductive bodies and tentacles. The average length of the V. is about 2 inches long by 1½ inches in height. The organism is of a beautiful delicate blue tint.

VELLORE', the most populous town of the district of N. Arcot, Madras Presidency, British India, near the left bank of the Palar river, 80 miles W. of Madras by rail. Pop. (1871) 38,022. The old fort, which was formerly very strongly garrisoned, now contains only a single regiment of native infantry. Inside there is a pagoda, with beautiful stone carvings. A central jail has lately been built for 1000 long-term prisoners, where excellent carpets, rugs, &c., are manufactured. V. was the scene of a mutiny in 1806, when the native sepoys rose and murdered 113 European officers and soldiers. The outbreak was promptly suppressed. It was supposed to have been instigated by the sons of Tippoo Sultan, who had been confined in the fort as state prisoners since 1799. They were forthwith removed to the neighborhood of Calcutta, where the last survivor died in 1875. See Kaye's *History of the Sepoy Mutiny* (vol. i.).

VE'NUS' GIR'DLE (*Cestum Veneris*), the name given to a species of *Cœlenterate* animals, belonging to the highest group of that sub-kingdom—the division *Ctenophora*. It appears in warm seas as a long, band-like animal, attaining a length of from 2 to 3 feet. At night it is markedly phosphorescent.

VERA CUEVADE, a town of Spain, province of Almeria, on the Almanzora, near its entrance into the Mediterranean, 65 miles S.W. of Carthagena. It has an old Moorish castle, and a massive parish church, and produces pottery, wine, oil, &c. There are mines in the vicinity. Pop. 10,500.

VERCELL'I BOOK, a MS. volume discovered by Dr. Blume at Vercelli in 1823, which, in spite of its mutilated condition, is one of the most valuable relics of Old English literature, containing as it does not only six Saxon homilies, but also six poems which together amount to 7000 lines. A transcript of the poems, made by Dr. Blume for the Record Commission and still preserved by the Master of the Rolls, was printed as an appendix B to the report of the Commission for 1836.

VER'DEN, a town of Prussia, province of Hanover, on the river Aller, 2½ miles above its junction with the Weser, has a Gothic cathedral (1290–1490) and two other Evangelical churches, a Catholic church, and a gymnasium. V. has considerable trade, manufactures tobacco, cigars, and lucifers, and carries on brewing, fishing, and shipbuilding. Pop. (1875) 7669.

VER'GIL, POL'YDORE, a native of Urbino, studied at Bologna, and taking orders became chamberlain to Pope Alexander VI., who sent him to England to receive Peter's Pence (1501). In England he tarried fifty years, holding the rectory of Church Langton, Leicestershire (1503), and archdeaconry of Wells (1508), with prebends of Hereford and St. Paul's (1513), and returning to Italy in 1551, to die four years later at his native town. A slight dispute touching the priority of V.'s *Proverbiorum Libellus* (1498) to Erasmus' *Adagia* led to a life-long friendship between the authors; but V. is better remembered by his *De Inventoribus Rerum* (1499), edition of Gildas (1525), *De Prodigiis* (1526) and *Historia Anglica* (Basel 1534; 7th ed. Lond. 1651). As the first history where the facts and statements of earlier chroniclers were weighed and compared, and also by its choice Latinity, the last-named work merited the high value set on it by V.'s compeers. Sir Henry Ellis edited for the Camden Society the three last and first eight books of an old MS. translation of it in the British Museum (1844–46). See the Preface of Dr. W. A. Hammond's translation of the *De Rerum Inventoribus* (New York 1868).

VERGNIAUD, PIERRE VICTURNIEN, born at Limoges, 31st May 1759, settled as an advocate at Bordeaux in 1781, and on the outbreak of the Revolution was sent as a deputy to the Constituent Assembly, and afterwards to the National Convention, where his brilliant eloquence gave him a foremost place in the ranks of the Girondists. During the trial of Louis XVI. V. strove with all the power of his oratory to persuade the Convention to let the nation decide the fate of its former monarch, yet when it came to vote he pronounced for death. After the execution of Louis he became an avowed opponent of Robespierre and the party of the Mountain, was arrested 4th June 1793, and guillotined with twenty of his companions on the 21st of October following. See Barthe, *Les Orateurs Francais* (4 vols. Par. 1820); Vermorel, *Oeuvres de V., de Gaudet et de Gensonné* (Par. 1866), and Touchard Lafosse, *Hist. Parlementaire et Vie Intime de V.* (Par 1848).

VERMILYE, THOMAS EDWARD, D.D., LL.D., an eminent American clergyman, born at New York, N. Y., in 1803; educated at Yale College and Princeton Seminary; was pastor of churches in New York (Presbyterian), West Springfield, Mass. (Congregational), Albany, N. Y. (Reformed), and in 1839 was called to the pastorate of the Collegiate Reformed church in New York, which position he continues to hold (1885) as *emeritus*.

VERNE, JULES, a popular French story teller, was born at Nantes, February 8, 1828. After producing several comedies and operatic librettos he was fortunate enough to strike on the new vein of fictitious narrative which he has since worked with immense diligence and success. The main characteristic of his method is the continual employment of quasi-scientific material in the construction of his most fantastic and incredible creations.

The most remarkable of these productions, which are, however, altogether lacking in pure human interest, are *Twenty Thousand Leagues under the Sea*, *From the Earth to the Moon*, *Across Africa in a Balloon*, and *To the Center of the Earth*. Most of V.'s works have been translated into English and German.

VÉRON, LOUIS DESIRE, a French journalist, born in Paris, 5th April 1798, took his degree of M.D. in 1823, and in 1824 received the appointment of physician to the royal museums, but in 1828 renounced his profession and obtained a post on the staff of *La Quotidienne*. He afterwards founded the *Revue de Paris* (1829), was director or lessee of the opera from 1831 to 1835, and acted as editor of *La Constitutionnel* from 1835 to 1856. In this last capacity he at first strongly supported M. Thiers, but after 1849 he became a partisan of the Bonapartes, and in 1851 loudly applauded the *coup d'état*. In 1852 he was appointed officer of the Legion of Honor. He died Sept. 27, 1867.

VERPLANCK, GULIAN CROMMELIN, LL.D., a well-known American author, born at New York, N. Y., in 1786; educated at Columbia College (1801), and became a lawyer; in 1822 was made professor of the evidences of Christianity in the theological seminary of the Episcopal Church at New York; was member of Congress (1825–33), and held several other political positions. Died at New York, N. Y., in 1870. He published *Evidences of Revealed Religion*, *Discourses and Addresses*, &c.

VER'WICK, a town in the province of W. Flanders, Belgium, close to the French frontier, and 10 miles N.W. of Courtray by rail. It has large tobacco manufactures. Pop. (1870) 6758.

VESICULA'RIA, a genus of Lower *Mollusca* or *Molluscoida*, belonging to the *Polyzoa*, included in the group *Ctenostomata*. In this group, the cells of which the organism is composed arise from a common tube, and the cell mouths are terminal in position.

VETHAKE, HENRY, LL.D., born in Guiana, South America, in 1792, and came to the United States, when young; was educated at Columbia College (1808), and studied law; devoted his life to teaching mathematics, and was in this capacity, connected with the faculties of several American colleges. Died at Philadelphia, Pa., Dec. 16, 1866. He published *The Principles of Political Economy* (1838).

VE'TRO DI TRI'NA, or LACE GLASS, is a beautiful ornamental variety of glass made at Venice by enclosing small rods or threads of opaque glass within an object made of transparent glass so as to form a regular lattice pattern; and at each intersection an air bubble is shut in to give beauty and variety to the work.

VIARDOT-GARCIA, MADAME MICHELLE-PAULINE, an operatic singer, daughter of Manuel Garcia and younger sister of Madame Malibran, was born in Paris, July 18, 1821. She was a pupil of Liszt. She appeared as Desdemona in London in 1839, and proving herself a worthy successor to her great sister, soon obtained a European reputation. In 1840 she married M. Louis V., director of the Italian Opera in Paris. Perhaps her greatest successes were in Meyerbeer's operas, *Les Huguenots* and *Le Prophète*, as Valentine in the former, and as Fides in the latter. Her splendid voice had a compass of 3 octaves, and she shone in the concert-room, particularly in the rendering of Spanish songs, as conspicuously as on the stage.

VIAUD, THÉOPHILE DE, born in 1590 at Clairac in Agenois, came to Paris in 1610, and by his talents and sprightly wit secured the patronage of the young lords and choicest spirits of the day. With Balzac he made a tour in Holland, next entered the household of the Duc de Montmorency, and, after writing court ballets and masques, had a great success with the tragedy, *Pyrame et Thisbé* (1617). His fondness for satire made him enemies, who, coupling obscenity with the charge of heresy, procured his banishment (1619); but after a two years' exile in England he returned to Paris, and abjuring Calvinism followed the king on his campaigns of 1621–22. Persecution, however, soon recommenced, his attack on a single Jesuit rousing the hatred of the entire order; and for the filthy *Parnasse Satirique* (1623), published under his name but without his knowledge, if indeed he had any part in it at all, he was sentenced first to death (1625), then to perpetual banishment. Montmorency obtained him leave secretly to return to Paris, where at the age of thirty-six he died in the duke's hôtel, 25th September 1626. Odes, sonnets, epistles, and elegies, fresh but fantastic, make up with vigorous prose the bulk of V.'s works, which, unduly exalted in the 17th c., fell in the 18th into complete oblivion, from which they were rescued by the Romanticists. See the preface to Alleaume's edition of them (2 vols. Par. 1856), and Théophile Gautier's *Les Grotesques* (Par. 1844).

VI'BORG, a län of Finland, comprising that part yielded to Russia by Sweden by the treaties of Nystad (1721) and Abo (1743), lying S. of Karelia between the Gulf of Finland and the Lake of Ladoga. Area 1662 sq. miles; pop. (1875) 289,010 (88 per cent. Lutheran). The surface is mostly mountainous, but is marshy along the coast. The principal rivers are the Voxen and the Kymene. The inhabitants are occupied with agriculture, cattle-rearing, fisheries, and a coast transit-trade.

VIBRAC'ULA, the name given to the peculiar moving or vibratile filaments associated with the 'Birds' Head Processes' or *Avicularia* of the *Polyzoa*. Their nature is still undetermined, but some authorities believe them to be rudimentary *polypides* or *Zooids*.

VICTORIA, in Victoria Co., Tex., on the Guadalupe River, 45 miles from Indianola. It is at the junction of the Gulf, West Texas & Pacific and N. Y. Texas & Mexico railroads. It is surrounded by a fine agricultural region. Pop. 8500.

VIELLE', the old name for the hurdy-gurdy. It had usually five strings, and was tuned in various ways. It was a favorite and even fashionable instrument in France in the middle of the 18th c. It is still played by itinerant Savoyards in the streets of London and Paris.

VIER'SEN, a town of Rhenish Prussia, on the Nord-Canal, 5½ miles N.E. of Gladbach by rail. It has one Evangelical and one Catholic church, carries on dyeing and bleaching, and manufactures silks, half-silks, cottons, woollens, velvet, ribbons, lace, damask, leather, strawplait, and tobacco. Flax is extensively cultivated in the neighborhood. Pop. (1840) 4543; (1875) 19,705.

VIERZON-VILLE, a town of France, department of Cher, at the confluence of the Yèvre and the Cher, 50¾ miles S. of Orleans by rail. It has some important ruins. There are manufactures of porcelain, glass, parchment, leather, hosiery, and vinegar. Corn and vines are grown in abundance. Pop. (1876) 8995.—V.-VILLAGE, less than a mile distant, has manufactures of lace and wire-drawing. Its once famous steel-works and blast-furnaces are no longer in operation. Pop. (1876) 1058.

VIK'RAMADIT'YA, a great legendary Hindu monarch of India, whose capital was at Oojein in Malwa, and whose era, 57 B.C., is still current in Hindustan proper. He is regarded as the champion of the revived Brahminic faith, who drove away the Buddhists to Ceylon.

VILLEHAR'DOUIN, GEOFFROI SIRE DE, an old French warrior and chronicler, was born probably about 1155 or 1160, in the family château near Bar-sur-Aube. In 1180 he succeeded his father Guillaume as Marshal of Champagne under Thibaut, brother of Henri II. of France, and in 1201 he was one of the ambassadors despatched to Venice to make arrangements for the transport of the forces for the fourth crusade. On his return he found Thibaut dangerously ill, and it was soon his duty to act as guardian of the rights of the widowed princess, Blanche of Navarre. Having concluded a treaty in her name with the king, Philippe Auguste, he departed for the East, where he distinguished himself greatly in the conflict which finally placed Baldwin of Flanders on the throne of the Byzantine empire. Rewarded by the new monarch with extensive lands on the Hebrus, and appointed Marshal of Rumania, he repaid the favor by saving the crusaders from disastrous defeat near Adrianople in 1205. On his death in 1213 his nephew Geoffroi inherited his title and possessions. The narrative of the fourth crusade, by which V. ranks among the most important historians of the time, covers the period from 1198–1207, and consists largely of his own personal experience. Its principal defect is the prominence given to purely military matters.

VILLEMARQUÉ, THEODORE CLAUDE HENRI HERSART, VICOMTE DE LA, was born at Quimperté, in Bretagne, July 6, 1815, and having early distinguished himself by his works on the Breton language and literature, received the decoration of the Légion d'Honneur (1846), and was admitted a correspondent of the Berlin Academy (1851), and a member of the French Academy (1858). Besides other works, V. has published *Coutes Populaires des Anciens Bretons* (2 vols. 1842), *Poëmes des Bardes Bretons du Sixième Siècle* (1850), *Noticés des Principaux Manuscrits des Anciens Bretons* (1856), *La Legende Celtique en Irlande, en Cambuè et en Bretagne* (1859), *Myrdhinn ou l'Enchanteur Merlin* (1860). *Le Grand Mystere de Jesus* (1865), &c.

VILL'I, the name given to those projections of the mucous membrane of the intestines which constitute the openings of the *lacteals* or *absorbent vessels*. The *chyle* or product of digestion passes through the V., and is thence conveyed to the blood-system. The V. attain a length varying from a line to a line and a quarter, and may number from 50 to 90 per square line. The surface is coated with columnar epithelium, and internally are found blood-vessels and lacteal vessels.

VILL'ON, FRANÇOIS, one of the earliest French poets, was born at Paris in 1431. The few authentic details of his life which we possess are to be gathered from his verses, where he paints his own character in anything but favorable colors. His father was of humble rank, perhaps a shoemaker, and his mother appears to have

been a woman of fine character, full of piety and love for her son. He began to attend the University of Paris, but soon deserted the lectures for evil courses of all descriptions, of which he makes full confession in many of his poems, and of which the *Repues Franches*, though admittedly not by V. himself, give a too faithful picture. He was in fact the first of the long series of literary Bohemians of Paris, always living at other people's expense, and very often carrying his love for the goods of others, or his boisterous debauches, to such a length as to land him in prison. Some exploit of this sort led to his removing in 1456 from Paris to Angers, and before leaving Paris he composed a burlesque will in verse, known as his *Petit Testament*. Next year, however, he was again in Paris, where he was shortly afterwards imprisoned in the Châtelet, and would probably have been executed but for the intervention of Charles d'Orleans. Again in 1461 we find him in prison, this time at Meury-sur-Loir, and after his release he seems to have composed his *Grand Testament*. After this his life is almost a blank. He is stated on the authority of Rabelais to have retired towards the end of his life to Saint-Maixent in Poitou, and also to have visited England. He died about 1487.

His popularity may be judged from the fact that between 1489 and 1542 twenty-six editions of his poems were published in Paris and three in Lyon. The best modern editions are that in the *Bibliothèque Elzevirienne* (Par. 1854), that of M. Jannet (Par. 1867), and that of Paul Lacroix (Par. 1877). Several English translations have been made of his famous ballad, *Mais où sont les neiges d'Antan;* by Rosetti, among others. Swinburne has given us a version of the *Ballad of the Fair Armourer*, and an English translation of almost all his works has been privately printed by John Payne (1878). See Besant's *Early French Poetry* (1868), Campaux's *F. V., sa Vie et ses Œuvres* (Par. 1859), Nagel's *F. V.* (Berl. 1877), and Longnon's *Études biographiques sur F. V.* (Par. 1877).

VIL'NA, a government of West or White Russia, surrounded by the governments of Kovno, Vitebsk, Minsk, Grodno, and Suvalki. Area 16,411 sq. miles; pop. (1879) 1,073,539. The surface forms an undulating sandy plain, with hill country in the S. and E. Except in the N.E., where Devonian sandstone and limestone occur, the formations are Lower Tertiary, consisting of layers of clay-slates, gravelly sandstone, coarse limestone, lignite, and marl. The rivers run to the Niemen, which forms the W. and part of the S. boundary, and whose chief tributary, the navigable Vilia, crosses from E. to W. the middle of V., while the Disna flows N.E. to the Düna on the N. border. There are in V. 400 small lakes, and numerous wooded marshes. Pine-woods, in which are found the elk, bear, wolf, boar, and glutton, cover 38 per cent. of the surface. The cereal products are rye, oats, buckwheat, and barley, the trade in which, as in wood, pitch, tar, turpentine, honey, and wax, is chiefly in the hands of Jews. V. is traversed by the St. Petersburg-Warsaw Railway. —V., the capital, is situated on the Vilia, 42½ miles S.S.W. of St. Petersburgh by rail. It has narrow and irregular streets, 18 squares, 2 large suburbs, called *Antokolla* and *Rudaishka*, a ruined castle, an imperial palace, a theater, and the Ogiński Palace, which is now used as government buildings. Of its churches 35 are Catholic (including the cathedral, with the tomb of St. Casimir and the great churches of St. John and St. Peter), 6 Russo-Greek, and 3 Protestant. There are also a synagogue, a mosque, and several Catholic and 2 Greek monasteries. The university, founded in 1576, was abolished in 1832, when the greater part of its library, observatory, and scientific collections were removed to St. Petersburg and Kiev. The other chief educational institutions of V. are a Catholic Priest's College, a Lithuanian Orthodox Priest's College, a Rabbinical School, a classical gymnasium, and 3 Hebrew schools. It has also an antiquarian museum, a deaf and dumb institute, and an orphanage, several factories and distilleries and an active trade. V. is a very old town. In the heathen period it was a holy place. In 1387 Jagellon here introduced Christianity, and built the cathedral on the site of the old heathen temple. Pop. (1879) 88,693 (about 20,000 Jews).

VINAROZ', a town of Spain, province of Castellan, at the mouth of the Servol on the railway between Valencia and Tarragona, has some small trade in salt, oil, and wine, besides the building of fishing-boats. Pop. 9200. In November 1810 the French general, Musniers, defeated the Spanish army here.

VIN'EGAR EEL (*Anguillula aceti*), a small species of *nematoid* worm, inhabiting vinegar. The V. E. is one of the 'free' or non-parasitic nematoids. The young are produced in large numbers, and frequently by a process analogous to asexual methods of reproduction.

VINELAND, a town of New Jersey, 34 miles S. of Philadelphia by rail. With the exception of a few blocks in the main avenue, the town is laid out in fruit-farms of from 5 to 25 acres, and resembles a vast park. It has ten churches, numerous schools, flour, wood, machine mills, &c. There are 2 daily and 4 weekly newspapers. In 1880, 345,791 quarts of berries, 23,784 crates of peaches, and 1,210,188 lbs. of grapes were exported. Pop. (1880) 2519. V. was founded by Charles K. Landis in 1861 on 'temperance principles.' The cultivation of fruit forms the chief industry.

VINTON, ALEXANDER HAMILTON, D.D., an American divine, born at Providence, R. I., in 1807; educated at Yale Medical College, and practiced as a physician (1828–32); entered the ministry of the Episcopal church (1835); was rector of churches at Portland, Me. (1835–36), Providence, R. I. (1836–42), Boston, Mass. (1842–58), Philadelphia, Pa., (1858–61), New York City (1861–70), and in 1870 was called to the rectorship of Emanuel church, Boston. Died in 1881.

VINTON, FRANCIS, D.D., an American clergyman, born at Providence, R. I., in 1809; educated at West Point (1830), and pursued the calling of a civil-engineer for several years; entered the ministry of the Episcopal church (1838); was rector of churches in Providence and Brooklyn, and in 1855 became assistant rector of Trinity church, New York City. In 1869 he became professor of ecclesiastical law and polity, in the theological seminary of his denomination, at New York. Died at Brooklyn, N. Y. in 1872. He published *Manual Commentary on the General Canon Law of the Protestant Episcopal Church in the United States* and *Arthur Tremaine, or Cadet Life*.

VI'OLLET-LE-DUC, EUGENE EMMANUEL, born in Paris, 27th January 1814, studied ancient art at Rome and Taormina (1836–37) as well as in the cities of Southern France, and in 1840 was charged with the restoration of the exquisite Sainte Chapelle. Since then he has been employed on many of the historic monuments of Gothic art in France, notably Notre Dame (1846), and as engineer he assisted in the defence of Paris (1870–71), while playing in politics the part of a hot republican.

VI'RET, PIERRE, a Huguenot theologian, born at Orbe in the Pays de Vaud in 1511. Along with Farel he was one of the earliest preachers of the Reformation in Switzerland. Having held ministries at Geneva and Lausanne, he was summoned towards the close of his life by the Queen of Navarre to teach theology at Orthez, where he died in 1571.

VIRGULA'RIA, or SEA-ROD, a genus of *Cœlenterate* animals belonging to the order *Alcyonaria* and family *Pennatulidæ*. The V. are common round the British coasts. Each of these organisms consists of a colony of polypes, having a sclerobasic or axial coral. The tentacles are pinnate. *V. mirabilis* is a familiar species.

VIS'ON, a genus of *Carnivorous* quadrupeds included in the *Mustelidæ* or weasel family. Of this genus the Mink (*V. lutreola*) is the most familiar example. It inhabits N. Europe and N. America, attains a length of a foot and a half or rather less, and is of a brown color, marked with white on the chin and jaws. The V. swims with great ease, the feet being slightly webbed. The fur is very valuable.

VIZAGAPATAM (Visakha-patta-nam = 'the land of Visakha,' the Hindu Mars), the chief town of the district of the same name, in the Madras Presidency, British India, on the sea-coast, 380 miles N.E. of Madras, pop. (1871) 32,191. It stands at the head of a bay, on a small river, and carries on a large coasting trade. One of the points of the bay, called the Dolphin's Nose, rises 1500 feet above the sea. A British factory was settled here in the middle of the 17th c. There are special manufactures of cotton cloth, gold and silver embroidery, silver, ivory and horn ornaments. The *district* of V. occupies the strip below the E. Ghauts S. of Ganjam and the wild hill country behind; area 18,344 sq. miles; pop. (1871) 2,159,199. The crops are rice, oil-seeds, sugar-cane, and tobacco. The hills rise to the height of 5000 feet. Sugar is extensively manufactured under European superintendence. This tract formed one of the N. Circars occupied by the British in 1767, and includes the semi-independent States of the Jeypur Agency.

VIZIAN'AGRAM, a town in the district of Vizagapatam, Madras Presidency, British India, 35 miles N. of Vizagapatam, and 12 miles from the sea-coast; pop. (1871) 20,169. In the fort is the palace of the Rajah of V., a Rajput family which figures largely in the early history of the British in Madras.

VO'GEL, EDUARD, an African traveler, was born at Krefeld, March 7, 1820. His father was Johann Karl Christoph V., afterwards director of the public school at Leipzig, and his sister is known in German literature as Elise Polko. Devoting himself to astronomy, V. studied at Leipzig and Berlin, and in 1851 became assistant to Hind in London; but in 1853 he was called to take command of an expedition from England intended to co-operate with Barth and Overweg in Central Africa. In January 1854 he reached Lake Chad, in December joined Barth near Zinder, and in 1855 pushed S. to Yacoba and the Benue. Before the close of the year he entered the kingdom of Wadai, where in the early part of 1856, probably on 8th February, he was brutally massacred near Abeshr. See his sister Elise Polko's *Erinnerungen an Einen Verschollenen* (Leip. 1863).

VOGT, CARL, a German scientist of most pronounced radicalism, born at Giessen, July 5, 1817, studied medicine, but subsequently devoted himself to scientific pursuits. He has published many works, all of which advocate the grossest materialism.

VOI'TURE, VINCENT, born at Amiens in 1598, studied at Paris, and by a copy of verses (1614) securing the patronage of Gaston d'Orléans, became comptroller of that prince's household. Through a fellow-student, the Comte d'Avaux, and his own gay wit, he gained an entrée to the choicest Parisian circles, notably to the Hôtel de Rambouillet, of which he was looked on as the laughing, as Balzac its serious, philosopher; and in 1634 he was chosen one of the early members of the French Academy. Despatched to Tuscany (1638) to announce the Dauphin's birth, he passed on to Rome, there to receive the membership of the Academia dei Umoriste; and on his return became the king's maître d'hôtel (1639), from this and from other appointments drawing a revenue of 18,000 livres. Gambling his only passion, he lived on gallant and frivolous to the last, dying in Paris, 26th May 1648. The rondeaux of V. are the best among their kind; of his sonnets one gave rise to the great literary feud of Jobelins and Uranistes; his *Lettres* (ed. by Roux, 1856) were regarded as models of the epistolary art. Yet somehow they all have lost their point; the charm and prettiness ascribed to them can no longer be seen, though it is allowed that modern French prose owes much of its present facility to V.

VOORHEES, DANIEL W., an American statesman, born in Indiana, in 1828; educated at Asbury University (1849) and, studying law, was admitted to the bar; soon became prominent as a leader of the Democratic party in his state; was in congress (1861–65) and again (1869–71); was appointed U. S. Senator in 1877, to fill an unexpired term, and was elected to that position in 1879, which he now (1885) holds.

VOR'TIGERN, a British prince who flourished in the 5th c. According to Gildas, Bede, Ethelwerd, and the *Old English Chronicle*, he invited Hengist and Horsa to come over and assist him against his enemies the Picts and Scots. Nennius, on the other hand, represents the German chiefs as exiles who came to the island unasked. Whichever form of the story be true, it seems certain that after a short time the new-comers, reinforced by fresh bands of their countrymen, turned against V., and wrested from him the Kentish territory. Nennius is the first to bring 'the beautiful daughter of Hengist' on the scene. He does not, however, name her. This is first done by Geoffrey of Monmouth (12th c.), who in the main follows and expands the version of Nennius. Geoffrey calls her Rowena, or, according to some MSS., Ronwen and Ronwenna; and he is the first to tell the familiar legend of the lady making a low curtsy to V. and saying, as she offered him a cup of wine, 'Lauerd King, wacht heil,' and how the 'devil' made him so enamored of the lovely pagan that he married her that same night. There is something like unanimity in the chroniclers regarding V.'s character. He was at once tyrannical and lascivious; and monkish indignation (as expressed in the legend of St. Germanus) affirms that he was finally destroyed by fire from heaven. We may at least safely presume that V. came to a violent end, probably in conflict with the heathen adventurers who had established themselves in his dominions.

VUL'CAN, the name given to the intra-mercurial planet which M. Lescarbault believed he observed crossing the sun's disc on March 26, 1859. In 1856 Leverrier had pointed out that to account for certain irregularities in the motion of Mercury it was necessary to assume the existence of matter between the sun and that planet, and Lescarbault's discovery was hailed as corroborating this theory. The subsequent but unsuccessful endeavors to observe another transit of this body cast grave doubts upon the whole question of existence, and until lately Lescarbault's object was supposed to have been a comet. In 1876, however, Porro and Wolf of Zurich recorded a similar transit; and on July 29, 1878, during the total solar eclipse, which was visible from America, a bright object was observed near the sun by two independent observers, Professor J. C. Watson and Professor Lewis Swift, who are both agreed that what they observed was a planet. Gaillot has compared the position of Watson's planet with the various orbits which Leverrier had assigned as the most probable orbits of Lescarbault's planet, and has shown it to be compatible with one of these. The period of revolution Gaillot fixes at 24·25 days, and gives reasons for believing the inclination of the orbit not to exceed 7°. From recent researches it would appear that earlier observations are on record than those of Lescarbault, notably one by De Vico in July 1837, and one by De Cuppis in October 1839.

W.

WAAG'EN, GUSTAV FRIEDRICH, a writer on art, was born at Hamburg, 11th February 1794, and educated in Silesia, whither his father, a painter of some note, removed in 1807. As a volunteer he made the campaigns of 1813–14, but subsequently turning to art under the influence of Ludwig Tieck, to whom he was related, he studied at Breslau, Dresden, Heidelberg, and Munich, and after traveling in the Netherlands, published *Ueber Hubert and Johann van Eyck* (Bresl. 1822). He traveled with Schinkel in Italy in 1824, and was appointed director of the picture-gallery of Berlin in 1830. His subsequent life was spent mainly in art tours through Europe, in which he visited France, England, Spain, St. Petersburg, &c. He died at Copenhagen, 15th July 1868.

WABASH COLLEGE, an educational institution, at Crawfordsville, Ind., controlled by Presbyterians. It was founded in 1833, and has four buildings and a fine library.

WACO, in McLennan Co., Texas, on the Brazos River, 95 miles N. by E. of Austin. It has two railroads, and is engaged in agriculture, stock raising, wool growing, and manufacturing. Pop. 9000.

WADDELL, JAMES IREDELL, a Confederate naval officer, born at Pittsboro', N. C., July 13, 1824, and entered the U. S. navy when 17 years of age. At the outbreak of the civil war, he resigned his position and entered the Confederate service. In 1863 he was sent to Europe by the Confederate States, and in 1864 took command of the Shenandoah, which had formerly been named the Sea-King, and had been engaged in the British merchant service, and which had been bought by the Confederacy from a Liverpool merchant, and fitted out for privateering. After putting into Melbourne, Australia, for repairs, he sailed upon a thirteen-months' cruise, during which time he succeeded in destroying 32 U. S. merchant vessels and property to the value of $6,000,000. At the close of the war, Waddell sailed to Liverpool, and delivered the Shenandoah over to the British government. Shortly after he returned to the U. S.

WADD'ING, LUKE, born at Waterford in Ireland, 16th October 1588, after studying theology at the Lisbon Jesuit Seminary, entered the Franciscan order (1605), and became professor of divinity in the University of Salamanca. As chaplain to an embassy despatched to treat concerning the doctrine of the Immaculate Conception, he came in 1618 to Rome, and settling there, founded the Irish Franciscan College of St. Isidore (1625), acted as papal councilor in the great controversy with the Jansenists, whose tenets he shared at first but presently renounced, and was procurator of his order (1630–34) and vice-commissary (1645–48). He refused a cardinal's hat, and died at Rome, 18th November 1657.

WADD'INGTON, GEORGE, D.D., son of Rev. George W., vicar of Tuxford, Nottinghamshire, England, was born 7th September 1793. A brilliant university career at Cambridge was rewarded by a fellowship in Trinity College; and after several years of foreign travel he received the vicarage of Marsham in Yorkshire. In 1840 he was made Dean of Durham, and in the following year Warden of Durham University. He died 20th July 1869.

WADE, BENJAMIN FRANKLIN, an American statesman, born at Springfield, Mass., Oct. 27, 1800. When 21 years of age he removed to Ashtabula Co., Ohio, and seven years later was admitted to the bar, and began to practice law, in which profession he soon rose to distinction. After holding various political positions in his own state, he was, in 1851, elected U. S. Senator, which position he continued to fill until 1869. He was an earnest opponent of slavery, and a hearty supporter of Mr. Lincoln's administration during the civil war. Upon the assassination of Mr. Lincoln, he became acting Vice-President of the U. S. Died March 2, 1878, at Jefferson, O.

WADSWORTH, James Samuel, an American general, born at Geneseo, N. Y., Oct. 30, 1807, and educated at Hamilton and Harvard colleges. He studied law, but never engaged in the practice of that profession. At the outbreak of the civil war he entered the Union service, and was present at first Bull Run. In 1861 he was made brigadier-general of volunteers, and, in 1863, commanded a brigade at Gettysburg, where he distinguished himself by his gallantry. He was shot, May 6, 1864, in an engagement near the Rapidan, and died two days afterwards.

WAIN'WRIGHT, Jonathan Mayhew, D.D., D.C.L., a bishop of the American Episcopal Church, born at Liverpool, England, Feb. 24, 1792, of American parents, with whom he came to the U. S. in 1803. He graduated from Harvard College in 1812, and entered the ministry in 1816. He was rector of churches in Hartford, Conn., New York City, Boston, Mass., and in 1852, became Bishop of New York. He was a learned scholar and eloquent preacher. He published *Music of the Church* (1828), *The Pathways and Abiding Places of Our Lord* (1851), *The Land of Bondage, a Journal of a Tour in Egypt* (1852), and *Our Saviour with Prophets and Apostles* (1850). His life has been written by Rev. John N. Norton. Died in New York, Sept. 21, 1854.

WAKE'FIELD, Gilbert, a classical scholar and theologian, was born February 22, 1756, in the parsonage at St. Nicholas of Nottingham, England, and in 1776 became a Fellow of Jesus College, Cambridge. After holding two curacies in the Church of England, he obtained (1779) a classical tutorship in a dissenting academy, and in 1786 he formally withdrew from his connection with the Established Church. For two years (1799–1801) he was imprisoned in Dorchester jail for a seditious libel contained in his *Reply to some Parts of the Bishop of Llandaff's Address to the People of Great Britain* (Lond. 1798), and a few months after his release he died, September 9, 1801.

WAKEFIELD, a town of Middlesex Co., Mass., on the Boston & Maine Railroad, 10 miles from Boston. It is extensively engaged in the manufacture of iron castings, rattan goods, boots and shoes. Pop. 5548.

WAL'FISCH BAY is situated on the S.W. coast of Africa, in 22° 50′ S. lat. It possesses safe anchorage, but is without fresh water, and its shores are barren and desolate in the extreme. Fish are very abundant, and it was formerly a favorite whaling-ground, whence its name. Valuable deposits of copper and lead exist some distance inland, but are not yet worked. The climate of W. B. is almost rainless, and is fairly healthy except in the hot months, when low fever prevails. In 1878 the coast-line between the Cunene and Orange rivers, a distance of 720 miles, was annexed to Cape Colony, the English flag being hoisted at W. B. The strip of land thus taken possession of is from 13 to 18 miles broad.

WALKER, Amasa, LL.D., born at Woodstock, Conn., in 1799; engaged in mercantile pursuits at Boston, Mass.; was prominently connected with the anti-slavery movement; held several political positions in Massachusetts; was a member of Congress (1862–63); was for several years professor of Political Economy at Oberlin College, O.; and during the latter period of his life was lecturer on political economy at Amherst College, Mass. Died Oct. 29, 1875.

WALK'ER, Frederick, an English artist, was born in Marylebone, 24th May 1840, studied at the British Museum and at 'Leigh's,' and by the time he entered the Academy (1858) was earning a livelihood by designing wood-engravings. His beautiful drawings in *Once a Week* brought him into notice. Engaged by Thackeray to help him out with his illustrations for the novels, he was the 'F. W.' who gave to the crude designs of the humorist their charm of spirit, finish, and grace. He drew much for the Messrs. Dalziel Brothers, but with Miss Thackeray's *Village on the Cliff* ended his work for the engraver. He now devoted himself to painting, both in oil and water-colors. In the first his works were 'The Lost Path' (1863), 'Bathers' (1867), 'Vagrants,' and 'In the Glen, Rathfarnham Park' (1868), 'The Old Gate' (1869), 'The Plough' (1870), 'At the Bar' (1871), and 'The Harbor of Refuge' (1872). His water-colors comprise 'Spring' (1863), 'The Bouquet' (1866), 'Fisherman and Boy' (1867), 'Streams in Inverness-shire' (1868), 'Wayfarers' (1870), 'Girl at a Style,' and 'The Housewife' (1871), 'The Escape' (1872), 'The Village' (1873), 'The Rainbow' (1874), and 'Fishmonger's Shop' (1875). He died at St. Fillan's, Perthshire, 4th June 1875. An exhibition of 150 of his works took place in 1876.

WALKER, James, D.D., an American clergyman, born at Woburn (now Burlington), Mass., in 1794; educated at Harvard College (1814); studied theology and entered the ministry of the Unitarian church; was pastor of a church of that denomination at Charlestown, Mass. (1818–38); was professor of moral and intellectual philosophy at Harvard (1838–53), and was president of that institution (1853–60). Died at Cambridge, Mass., Dec. 23, 1874. Besides sermons and editions of several works as text-books, he published *A Memoir of Daniel Appleton White* and *A Memoir of Josiah Quincy*.

WALKER, James Barr, D.D., an American clergyman, born at Philadelphia in 1805; educated himself while working, first as an operative in a factory, and then as a printer; engaged in teaching; studied law; completed his education at Western Reserve College, O. (1831); engaged for a time in journalism; was licensed to preach by the Congregational church; and lectured at Oberlin College and the Chicago Seminary on the relations between science and revealed religion. He is the author of numerous works, among which the following may be mentioned: *God Revealed in Creation and in Christ, Philosophy of Skepticism*, and *Philosophy of the Divine Operations in Human Redemption*.

WALKER, Robert James, an American statesman, born at Northumberland, Pa., July 19, 1801, and graduated from the University of Pennsylvania in 1819. In 1821 he was admitted to the bar, and in 1826 removed to Natchez, Miss., where he became a successful lawyer. In 1836 he became U. S. Senator, in which position he attained highest distinction for his legal learning and masterly eloquence. During the civil war he was a strong supporter of the government, and in 1863–64 was its financial agent in Europe, where he was successful in negotiating large loans. At the close of the war he resumed the practice of law at Washington, D. C., where he died Nov. 11, 1869.

WALKER, William, an American adventurer, born at Nashville, Tenn., in 1824; became a physician and afterwards a lawyer; was for a time engaged in editorial pursuits, first at New Orleans and then at San Francisco; in 1853 led an expedition for the conquest of Northern Mexico, which after some trifling successes, surrendered to the United States authorities; was brought to trial and acquitted; in 1855 led an expedition to Nicaragua, with the intention of conquering that country; gained two battles and caused himself to be made president; in 1857, when imperilled by a powerful insurrection, surrendered to a United States man-of-war, and was returned to New York; attempted two other expeditions of like character, but was prevented by the U. S. government; in 1860 sailed from New Orleans to Honduras, where, after some temporary successes, he was seized, court-martialed, and shot, Sept. 12, 1860.

WALLA WALLA, in Walla Walla Co., Washington Territory. It is surrounded by a farming, grain, and stock raising district, and carries on an extensive trade with the surrounding country. Pop. 4000.

WALLINGFORD, a town in New Haven, Co., Conn., 13 miles N. of New Haven. It is largely engaged in the manufacture of Britannia ware. Pop. 6000.

WALLACE, Lewis, born in Indiana, in 1827; served with distinction in the Mexican, and also in the civil war. He presided at the court-martial which tried Pres. Lincoln's assassins, and was (1884), U. S. Minister to Turkey. He published *The Fair God* (1873) and *Ben Hur* (1880).

WAL'TON, Brian, born in 1600 at Seymour in Cleveland, Yorkshire, England, studied at Magdalen College and Peterhouse, Cambridge, and after graduating (1619) kept school in Suffolk. He became rector of St. Martin's Ongar, London, and Sandon in Essex (1635), chaplain to the king and a prebendary of St. Paul's (1639), but was sequestered from all these offices by the Parliament in 1642, having rendered himself obnoxious to the Puritans by his *Treatise on the Payment of Tithes and Oblations in London* (1641). Taking refuge in Oxford, he there designed the famous Polyglot that bears his name, and which in spite of infinite disturbances for his loyalty he completed in four years' time. At the Restoration he was rewarded with the bishopric of Chester, but died in London, 29th November 1661.

WALWORTH, Mansfield Tracy, an American novelist, born at Saratoga in 1830, and graduated from Union College in 1849. He published *Hotspur*, *Stormcliff*, and *Warwick*, all of which were brilliant literary productions, and had large circulations. He was shot and killed by his son Frank, at the Sturtevant House, New York, June 3, 1873. The shooting was the result of domestic differences between Walworth and his wife.

WALWORTH, Reuben Hyde, LL.D., born at Bozrali, Conn., in 1789, was largely self-educated; was admitted to the bar in 1809, and began the practice of that profession at Plattsburg, N. Y.; participated in the war of 1812 with the rank adjutant-general of the state troops; was member of congress (1821–23), one of the judges of the circuit court (1823–28), and state chancellor (1828–48). W. ranked high as a jurist, and his decisions are always good authority. Died at Saratoga, N. Y., in 1867.

WARD'LAW, Elizabeth Halket, Lady, a Scottish poetess, daughter of Sir Charles Halket of Pitferrane, was born April 1677, married Sir Henry Wardlaw of Pitreavie in 1696, and died in 1727. She is the authoress of the fine ballad of *Hardyknute*, which was long handed about in MS. as a genuine product of an-

tiquity, and was printed as such by Ramsay in his *Evergreen* 1724). The secret of the authorship was first disclosed by Percy in his *Reliques of Ancient English Poetry* (1755). Lady W. also touched up the ballad of *Gilderoy;* Kirkpatrick Sharpe was 'almost persuaded' that she wrote 'the grand old ballad of *Sir Patrick Spens,*' and finally Dr. Robert Chambers, in a controversial pamphlet, ascribed to her the fabrication of most of the 'historical' Scottish ballads.

WARE, in Hampshire Co., Mass., on the Ware River Railroad, about 21 miles from Springfield. It is largely engaged in cotton and woollen manufactures. Pop. 5500.

WARE, HENRY, D.D., an American divine, born at Sherburne, Mass., in 1764; educated at Harvard College (1785), and entered the ministry of the Congregational Church; was pastor of the First Church of Hingham, Mass. (1787–1805); and was professor of divinity at Harvard from 1805 until his death at Cambridge, July 12, 1845. He was one of the leaders of the Unitarian movement, which resulted in the division between that body and Evangelical Congregationalists. Among his works may be mentioned *Letters to Trinitarians and Calvinists;* and *An Inquiry into the Foundation, Evidences, and Truth of Religion.*

WARE, HENRY, JR., D.D., son of the preceding, born at Hingham, Mass., in 1794; educated at Harvard College (1812); entered the ministry of the Unitarian Church and was pastor of a church in Boston (Second Unitarian) from 1817 to 1830; became professor of pulpit eloquence at Harvard in 1829, which position he held until 1842. Died at Framingham, Mass. in 1843. He was one of the most active organizers of the Unitarian body. He was the author of *Hints on Extemporaneous Preaching* and *Life of the Saviour.*

WAR'HAM, WILLIAM, born about 1450 at Church Oakley, Hampshire, England, from Winchester was elected scholar of New College, Oxford, of which he became a fellow in 1475. At Oxford he commenced the study of law, and having taken his LL.D., repaired to London (1488) to practise in the Court of Arches. His sober abilities were brought by Archbishop Morton under the notice of Henry VII., who attached him to Poynings' embassy to the court of Burgundy (1493, the probable year of W.'s ordination). His inculent exposure on this occasion of Duke Perkin's claims led to his rapid advancement, and he became precentor of Wells, Master of the Rolls (1494), Archdeacon of Huntingdon (1496), Bishop of London and Lord Chancellor (1502), and Archbishop of Canterbury (1503). The popular minister of an unpopular king, W. was charged with divers important missions, but as an opponent of the marriage to Catherine enjoyed less favor with the Eighth than the Seventh Henry, and in 1515 gladly resigned the Great Seal to Wolsey, having labored to get quit of it for several years. With Wolsey he always stood on amicable terms, but his chosen friends were the scholars of the New Learning, Colet, Grocyn, Linacre, and Erasmus, all of whom he helped to preferment, which Erasmus repaid by the noble preface to his *St. Jerome.* From lettered retirement W. was called in 1529, weighed down with age and bodily infirmities, by the burning questions of the royal divorce and royal supremacy. On the first he sided passively with Henry, on the second yielded, presenting the submission of Convocation to the King three months before his death at Canterbury, 22d August 1532.

WARNER, CHARLES DUDLEY, a well known American writer, born at Plainfield, Mass., Sept. 12, 1829, and graduated from Hamilton College in 1851. He studied law, and practiced for a time in Chicago, Ill., and after that edited the *Press and Courant* of Hartford, Conn. He has, besides numerous magazine articles, published *My Summer in a Garden* (1871), *Saunterings* (1872), *Back-Log Studies* (1872), *Mummies and Moslems* (1876), and others. With Samuel L. Clemens (Mark Twain) he produced *The Gilded Age.*

WARNER, SUSAN, an American novelist, born at New York, N. Y., in 1818, and devoted her life to literary pursuits. She published *The Wide, Wide World; Queechy; The Hills of Shatemuc; The Golden Ladder; The Old Helmet; American Female Patriotism;* and *The Law and the Testimony.* The first two attained enormous circulations, and were translated into several languages. W. died at Highland Falls, N. Y., March 17, 1885.

WARREN, a town of Trumbull Co., O., on the Mahoning River, 52 miles E. of Cleveland. It has four railroads, and is noted for its coal and iron industries. Dairying is one of the chief industries of the surrounding country. Pop. 6000.

WARREN, JOSEPH, an American patriot, born at Roxbury, Mass., June 11, 1741, and graduated from Harvard College in 1759. He studied medicine and began the practice of that profession in Boston. He was an ardent patriot, and after the battle of Lexington, was active in organizing the Continental militia, and was made major-general by appointment of Congress. He was killed at the battle of Bunker's Hill, June 17, 1775, near the spot where the monument in memory of that conflict now stands. His life has been written by A. H. Everett.

WARR'EN, SAMUEL, English novelist and lawyer, was born in Denbighshire, Scotland, 23d May 1807, studied at Edinburgh for the medical profession, but afterwards went to London and qualified as a lawyer. He was called to the bar at the Inner Temple in 1837, made Queen's Counsel in 1851, and appointed Recorder of Hull in 1852. The following year brought him the degree of D.C.L. from Oxford; in 1856 and 1857 he was elected a member of Parliament; and in 1859 he was appointed by Lord Chelmsford a Master in Lunacy. He resigned the recordership of Hull in 1874, and died 29th July 1877. W.'s best achievements in fiction were *Diary of a Late Physician* (1832, 2 vols.), and *Ten Thousand a Year* (1841, 3 vols.); and in professional literature, *Popular and Practical Introduction to Law Studies* (1835; new ed., entirely remodeled, &c., 1845); and *Blackstone Systematically Abridged* (1857). As a novelist W. enjoyed an amazing success, which was not confined to England, but extended to America and the Continent. He possessed genuine humor, but of the kind which is hardly to be distinguished from extravagence and caricature. Of W.'s lesser productions it is enough to note *The Lily and the Bee* (1851), a strange rhapsodical poem on the Great Exhibition of 1851; *Now and Then* (1847, a novel of religious tendency; and *Moral and Intellectual Development of the Age* (1854). A collected edition of his literary works was published in 5 volumes (1853–54), having been preceded by a German edition by Tauchnitz (1843–48).

WASHBURN, EMORY, LL.D., an American lawyer and statesman, born at Leicester, Mass., in 1800; educated at Williams College (1817), and began to practice law at Worcester, Mass., was a judge of the court of common pleas (1844–47), governor of the state (1854–55), and professor of law at Harvard (1855–76). Died at Cambridge, Mass., in 1877. He published *Treatise on the American Law of Real Property* and law of *Easements and Servitudes,* both of which are standard authorities.

WASHBURN, ELIHU BENJAMIN, born at Livermore, Me., in 1816; learned the printer's trade; studied law and began the practice of that profession at Galena, Ill.; was a member of congress (1853–69); was appointed secretary of state, by Pres. Grant, in 1869, but soon resigned, and was made minister to France; and was recalled at his own request in 1877.

WASHINGTON, a manufacturing town of Fayette Co., O., on Point Creek. It has railroad communications with Cincinnati, Columbus, and other important points. Pop. 5000.

WASHINGTON AND JEFFERSON COLLEGE, an American educational institution at Washington, Pa., established in 1865, by the consolidation of Jefferson College at Carronsburg, Pa., and Washington College at Washington, Pa. It has new buildings, and an endowment that supports its faculty of nine professors.

WASH'INGTON AND LEE UNIVER'SITY, at Lexington, Virginia, was originally the Augusta Academy at Greenville, and was chartered in 1782. A grant of stock from General Washington was commuted by the legislature to an interest-bearing fund of $50,000, and this sum has been augmented by gifts of $25,000 from the Cincinnati Society in 1803, and of $40,000 from Mr. J. Robertson in 1826. The institution comprises 13 elective schools, including schools of law, engineering, and applied science. Scholarships are opened to divinity students, sons of ministers, intending journalists, teachers, and practical printers, and the foremost pupils of certain high schools and academies. Degrees are only gained by examinations in the several schools. The government is vested in the president and faculty under a board of trustees.

WASHINGTON, BUSHROD, LL.D., nephew of George W., born in Virginia, in 1759; served in the Colonial army during the Revolution; practiced law at Philadelpia, Pa., and afterwards in his native state; and in 1788 was made one of the judges of the U. S. supreme court. Died at Philadelphia in 1829. He published several volumes of *Reports.*

WAST'WATER, in Cumberland, the seventh largest of the English Lakes, lies 14 miles S.S.W. of Keswick, from which it may be gained by the steep Sty Head (1560 feet) or the Black Sail Pass (1690 feet). Shut in by rugged mountains, among them Scafell Pike (3208 feet), the highest point in England, W. presents an aspect of wild and gloomy grandeur. It is 3 miles long by half a mile wide, and has a depth of 270 feet.

WATERFORD, a town of Saratoga Co., N. Y., on the Hudson River, near the month of the Mohawk River, 4 miles from Troy. It is engaged in the manufacture of knit goods, fire hydrants, steam and hand fire engines, valves, paper, and brushes. Pop. 4326.

WATERLOO, a town of Black Hawk Co., Ia., on the Cedar River. It has two railroads; is surrounded by a fine agricultural country; and is engaged in manufactures of various kinds. Pop. 5630.

WATKINS GLEN, one of the most remarkable and picturesque phenomena of nature in America, in Schuyler Co., N. Y., and near the village of Watkins. Through a narrow chasm, with perpendicular rocks of from 200 to 300 feet high, runs a beautiful stream of water, which here and there dashes over cascades. This spot is visited every year by thousands of tourists.

WAT'SON, Richard, an English prelate, born at Heversham, Westmoreland, in August 1737, from the grammar-school of his birthplace was elected to a sizarship of Trinity College, Cambridge (1754), where he became a fellow (1760). Knowing nothing of science, he was raised to the chemical chair (1764), but exchanged it in seven years' time for that of divinity, and the latter he retained as well as a prebend and the archdeaconry of Ely, when in 1782 he was advanced to the bishopric of Llandaff. Himself of doubtful orthodoxy, he combated the views of Gibbon and Paine in his *Apology for Christianity* (1771) and *Apology for the Bible* (1796), other works by him being *Chemical Essays* (5 vols. 1781–87; 7th ed. 1800), *Sermons on Public Occasions* (1788), and *Miscellaneous Tracts* (2 vols. 1815). He died at Calgarth Park, in Westmoreland, 4th July 1816. See his autobiographical *Anecdotes of the Life of R. W.* (1817).

WAUKESHA, in Waukesha Co., Wis., on the Fox River, and 18 miles from Milwaukee. It is engaged in manufacturing and trade; and has stone quarries, mineral springs, and good water-power. It is widely known as a watering place, in connection with its mineral springs, and is sometimes called the Saratoga of the West. The surrounding country is fertile. The State Industrial School is located here. Pop. 4500.

WAUSAU, in Marathan Co., Wis., on the Wiseonsin River. It has two railroads, and is engaged in general lumber trade and general manufacturing. Pop. 8500.

WAYLAND, Francis, D.D., LL.D., an American thinker, born in New York, March 11, 1796, and graduated from Union College in 1813. He studied medicine and practiced at Troy, N. Y., but in 1816 entered the ministry of the Baptist Church. He was a tutor in Union College, pastor of a church in Boston, and was made President of Brown University in 1827. In 1855 he resigned, and was for a time pastor of a church in Providence. He published *Elements of Moral Science* (1835), *Elements of Political Economy* (1837), *Limitations of Human Reason* (1840), *Christianity and Slavery* (1845), *Elements of Intellectual Philosophy* (1854), *Life of Rev. Adoniram Judson, D.D.* (1853), *Letters on the Ministry* (1863), and other works. Died at Providence, R. I., Sept. 26, 1865. His life has been written by his sons Francis and H. L.

WAZI'RIS (the children of Wazir or Vizier), a tribe of independent Afghans, who occupy the Sulaiman Mountains, on the W. frontier of the Punjaub, British India. It is estimated that they can furnish 44,000 fighting men. Some of them have settled quietly within British territory, chiefly in the district of Bunnu, where they cultivate 27,000 acres and pay a revenue of £900. The majority yet live in the hills, a terror to all their neighbors, especially to the caravans that traverse the Gomul pass. Their crops are wheat, maize, and barley; they rear horses and sheep, and export iron and wood.

WEBB, Alexander S., born at New York, N. Y., in 1835; educated at West Point (1855); after serving on the frontier, was assistant professor of mathematics at West Point (1857–61); served with distinction during the civil war, and was twice severely wounded, at Gettysburg and the Wilderness; and in 1871 became president of the college of the City of New York.

WEBB, Samuel Blatchley, an American patriot, born at Wethersfield, Conn., in 1753; entered the Continental service at the outbreak of the Revolution; was engaged at Bunker Hill, Trenton, and Brandywine, and rose to the rank of major-general. Shortly after the close of the war he removed to Claveraek, N. Y., where he died, Dec. 3, 1807.

WEB'STER, John, an English dramatist, born in the latter part of the 16th c., wrote plays partly in conjunction with Dekker. He lived on into the period of the Commonwealth, and died about 1654. His chief original dramas are *The White Devil, or Vittoria Corombona* (1612), and *The Duchess of Malfi* (1619). Both are full of tragic pathos and exquisite description, and secure for their author a high place among the selecter spirits of the Elizabethan age.

WEED, Stephen H., an American general, born at New York, N. Y., in 1834; educated at West Point (1854); served in the Florida war; distinguished himself by his great gallantry at the battles of Antietam and Chancellorsville in the Civil war; was promoted to be major-general; and was killed at the battle of Gettysburg, while at the head of his command, July 2, 1863.

WEISS, John, an American author, born at Boston, Mass., in 1818; educated at Harvard College (1837) and the divinity school (1840); was twice minister of a Unitarian church at Watertown; and withdrew from the ministry in 1870 to devote himself entirely to literary work and took up his residence at Boston. Died in 1879. He published *Life and Correspondence of Theodore Parker, American Religion*, and *Wit, Humor, and Shakespeare*.

WEITZEL, Godfrey, an American general, born at Cincinnati, O., in 1835; educated at West Point (1855); served with gallantry in the civil war, being present at the siege of Port Hudson (1863) and accompanying Gen. Butler's expeditions against New Orleans and Fort Fisher. He subsequently (1865) was given a command in Virginia, and eventually retired from the service with the rank of major-general.

WELCH, John, D.D., a Scottish divine, son of the proprietor of Collieston in Nithsdale, was born about 1570, spent part of his youth in the society of Border thieves, and 'lived for a time entirely by plunder,' but growing ashamed of his wickedness, was reconciled to his family and studied for the church. Ordained minister at Selkirk before he had reached his twentieth year, he was successively called to Kirkcudbright and Ayr, where he proved himself a bold and successful preacher of the gospel. His opposition to James VI.'s arbitrary policy led to his imprisonment (1605), and banishment (1606) from the kingdom. He sought refuge in France, and became pastor of a Protestant congregation first at Nerac, and afterwards, for sixteen years, at St. Jean d'Angely, in Lower Charente. Owing to declining health, he obtained permission to return to England, and died in London 1623. His wife, Elizabeth Knox, third daughter of the great reformer, died at Ayr in Jan. 1625.

WELHAVEN, Johan Sebastian Cammermejer, a Norwegian poet, born 22d December 1807 at Bergen, studied at Christiania from 1825, where he became 'Lector' in 1840, and 1846 Professor of Philosophy. His first appearance in literature was closely connected with the political and literary ferment which about 1830 produced a new epoch in the social history of Norway. The views of W. were fullest expressed in the poem *Norges Dæmring* (Christ. 1834), which with the boldest freedom lashed the weaknesses of the Ultra-Norse School that strove to curb the powerful influence of Danish culture. Before this he had written *Fre Dusin Complimenter tie Henrik Wergeland* (Throndhjem 1838) and *Henrik Wergeland's digtekunst og Character* (Christ. 1839), but henceforth from the long and bitter controversy he had now called forth W. in the main held aloof. The chief events of the remainder of his life were the issues of four collections of poems at Christiania in 1839, 1845, 1848, and 1860, marked by great finish of form and beauty of style, and of his *Reisebilleder og digte* (Christ. 1851). Of great merit are his romances *Asgaardereien* and *Eyvind Bolt*, and the short sketches *Holberg* (Christ. 1854), and *Ewald og de Norske Digtere* (*ib.* 1863). W.'s *Samlede Skrifter* are in 8 vols. (Copenh. 1868). He died 21st October 1873.

WELLES Gideon, an American statesman, born at Glastonbury, Conn., July 1, 1802, and was educated at Norwich University. From 1826 to 1837 he edited the Hartford *Times*, and after holding various political positions, was in 1861 made secretary of the navy by President Lincoln, which position he held throughout the civil war. Died at Hartford, Conn., Feb. 11, 1878.

WELLS, Charles Jeremiah, born in London, England, in 1800, was educated at Edmonton with Keats's brother, and Horne the author of *Orion*. With Keats himself he grew intimate, and after that intimacy was snapped by a hoax on the poet's brother, it was in rivalry with Keats that he wrote the little prose volume, simple, idyllic, stillborn—*Stories after Nature* (1822). Two years later appeared *Joseph and His Brethren*, by '*H. L. Howard.*' *Joseph* lay long neglected, by no man more than by its author, who from fishing and boating in S. Wales betook himself about 1840 to Brittany, there raised, it is said, the dead to life by prayer, and finally settled at Marseille, where he died 17th February 1879. But *Joseph* ere that had been brought from prison by Swinburne, whose attention was called to it by D. G. Rossetti, and who, after vainly dwelling, in his *Essay on Blake*, on the 'dramatic language, passion, and characterization of this great poem,' had the tardy satisfaction of adding to the reprint (1876) an Introduction that commanded from the critics an almost unanimous credit of 'the most Shakespearean drama since Shakespeare's day.'

WELLS, David Ames, D.C.L., born at Springfield, Massachusetts, June 17, 1828, graduated (1847) at Williams' College, and at the Lawrence Scientific School, Cambridge (1851), where he was assistant-professor (1851–52), became a practical chemist at Boston (1853), a member of the publishing house of Putnam & Co., New York (1857–58), and associate-editor of the *Springfield Republican* (1858). W. was sent to Europe (1862 and 1867) on commissions for the United States Government, was United States Special Commissioner on Revenue (1866–70), during which time he made fifteen valuable reports, was appointed (1872) lecturer on Political Economy at Yale College, visited Europe (1873), succeeded John Stuart Mill as foreign associate of the French Academy of Political Sciences (1874), received the degree of D.C.L. from Oxford University (1874), and has for many years been a zealous advocate of

Free Trade. He has edited the *Annual of Scientific Discovery* (16 vols. Bost. 1850–65); C. Knight's *Knowledge is Power* (1856), and Timb's *Things not Generally Known* (1857); and is the author, among other works, of *The Science of Common Things* (1857); *Elements of Natural Philosophy* (1857); *Principles and Applications of Chemistry* (1858); *First Principles of Geology* (1861), and *Our Burden and Our Strength* (1864).

WER'GELAND, Henrik Arnold Thaulow, a Norwegian poet, was born at Christiansand, 17th June 1808, and graduated at Christiania in 1829. His early sympathies were fired by the July Revolution in France, the struggles of the Poles, and the rise of Democratic sentiment in Norway. Liberty and Reason became his guiding-stars in politics and religion, and he followed their guidance with all the force of genius and the enthusiasm of a poet. His first works were the so-called farces of 'Siful Sifadda.' *Ah!* (1827), and *Irreparabile Tempus* (1828), and *Digte, forste Ring* (1829). In the latter year W. entered public life as one of the most eloquent opponents of the Conservative party. His religio-philosophical poem, *Skabelsen, Mennesket, og Messias* (1830), called forth the sharp criticism of Welhaven in 1832. W. was for some time editor of *Folkebladet*, and from 1835 to 1837 of *Statsborgeren;* and after the dissolution of the popular parliament in 1836 published a large number of violent party songs and pamphlets. His *Digte, anden Ring*, and the drama *Barnemorder-sken* (1835), are full of the noblest lyric diction, and show a great advance on his earlier works in clearness. But W.'s style was at best too difficult to be popular with the vulgar, as his genius was too original to be the organ of any party. The friendly offices of King Karl Johan gradually won him over to the court; in 1839 a pension from the king succeeded in drawing him from the field of politics. To this later period belong some of his best poems, *Jan van Huysums Blomsterstykke, Svalen, Jöden, Jödinden*, and *Den Engelske Lods*. He died of consumption at Christiania, August 12, 1845. His poems are published in 9 vols. by H. Lassen (1852–59), and a selection, *Udvalgte Skrifte*, appeared in 1859.

WESLEYAN FEMALE COLLEGE, an American educational institution, at Macon, Ga., founded in 1836, and controlled by the Methodist Episcopal Church, South. It is claimed that it was the first female college ever chartered, and empowered to confer the usual college degrees upon females.

WESLEY'AN UNIVER'SITY, The, opened at Middletown, Connecticut, in 1833, occupies the former buildings of the American Literary, Scientific, and Military Academy, which with recent additions comprise a library of 20,000 volumes, a chapel erected as a memorial of the eighteen students and alumni who fell in the Civil War, laboratories, the Orange Judd hall of natural science, &c. There are three courses: Classical, Latin-Scientific, and Scientific. Since 1872 ladies have been admitted to the W. U.

WESTBOROUGH, in Worcester Co., Mass., on the Boston & Albany Railroad, 32 miles from Boston. It is engaged in manufacturing boots, shoes, and various other articles. The State Reform School for Boys is located here. Pop. 5214.

WEST'COTT, Brooke Foss, D.D., born near Birmingham, England, in January 1825, obtained a scholarship at Trinity College, Cambridge, and having gained many university distinctions graduated B.A. (1848) as twenty-third wrangler and bracketed senior classic. Elected a fellow of Trinity in 1849, he next year took orders, and was an under-master at Harrow from 1852 to 1869, when he received a Peterborough Canonry. In 1870 he became Regius Professor of Divinity at Cambridge, in 1875 an honorary chaplain to the Queen, and in 1879 a chaplain in ordinary, being besides a member of the Revision Company.

WESTERN COLLEGE, an educational institution at Western, Ia., established by the United Brethren in Christ in 1856. It has classical, scientific, and commercial departments, and co-education of the sexes is practiced.

WEST'FIELD, a town of Massachusetts, 9 miles W. of Springfield by rail. It has 9 churches, a public library, and 1 weekly newspaper. The waterworks of W. are very large. W. has great whip-factories, turning out annually $800,000 worth of whips, extensive cigar-manufactures—18,046,000 cigars having been made in 1875—paper-mills, &c. It is also noted for its manufacture of church-organs and piano legs. Pop. 7587.

WEST POINT. See United States Military Academy.

WEY'ER, Sylvain van de, a Belgian statesman, born in 1802 at Louvain, studied law there, and subsequently practiced at the bar in Brussels till appointed city librarian, keeper of the Burgundian archives, and professor at the museum. These appointments he lost in consequence of his becoming leader of the opposition and co-editor of the *Courrier des Pays-Bas*. After the Revolution of 1830 he was a member of the Committee of Public Safety, and of the Provisional Government, and in the National Congress was a zealous advocate of the exclusion of the House of Orange. In November 1830 he was commissioned to confer with the English cabinet, and on his return he became President of the Diplomatic Committee and Minister of Foreign Affairs (February 26, 1831). On the accession of Prince Leopold, W. was appointed ambassador to England. Recalled in 1845 to form a new cabinet, he failed as Minister of the Interior to reconcile the Liberal and Catholic parties, and in 1846 returned to his former post in London, which he held till his resignation in 1867. He died in London, May 23, 1874.

WHARTON, Francis, D.D., LL.D., born at Philadelphia, Pa., 1820; educated at Yale College (1839); was admitted to the bar and settled in his native city; became professor of logic in Kenyon College, Ohio (1856–63); entered the ministry of the Protestant Episcopal Church, and was rector of a church at Brooklyne, Mass. (1863); and in 1866 became one of the faculty of the Harvard divinity school. Among his works are the following: *A Treatise on the Criminal Law of the United States; A Treatise on the Law of Homicide in the United States; A Treatise on Theism and Modern Skepticism; The Silence of Scriptures;* and *A Treatise on the Conflict of Laws.*

WHEATON COLLEGE, an educational institution at Wheaton, Ill., founded by the Wesleyan Methodists in 1850. On account of financial difficulties, in 1860 it was transferred to the control of the Congregationalists. It has property to the value of more than $100,000, a faculty of eleven members, and its course of instruction is open to both sexes.

WHID'AH BIRD, the name given to a species of *Insessorial* birds allied to the weaver. It inhabits W. Africa, and is noted for the peculiar development of the tail-feathers. The webs of the two central feathers are very broad, and the shafts protrude without a web. The next two feathers—one on either side—are extremely long, and may measure upwards of 10 inches in length. This disposition of feathers is typical of the broad-shafted W. B. (*Viduia paradisea*), which attains a length of 5 or 6 inches, and is of a brown-black hue above, and pale-buff below, with an orange collar. The Shaft-tailed W. B. (*V. regia*) is so named from its four central feathers presenting the bare shafts without any web. The color is a dark brown, and the length from 9 to 10 inches.

WHITE, Andrew Dixon, LL.D., an American educator, born at Homer, N. Y., Nov. 7, 1832, and graduated from Yale College in 1853. He subsequently studied at the University of Berlin, and returning to the U. S., from 1857 to 1862 was professor of history and English literature in the University of Michigan. He was one of the founders of Cornell University, and in 1866 was made president of that institution. During late years he has been a prominent member of the Republican party. He has published *Lectures on Mediæval and Modern History* (1861), *A Word from the North-west* (1863), *The New Education* (1868), *Report on the Co-education of the Sexes* (1871), *The Warfare of Science* (1876), and others.

WHITE, Richard Grant, an American author, born in New York City, May 22, 1822, and graduated from the College of the City of New York (then known as the Free Academy) in 1839. He studied medicine and afterwards law, and was admitted to the bar in 1845, but has devoted his life almost entirely to literary work. He has been connected with several papers, at various times, and has written voluminously for the magazines, making a specialty of philological subjects. Died in 1885. He published *Shakespeare's Scholar* (1854), *The Authorship of the Three Parts of Henry VI.* (1859), *National Hymns, how they are Written and how they are not Written* (1861). *The New Gospel of Peace, according to St. Benjamin* (1863–66). *Memoirs* of the Life of William Shakespeare (1865), *Words and their Uses* (1870), and others.

WHITE, William, D.D., born at Philadelphia, in 1748; educated at Philadelphia College (1765); visited England, where he studied theology, and was admitted to the ministry of the Established Church in 1742; returned to the United States, and became rector of St. Peter's Church at Philadelphia; was made presiding officer of the first Convention of the Episcopal Church in America; was chosen Bishop of Pennsylvania (1786), and, visiting England, was there consecrated to that office (1787). He was one of the most active of the early workers of his denomination in America. Died at Philadelphia, in 1836. An account of his life has been published by Rev. Bird Wilson (1839).

WHITEHALL, in Washington Co., N. Y., on Lake Champlain, at the mouth of the Poultney River. It is extensively engaged in the lumber business, and boat-building is carried on. Pop. 5347.

WHITE'LOCKE, Bul'strode, born in London, England, 2d August 1605, from Merchant Taylors' passed to St. John's College, Oxford, and thence degreeless to the Middle Temple. Returned to the Long Parliament of 1640, he acted as chairman of the committee for drawing up Strafford's charges of impeachment, and was one of the commissioners appointed to treat with the king at Oxford; but during the Troubles he steered a uniformly middle course, as member of the Westminster Assembly

643) opposing the adoption of Presbyterianism, as governor of Windsor (1644) saving the royal library and cabinet of medals from dispersion, and as a commissioner of the Great Seal (1649) withholding his consent to Charles's death. Ambassador to Sweden (1653), he concluded a treaty with Queen Christina, and by her was made knight of the order of Amartha, on his return becoming a commissioner of the Treasury (1655), Speaker of the House of Commons (1656), and one of Cromwell's lords (1657). He helped, however, to dethrone the Protector's son, and after the Restoration lived unmolested at Chilton Park, his Wiltshire seat, where he died, 28th January 1676.

WHITMAN, WALT., born on Long Island in 1819; educated at the public schools and learned the printer's trade; became respectively carpenter, editor, and government clerk at Washington; subsequently removed to Camden, N. J. He has published *Leaves of Grass, Democratic Vistas, The Two Vistas*, and *Drum Taps*. There is no unanimity of opinion as to the rank to which he is entitled as a poet. He certainly has the merits of genius and originality, whatever his defects may be.

WHIT'NEY, WILLIAM DWIGHT, born at Northampton, Mass., 9th Feb. 1827, after graduating at Williams College in 1845, held for some time a clerkship in a bank. Having, however, resumed his studies at Yale College (1849), he visited Europe, and at Berlin under Weber, at Tübingen under Roth, made Oriental languages, Sanscrit especially, the object of three years' investigation (1850–53); and returning home by way of Paris, London, and Oxford, became in 1854 professor of Sanscrit in Yale College, and of comparative philology in 1870. He has been besides a member of the American Oriental Society since 1849, its librarian (1855–73), and corresponding secretary since 1857, and was first president of the American Philological Association. W. has done in America what Max Müller has done in England, popularized the science of language.

WHIT'WORTH, SIR JOSEPH, BART., F.R.S., a well-known mechanician, was born at Stockport, England, in 1803. At the Great Exhibition of 1851 he exhibited a number of improved tools and machines; and a few years later turned his attention to the construction of projectiles and firearms of great range and accuracy. In this department he has gained a high reputation; and for his services in perfecting military armaments he was created a baronet in 1869. The same year he founded the Whitworth Scholarships for the encouragement of engineering science. These consist of 30 scholarships of £100 a year each, and tenable for two or three years. In 1878 he received from the University of Edinburgh the degree of LL.D. He is the author of *Miscellaneous Papers on Practical Subjects; Guns and Steel* (1873).

WHYTE-MELVILLE, GEORGE JOHN, son of a Fifeshire laird, born near St. Andrews, Scotland, in 1821, was educated at Eton, and entering the army at eighteen, retired after ten years' service, having risen to be captain in the Coldstream Guards (1846). On the outbreak, however, of the Crimean War, he joined the cavalry of the Turkish contingent, and during 1855–56 gained the experiences embodied in the *Interpreter* (1858). This was the fourth of some twenty novels, which, whether sporting, historical, or 'costume,' have all a cleverness and dash that make them popular, among them being *Digby Grand* (1853), *General Bounce* (1854), *Kate Coventry* (1856), *Holmby House* (1860), *The Gladiators* (1863), *Cerise* (1865), *Sarchedon* (1871), *Katafelto* (1875), and *Black but Comely* (1879). He who so well described a good run with the hounds, met his death in the Gloucestershire hunting-field, 5th December 1878.

WICHITA, a town of Sedgwick Co., Kan., at the mouth of the Great Arkansas River. It has two railroads; is engaged in stock-raising and wheat-growing; and is an important shipping point for Texas cattle and grain. Pop. 4911.

WIL'DERNESS, BATTLES OF THE, in the American Civil War, the name conferred on a series of desperate actions in Virginia between the Federals under Grant, and the Confederates under Lee, May 5–31, 1864. Commencing in the 'Wilderness' proper, a swampy expanse of brushwood to the S. of the Rapidan, the contest was renewed at Spottsylvania and on the bank of the North Anna, and ended in the Federals' repulse at Cold Harbor in their attempt to enter Richmond. The Federal loss was officially stated at 41,398, including 33,948 killed and wounded; that of the Confederates was certainly less.

WILKES-BARRE, a city of Luzerne Co., Pa., on the N. branch of the Susquehanna River. It has numerous railroads, carries on a large trade, and is the center of the Wyoming Valley anthracite coal-fields. Pop. 32,000.

WILL'IAMS, EDWARD (Cymr. *Iolo Morganwg*), born at Llancarvan, Glamorganshire, in 1745; with Owen Jones and Pughe edited the *Myvyrian Archæology* (3 vols. 1801–7), and himself published, among other works, *The Fair Pilgrim, a Poem translated from the Welsh* (1792). To this he appended specimens of Druidical 'Triads,' which, after a long-protracted controversy and on the non-production of their MSS., are commonly looked on as a literary forgery. A friend of Southey, W. by trade was a stonemason, and worked for some years in London, but died at Flemingstone, Glamorganshire, 17th December 1826, leaving a posthumous Welsh work, *Secrets of the Bards of the Isle of Britain* (1829). See E. Waring's *Recollections of E. W.* (1850).

WILLIAMS, JOHN, D.D., born at Deerfield, Mass., in 1817; educated at Trinity College (1835); entered the ministry of the Protestant Episcopal Church, and was rector of a church at Schenectady, N. Y. (1842–48); was president of Trinity College, Connecticut (1848–53), assistant bishop of Connecticut (1861), and bishop (1865). Among other works, he is author of *Thoughts on the Gospel Miracles*, and *Exposition of the Thirty-nine Articles*.

WILLIAMS, MONIER, son of a Surveyor-General of the Bombay Presidency, was born at Bombay, 12th November 1819, and after studying at King's College, London, and Balliol, Oxford (1838), gained an Indian writership, and entered Haileybury College. In spite of a brilliant career there, circumstances forced him to resign his appointment, and returning to University College, Oxford, he was elected Boden scholar (1843), graduating B.A. in 1844. He occupied the Sanscrit chair at Haileybury (1844–58), was two years Oriental master at Cheltenham College, and in 1860 defeated Max Müller in a candidature for the Boden Sanscrit professorship at Oxford. His tenure of this office has been distinguished by his two visits to India (1875–76), there to collect subscriptions to found at Oxford an Indian Institute, a task that he has successfully achieved. Among his works are *A Sanscrit Grammar* (1846; 4th ed. 1877), an *English-Sanscrit Dictionary* (1851), *Rudiments of Hindustani* (1858). *Indian Epic Poetry* (1863), *A Sanscrit-English Dictionary* (1872). *Indian Wisdom* (1875), *Hinduism* (1877), and *Modern India and the Indians* (1878).

WILLIAMS, ROWLAND, D.D., born at Halkyn, Flintshire, England, 16th August 1817, from Eton (1828–36) passed to King's College, Cambridge, of which, having graduated in 1841, he became a fellow and tutor. Taking orders, he was appointed chaplain to the Bishop of Llandaff, vice principal and Hebrew professor at Lampeter College (1850), select preacher to Cambridge University (1854), and vicar of Broadchalk, Wiltshire (1859). A foremost member of the Broad Church party, he was condemned by the Court of Arches (1862) for his paper on Bunsen's 'Biblical Researches' contributed to the famous *Essays and Reviews*, and having resigned his professorship prior to the reversal of that sentence by the Privy Council (1864), resided thenceforth at his vicarage down to his death there, 18th January 1870.

WILLIMANTIC, in Windham Co., Conn., on the Willimantic River, at the junction of several railroads, 50 miles from Providence. It is engaged in silk and cotton manufactures. Pop. 6612.

WILMOT, DAVID, an American statesman, born at Bethany, Pa., Jan. 20, 1814, and began the practice of law at Wilkesbarre, Pa., in 1834. In 1845 he was elected to Congress by the Democratic party, and continued a member of that body until 1851. In 1846 a bill was before congress, to appropriate $2,000,000 for the purchase of territory from Mexico, and on August 8th Mr. Wilmot introduced an amendment to it, which has since come to be known as the 'Wilmot Proviso.' It was to the effect 'that, as an express and fundamental condition to the acquisition of any territory from the Republic of Mexico by the United States, neither slavery nor involuntary servitude shall ever exist in any part of the said territory.' This amendment was passed by the House, but failed to pass the Senate. It led, however, to the organization of the Free-Soil party. Mr. Wilmot is best known by this amendment. He was afterwards U. S. Senator, and Judge of the U. S. Court of Claims. Died at Towanda, Pa., March 16, 1868.

WILSON, HENRY, LL.D., an American statesman, born at Farmingham, N. H., Feb. 16, 1812. His early surroundings were those of poverty, and his education was almost entirely self acquired. When a boy, he was apprenticed to a farmer. At the age of 21 he removed to Natick, Mass., where he spent the remainder of his life. A few years afterwards, visiting Washington, D. C., he became profoundly impressed with the wrong of slavery, and was ever afterwards one of its most earnest opponents. Originally a Whig, he left that party in 1848, when it nominated Gen. Taylor for President, and adopted a platform which raised no opposition to the extension of slavery, and joined the Free-Soil party. After filling various political positions in his own state, he was, in 1855, elected U. S. Senator, to succeed Edward Everett. During the civil war he rendered great services to the country as chairman of the committee on military affairs. In 1872 he was elected Vice-President of the U. S. He was a man of large executive abilities, unbending integrity, and intense purpose. He published *The Rise and Fall of the Slave Power*. Died at Washington, D. C., Nov. 22, 1875.

WIMM'ERA, a district of the colony of Victoria, occupying its N.W. portion, and having an area of 25,000 sq. miles. It consists

for the most part of wide sandy plains, thinly grassed and badly watered, yet supporting great flocks of sheep, for which water is obtained by digging wells from 80 to 140 feet deep. The plains are intersected by belts of scrub and forest, and there are also patches of land suited for agriculture.

WIN'CEY is a mixed textile fabric, consisting of a cotton warp with a worsted weft. Winceys are woven either plain or twilled, and though generally made of grey, drab, or brown colors without any pattern, in fancy winceys checks and stripes are introduced, but the coloring is always sober. It is chiefly used for gowns and petticoats, and of late years it has been commonly employed for men's shirts, &c.

WINCHELL, ALEXANDER, LL.D., an American scientist, born at North East, Duchess Co., N. Y., Dec. 31, 1824, and graduated from Wesleyan University in 1847. After teaching in several institutions, he was made, in 1853, professor of physics and civil engineering in the University of Michigan, and, in 1855, he became professor of geology, zoology, and botany in the same. He was state geologist of Michigan and directed the geological surveys of that state and Minnesota. He was subsequently chancellor of Syracuse University (1872–74) and professor of geology and zoology in that institution. He has published *The First Biennial Report of the Geological Survey of Michigan* (1861), *The Grand Traverse Region* (1866), *Geological Maps of Michigan* (1865), *Geological Chart of New York* (1870), *Sketches of Creation* (1870), *Geology of the Stars* (1872), *The Doctrine of Evolution* (1874), *Lay Theology* (1876), and numerous essays and addresses.

WINGS, the name applied to those organs in animals by which flight is effected. In their most typical development, as seen in birds, they consist of the bones of the fore-limbs, specially modified to form a support and axis, whilst attached to this skeleton are the muscles moving the limb. Externally the skin is provided with feathers, and the whole fore-limbs of the bird thus form the W.; while the bones of the shoulder girdle are modified to form a special support for the organ of flight. In the bat the 'wing' consists of an expansion of the skin or integument, supported on four of the fingers, which are extremely long. This membrane, or *patagium*, extends from the fore limbs to the hind limbs, and in many cases between the hind limbs and tail as well. In such Mammalia as the flying foxes, flying squirrels, flying phalangers, and in the lizards known as flying dragons, the 'wing' is a mere expansion of skin, extending along the sides of the body, often connecting hind and fore limbs, and serving as a parachute to sustain the animals in their flying leaps from tree to tree, but in no sense serving as an organ of true flight. In insects the wing is formed of two delicate skin layers, supported on hollow tubes or *nervures*, placed in communication with the respiratory or breathing system. The W. of insects become thus related to respiration, and by their movements probably aid in the diffusion of air through the breathing-tubes.

WINK'ELRIED, ARNOLD STRUTH VON, a Swiss of Unterwalden, who, at Sempach, on the 9th of June 1386, contributed to the victory over Duke Leopold of Austria by rushing on the lances of the enemy and opening up a lane for his countrymen. A monument on the spot commemorates the deed. See Liebenau, *Arnold W.* (Aarau, 1862); and Kleissner, *Die Quellen der Sempacher Schlacht und die Winkelriedsage* (Göttingen, 1874).

WINNEBA'GO, a lake of Wisconsin, in the basin of the Fox River. It is 26 miles long and 10 broad, and has an area of 212 sq. miles. Both the river and the lake are navigated by steamboats, and afford good fishing.

WINNEBA'GOES, WINNIPEGOOS', or LITTLE WINN'IPEG, a lake of British N. America, draining into Lake Winnipeg, from which it is distant 50 miles westward. W. measures 125 miles by 25. It abounds in fish, and its shores are very fertile.

WINN'IPEG RIVER rises in Minnesota, and flows to Lake Winnipeg. Its course, though serpentine, is generally northwards. It passes through Rainy Lake and the Lake of the Woods, which are thus connected with Lake Winnipeg. Though its length is only 520 miles, it drains a very large basin, and discharges an immense volume of water into Lake Winnipeg. W. R. abounds in fish, and its shores are richly wooded, but the forest is rapidly being cleared, for the soil yields magnificent wheat crops. An Icelandic national colony has been founded, and a rapid influx of settlers from England is taking place. Much mineral wealth is known to exist in this region, though as yet it is undeveloped.

WINO'NA, a township of Minnesota, on the Mississippi, 90 miles S.E. of St. Paul by rail. It was founded in 1851, and has 15 churches, a public library, a normal school, 1 daily and 3 weekly newspapers. There are 3 saw-mills, 7 flour-mills, 2 foundries, and 6 carriage factories. In 1880 it exported 5,550,000 bushels of wheat and $1,500,000 of lumber. Pop. 10,208.

WINSLOW, EDWARD, one of the early settlers of New England, born at Droitwich, England, Oct. 19, 1595. He was born of a worthy family, received a good education, and in early life became addicted to the views of the Puritans. Traveling abroad he joined the congregration of Rev. John Robinson at Leyden. He was one of the company that crossed the Atlantic in the *Mayflower*, and was a prominent member of Plymouth colony. In 1635 he returned to England, and, by order of Archbishop Laud, was thrown into prison for having preached, being only a layman, and for having, as a magistrate, performed the ceremony of marriage. He lived in England during the protectorate, and enjoyed the confidence of Cromwell. Died at sea, between Jamaica and Santo Domingo, May 8. 1665. He was the author of several works, among which are *The Danger of Tolerating Levelers in a Civil State*, *New England's Salamander*, *The Glorious Progress of the Gospel among the Indians in New England*, and *A Platform of Church Discipline in New England*.

WIN'SLOW, FORBES BENIGNUS, D.C.L., born in London, England, but of a Massachusetts family, August 1810, was educated in Scotland and near Manchester, and after studying medicine at New York and the London University, passed the College of Surgeons (1835), and took his M.D. at Aberdeen. With his earliest practice he combined the duties of a *Times* reporter, but having since 1830 paid special attention to insanity, he opened a private asylum at Hammersmith (later another in London), and rose in time to be the supreme authority on all relating to diseases of the brain. Founder and editor of the *Quarterly Journal of Psychological Medicine and Mental Pathology* (1848) and of the *Medical Critic* (1861), vice-president of the Juridical and president of the Medical Society (1853), President of the Association of Medical Officers of Asylums (1857), and a Commissioner of Lunacy (1859), he was besides a member of numerous scientific bodies, a frequent contributor to the press, and the great 'expert' in medico-legal cases. He died at Brighton, 3d March 1874.

WINSLOW, JOHN A., an American naval officer, born in North Carolina, Nov. 9, 1811, and entered the navy in 1827. In 1855 he was made commander, and in 1862 captain. In 1864 he was in command of the *Kearsarge*, and on June 19 fought and sank the Confederate cruiser *Alabama*. The vessels were evenly matched, and the contest lasted for about an hour. The *Alabama* had become the terror of the seas to American merchant vessels, and Winslow won highest commendation for his brilliant victory. He was made commodore in 1864, and rear-admiral in 1866. Died Sept. 29, 1873.

WINSTED, a town in Litchfield Co., Conn., at the terminus of the Naugatuck Railroad, 26 miles from Hartford. It is extensively engaged in manufacturing, and is an important trade center. Pop. 5186.

WINSTON, in Forsyth Co., N. C. It contains a number of tobacco factories, which employ large numbers of men during the winter, and it is an important tobacco centre. It is also engaged in manufacturing and fruit culture. Pop. 7000.

WIN'TERBERGEN, a lofty mountain-range in the E. of Cape Colony, forming a part of the great dividing chain, sometimes called 'the backbone of S. Africa.' Its culminating point, the Great Winterberg Peak, is 7806 feet high.

WIN'TERHOEK MOUNTAINS, a range in Cape Colony whose eastern termination is about 30 miles N.W. of Port Elizabeth. Its loftiest peak, the Cock's-comb, is estimated to be 8000 feet high, and, though 20 miles inland, is visible 60 miles out at sea. There is also a W. Peak, 6840 feet high, 75 miles N.E. of Capetown, whence it is visible.

WINTHROP, THEODORE, born at New Haven, Conn., in 1828, educated at Yale College (1848); engaged in mercantile pursuits in New York City; conducted explorations in Central and South America; studied law at St. Louis, Mo.; removed to New York City (1855), where he became a lawyer; entered the Union army at the outbreak of the civil war; and was killed at the battle of Big Bethel, while leading an assault upon the enemy, June 10, 1861. His works, published after his death, are *Cecil Dreeme*, *John Brent*, *Life in the Open Air*, *Canoe and Saddle*, and *Edwin Brothertoft*.

WIREKER, NIGEL, flourished in the 12th c. in the reign of Henry II. He was a precentor in the Benedictine Monastery at Canterbury, and a friend of William of Longchamp, afterwards Bishop of Ely, to whom he dedicated a treatise *On the Corruption of the Church*. His chief work is *Brunellus*, or the *Speculum Stultorum* ('Mirror of Fools'), a satirical poem extending to nearly 4000 verses of Latin elegiacs. The hero Brunellus is an Ass who convinced that he has an immense power of patient labor, resolves to study at the University of Paris; he goes through the sciences, tries the various orders of the Church, is dissatisfied, resolves to establish a new one of his own, and after a long discussion with his favorite 'Galen,' is caught by his old master and forced to resume his original and true occupation. The poem is brisk and biting in its ridicule of scholastic and monastic fol-

lies, and may be regarded as in part a protest against ecclesiastical abuses.

WIRT, WILLIAM, LL.D., born at Bladensburg, Md., in 1772; became a lawyer and followed that profession at Culpeper, Va.; removed to Richmond (1806); was attorney-general of the United States (1817–29); and afterwards located at Baltimore, Md. He held several other public offices, and was the candidate of the Anti-masonic party for president, in 1832. Died at Washington, D. C., in 1834. He published a *Life of Patrick Henry*.

WISCON'SIN, UNIVERSITY OF, at Madison, in Wisconsin, incorporated in 1838, opened its first classes in 1851. It comprises a school of ancient and modern classics; a school of agriculture, engineering, mining, and of general and military science; and a school of law (organized in 1868). Instruction is free to all natives of the state (of both sexes since 1867).

WITHERSPOON, JOHN, D.D., LL.D., born in Scotland, in 1722; educated at Edinburgh University, and entered the ministry; was pastor of several churches; became president of Nassau Hall, Princeton, N. J. (now the College of New Jersey); took an active part in the colonial struggle for liberty, and was one of the signers of the Declaration of Independence; after the war visited England to raise founds for the college; and spent the closing years of his life on a farm near Princeton, where he died, in 1794. A fine monument has been erected to his memory, in Philadelphia.

WOFFORD COLLEGE, an American educational institution at Spartanburg, S. C., and under the control of the M. E. Church. It was named after Rev. Benjamin Wofford, who in 1851 gave $100,000 to found it.

WOLF SPIDER, a name given to spiders of the genus *Lycosa*, in which the body is large and hairy, and in which the fourth pair of feet is larger than the other pairs. It makes no web, but roams about in search of prey, and hides beneath stones. *L. Tarantula* is the Tarantula of Italy.

WOOCHANG', a town in the interior of China, province of Hu-pé, on the Yang-tse-kiang, opposite the important trading town of Hankow. It stands amid cotton-plantations and rice-fields, and is a great emporium for tea, which is exported to Britain *viâ* Shanghai. Hankow is virtually a suburb, and another considerable section of the town on the N. bank of the river is Hang-yang-fu. The pop. of W., including the outlying portions, is estimated at 1,000,000.

WOODS, LEONARD, D.D., an American divine, born at Princeton, Mass., June 19, 1774; educated at Harvard College (1796); entered the ministry and became pastor of a church (Congregational) at Newbury, Mass. (1798); was professor of theology at Andover Seminary (1807-46), and *emeritus* from that time until his death, in 1854. During the Unitarian controversy, he was a strong supporter of Calvinism, and wrote voluminously in its defense. Among his works are, *Doctrine of Perfection; Lectures on Church Government; Reply to Ware;* and *Letters to Unitarians.*

WOODS, LEONARD, JR., D.D., LL.D., son of Leonard, born at Newbury, Mass., in 1807; educated at Union College (1827); entered the ministry (1831); was professor of sacred literature at Bangor Seminary (1836–39); and president of Bowdoin College (1839–66); and afterwards visited Europe for the purpose of investigating records relative to the early history of Maine. Died in 1878.

WOOL, JOHN ELLIS, an American general, born at Newburg, N. Y., in 1788; studied law, but entered the U. S. army in 1812; was present at the battles of Queenstown Heights and Plattsburg in the war of 1812, and was severely wounded at the former; for his gallantry in this conflict was promoted and in 1841 had attained the rank of brigadier-general; at the outbreak of the Mexican war, organized a volunteer force of 15,000 men, and was second in command to Taylor at Buena Vista; was brevetted major-general for his services in the Mexican war and presented with a sword by congress and also by his native state; during the civil war, commanded fortress Monroe, and afterwards of the department of Virginia; was made major-general (1862), and retired from the service in 1863. Died at Troy, N. Y., in 1869.

WOOL'NER, THOMAS, R.A., an eminent English sculptor, was born at Hadleigh, in Suffolk, 17th December 1825 and educated in Ipswich. At the age of thirteen he entered the studio of William Behnes, under whom he worked for six years and became a skillful draughtsman. W.'s first efforts showed a fine imagination and a cultured intellect. He drew his inspiration from the high sources of poetry and history. In 1843 he exhibited at the Royal Academy 'Eleanor Sucking the Poison from Prince Edward's Wound,' and about the same time a life-size group, 'The Death of Boadicea,' the latter of which was hailed as the promise of a great career in ideal sculpture. These works were followed by figures of 'Puck,' 'Titania with her Indian Boy,' 'Eros and Euphrosyne,' and 'The Rainbow' (1848). In 1850 he joined Millais, Holman Hunt, and D. G. Rossetti in establishing the Pre-Raphaelite magazine called *The Germ*, to which he contributed some poems which were afterwards gathered, with additions, into a volume entitled *My Beautiful Lady* (1863; 3d ed. 1866). In 1854 he visited Australia, where he remained for two years, and executed some fine medallions. On his return to England he produced a life-size statue of Lord Bacon for the new museum at Oxford. Among W.'s subsequent works may be mentioned his statues of Prince Albert for Oxford, Lord Macaulay for Trinity College, Cambridge, William III. for the Houses of Parliament, Sir Bartle Frere for Bombay, Dr. Whewell for Cambridge, Lord Lawrence for Calcutta, Lord Palmerston for Palace Yard; busts of Tennyson, Carlyle, Newman, Darwin, Cobden, Dickens, Kingsley, Gladstone, Lushington (University of Glasgow), Huxley, and other distinguished men. 'Elaine with the Shield of Sir Lancelot,' 'Ophelia,' 'Guinevere,' and 'Achilles and Pallas Shouting from the Trenches' (1876), show the same high aim as the earlier products of his chisel. In 1878 W. completed a colossal statue in bronze of Captain Cook for the Government of New S. Wales, which has been erected in Sydney. In 1874 he was elected an R.A., and in 1877 was appointed Professor of Sculpture in the Royal Academy.

WOOL'SEY, THEODORE DWIGHT, D.D., LL.D., born in New York, 31st October 1801, graduated in 1820 at Yale College, where, after studying theology at Princeton, he was a tutor (1823–25). Licensed to preach in the latter year, he studied Greek in Germany (1827–30), became Greek professor at Yale College (1831), and was its president (1847–71). A master of political science, a brilliant scholar, and a profound and catholic theologian, W. has edited four Greek plays (1833–37) and Plato's *Gorgias* (1842), and has published many sermons and discourses; but his fame is principally based on his *Introduction to the Study of International Law* (1860; 5th ed. 1879) and *Political Science, or the State Theoretically and Practically Considered* (1878). He has also written *An Essay on Divorce and Divorce Legislation* (1869), and in 1874 re-edited Prof. Lieber's *Civil Liberty and Self-Government* and *Manual of Political Ethics*.

WOOSTER, in Wayne Co., O., on Killbuck Creek and the Pittsburg, Fort Wayne & Chicago Railroad, 52 miles from Cleveland. It is engaged in manufacturing, and is the seat of Wooster University. Pop. 5843.

WOOSTER UNIVERSITY, an American educational institution, at Wooster, O., founded in 1866 by the Presbyterian Church. It has fine buildings, museum, laboratory, a full corps of teachers, and an increasing endowment. It has three courses of study: classical, scientific, and philosophical. Co-education of the sexes is practiced.

WORCESTER, JOSEPH EMERSON, LL.D., born at Bedford, N. H., in 1784; educated at Yale College (1811); engaged in teaching at Salem, Mass., and in 1819 removed to Cambridge, Mass., where he spent the remainder of his life. He published several dictionaries and educational works, and in 1860 his *Dictionary of the English Language*. This work is, with Webster's *Dictionary*, standard authority, wherever the English language is spoken, and will ever remain a monument to W.'s scholarship. Died at Cambridge, Mass., in 1865.

WORDE, WYNKYN DE, one of the earliest English printers, was a native of Lorraine. Whether he was with Caxton at Bruges is open to question, but he was certainly for many years in the famous office at Westminster, and succeeded to the business on his master's death. About 1500 he removed to the city, and from 1502 till his death in 1534 he had his office at the sign of the 'Sun' in Fleet Street. He was appointed king's printer, enjoyed the patronage of Margaret, the mother of Henry VII., and attained a good position as a citizen of London. Though less scholarly than Caxton, W. did excellent service to his art. He was his own typefounder, and not only did he set the fashion of employing Roman letters as we now use italics, but he was the first to introduce Greek types into England, and in some of his works he inserted Hebrew and Arabic characters cut in wood. Of the four hundred and odd books which proceeded from his press it is enough to mention *Bartholomæus de Proprietatibus Rerum* (without place or date, but about 1495), which was the first book printed on English paper, and ranks as altogether his finest production; *Scala Perfectionis* (1493), *Bonaventuras Speculum Vitæ Christi* (1494), Trevisa's *Polichronicon* (1495). See Blade's, *Life of Caxton;* Bullen, *Caxton Celebration Catalogue* (Lond. 1877).

WORDEN, JOHN L., an American naval officer, born in New York City, March 12, 1818, and entered the navy in 1834. He commanded the *Monitor* in its famous fight with the Confederate ironclad *Merrimack*, March 9, 1862, and distinguished himself by his gallantry in the action, during which he was severely wounded in the eyes. He subsequently commanded the *Montauk* in several naval engagements.

WORNUM, Ralph Nicholson, an English art-critic and historian, was born at Thornton, Northumberland, December 29, 1812, and studied at University College, London. During 1834–39 he carefully examined the art-galleries of the Continent, and on his return to England contributed articles on his favorite subject to the *Penny Cyclopædia*, and to Dr. Smith's *Dictionary of Greek and Roman Antiquities*. In 1845 he was appointed to draw up the official catalogue of the National Gallery, became art-lecturer to the Government Schools of Design (1848), librarian to these schools (1852), and Keeper and Secretary of the National Gallery (1855). He died at Hampstead, December 15, 1877.

WORTH, William Jenkins, an American general, born at Hudson, N. Y., March 1, 1794. At the beginning of the war of 1812 he entered the army as a private, and was promoted captain and major for his gallantry at the battles of Chippewa and Niagara. He was at the close of the war retained in the regular service, was instructor at West Point, and commanded the Florida army in its campaign against the Seminole Indians. For his services in the Seminole war he was promoted brigadier-general. He participated in the Mexican war, and for gallantry at Monterey, was made major-general. He rendered valuable services at Cerro Gordo, Cherubusco, Molino del Rey, Chapultepec, and the capture of the city of Mexico. For his gallantry at Monterey, Congress voted him a sword of honor. After the war he was placed in command of the department of New Mexico and Texas. Died at San Antonio, Tex., May 7, 1849. His remains are buried at the junction of Broadway and Fifth Avenue, New York, and a handsome memorial monument is erected over them.

WOTT'ON, Sir Henry, born at Boughton Malherbe, Kent, England, March 30, 1568, was bred at Winchester, New College, and Queen's, and making the 'grand tour' (1589–97), met at Geneva Beza and Casaubon. Secretary to Essex, he fled, upon Essex's fall, to Tuscany (1600), whose Grand-Duke sent him disguised to Scotland, to warn James VI. of a plot to poison him. James, taking this 'honestest dissembler' into high favor, despatched him on embassies to most of the European courts, and at Venice W. formed a close friendship with Fra Paulo Sarpi, whose *Istoria del Concilio Tridentino* he transmitted to James, sheet by sheet, as it was written. Over-freedom of speech—his saying, namely, that an 'ambassador is a good man and true sent abroad to lie for his country's good'—caused W.'s disgrace, but in 1625 he received the provostship of Eton College, which, with angling and philosophy for recreation, he held till his death in December 1639. Author of poems and sundry treatises, as well as of many sage and quick apothegms, W. chose for his epitaph—'*Hic jacet hujus sententiæ primus auctor: Disputandi Pruritus sit Ecclesiarum Scabiés. Nomen alias quære.*' See a life by Izaak Walton prefixed to his edition of the well-known *Reliquiæ Wottonianæ* (1651).

WRIGHT, Silas, an American statesman, born at Amherst, Mass., May 24, 1795, was admitted to the bar in 1819, and settled at Canton, St. Lawrence Co., N. Y. After holding several important positions in his own state, he was in 1827 elected to Congress. He became U. S. Senator in 1834, and was chosen governor of New York in 1844. He was a successful lawyer and ranked high as a statesman. Died at Canton, N. Y., April 27, 1847.

WRY'NECK is a common deformity in children from spastic contraction of the sternomastoid muscle by which the head is drawn towards the shoulder, and the chin turned to the opposite side. The contracted muscle stands out strongly under the skin, and sometimes the size of the features on the affected side is strikingly less than on the opposite. If the deformity be neglected, the clavicle itself may yield and be curved upwards. The trapezius, scalene, and other muscles are involved, but to a less extent. W. is usually due to congenital causes, though it may not be noticed till some years after birth. The only effective treatment consists in the division of the sternomastoid muscle by two punctures. The head should be put well on the stretch, and the knife should be entered behind the clavicular fibres, about half an inch above the cavicle, and passed beneath the muscle. Then its edge is turned towards the fibres, and they are divided completely. The same operation is performed with the sternal tendon. The head is afterwards kept in position by a suitable apparatus.

WY'ANDOTTE, a town of Kansas, at the confluence of the Missouri and Kansas rivers, opposite Kansas city, has 8 churches, a State blind asylum, 2 weekly newspapers, &c. W. is an important railway junction, and the seat of great machine-shops, stock-yards, rolling-mills, and pork and beef packing-houses. The neighborhood is rich in coal, and the town has been lighted since 1867 by gas from a natural gas-well. Pop. 9000.

WYR'CESTRE, William, son of a Bristol burgess of the same name, was born in that city in 1415, entered Hart Hall (now Balliol College), Oxford, in 1432, where he remained four years, and afterwards became secretary and pursuivant to Sir John Fastolf, in commemoration of whose exploits he wrote the *Acta Domini Johannis Fastolf*, which Bale had seen and quotes, but which is now lost. He was one of Fastolf's executors, and the administration of the will brought him into controversy with Sir John Paston and others. The dispute was not settled till 1472. In 1473 he presented his friend, Bishop Waynflete, with a copy of an English version which he had made of Cicero's *De Senectute*, and which was published anonymously by Caxton. He died in Bristol about 1479. The twin passions of his life were literature and architecture. His chief works are the *Itineraria* (edited by Nasmith, 1778), and the *Annales Rerum Anglicarum*, 1324–1468 (edited by Hearne, 1771).

WYTT'ENBACH, Daniel Albert, born 7th August 1746 at Bern, Switzerland, studied at Marburg, Göttingen, and Leyden, and was successively professor of Greek at the Remonstrants' College at Amsterdam (1771), of philosophy at the Athenæum there (1779), and of eloquence at the University of Leyden (1799). Retiring in 1816, he resided first at Heidelberg, then at Leyden, and died at Œsgeest, 17th January 1820. W.'s writings are full of sound classical learning and criticism, expressed in pure and clear Latin. The chief are *Epistola Critica ad D. Ruhnkenium* (Gött. 1769); *Præcepta Philosophiæ Logicæ* (Amst. 1782); *Vita Ruhnkenii* (Leid. 1800); the *Bibliotheca Critica* (3 vols. Amst. 1777–1808); the *Philomathia seu Miscellanea Doctrina* (3 vols. Amst. 1809–17); his editions of Plato's *Phædo* (Leid. 1810, Leip. 1825) and Plutarch's *Moralia* (5 vols. 1795–1800), and the *Animadversiones* (3 vols. 1810–21). A collection of his *Opuscula Varii Argumenti* appeared after his death (2 vols. Leid. 1821); selections by Friedemann (Brunsw. 1825), as also of his *Index Gracitatis* (2 vols. Oxf. 1830), and his letters, *Epistolarum Selectarum Fasciculi Tres* (edited by Malme, Ghent 1830). See Malme, *Vita D. Wyttenbachii* (Ghent 1823).—Johanna W. (*née* Gallien), married to the above in his seventy-second year, lived after her husband's death chiefly in Paris, obtained the degree of doctor of philosophy from Marburg University in 1827, and died at Leiden in 1830. Of her writings the chief are *Théagène* (Par. 1815); *Das Gastmahl des Leontis* (Ulm 1821), and the novel *Alexis* (Par. 1823).

X.

XIN 'GU, a large river of Brazil, rises in the eastern spurs of the Serra Diamantina, near the heart of the country, and after flowing N. and N.E. for fully 1300 miles through a fertile, but undeveloped region, joins the Amazon 210 miles W. of Para.

XIPHOSU'RA, an order of *Crustacea*, represented solely by the king crabs or *Limuli*, found in the West Indian seas, and also in the East Archipelago. The front segments of the body are united to form a broad shield-like plate or *carapace* of convex shape, whilst the posterior portion is elongated to form a terminal, sword-like, spinous tail (*telson*), from the presence of which the name X., or 'sword-tailed,' has been given. On the upper and convex surface of the 'carapace' are placed the eyes, whilst the concave or under surface bears the locomotive and other appendages. In the limulus there are thirteen pairs of appendages, and of these, six pairs, in the form of legs, are attached round the margin of the oral aperture, the spines with which the basal or proximal joints of the legs are furnished subserving the function of a masticatory apparatus. Anteriorly, and in front of the mouth, a pair of chelate antennæ are also situated. The remaining feet are placed posteriorly on the abdominal surface in the form of broad plate-like structures, to which the respiratory organs are attached. The extinct group of the *Eurypterida* were closely related to the X. The two genera, *Pterygotus* and *Eurypterus*, are included in this group, the most familiar form being that of the *Pterygotus Anglicus*. Like the *Trilobites*, the *Eurypterida* are solely characteristic of the Palæozoic life period.

XYLO'BIUS (Gr. *xylon*, 'wood,' and *bios*, 'life'), a fossil genus of *Myriapoda* occurring in rocks of Carboniferous age, within the hollowed trunks of *Sigillaria*, one of the most characteristic trees of the Coal Epoch. X. had the power of rolling itself up for protection into a ball-shaped form.

Y.

YAK'UB BEG, surnamed *Khushbegi* ('lord of the family'), and *Atalik Ghazi* ('victorious guardian'), was born near Samarcand early in the present century. His lineage and race are doubtful, but he originally appears as chamberlain to Khudayar Khan, the Mohammedan conqueror of Khokand, then a Chinese possession. He became successively a commander of five hundred soldiers, governor of the Ak Musjid ('White Mosque'), on the Jaxartes, where in 1853 he stubbornly resisted the advance of the Russian general Perovsky, and governor of Kurama. At this time Y. B. had the reputation of being a brave soldier, an orthodox Mohammedan, and a stern disciplinarian. But he first rose to great eminence after the recovery of Kashgar from the Chinese in 1864. In the course of three years he had firmly established his power. For twelve years this remarkable man conferred on a large part of Central Asia the benefits of a settled though rigorous government. He 'drilled and disciplined a large civil staff. He presented to his subjects the spectacle about which Indian administrators now and then dream, of a monarch who held a public durbar to which the meanest had access, who received all kinds of petitions, who passed orders by a sort of instinct on piles of reports, who punished delinquent officials for malpractices, who whipped vagrants and beggars, drove idlers to say their prayers at mosques, checked sedition, and forced women to go about in modest veils.' In his foreign policy he was strongly anti-Russian, and ultimately friendly to Britain. In 1874 a commercial treaty was concluded between Y. B. and Sir Douglas Forsyth to develop intercourse between India and Kashgar, which has already produced considerable results. But in the spring of 1877 he was assassinated, though another account attributes his death to fever, and the fabric he had so laboriously raised fell to pieces almost immediately. The Chinese armies overran the country (1878) and Kashgar has again come under Chinese rule. See Demetrius Charles Boulger's *Life of Yacoob Beg, Ameer of Kashgar*, 1878.

YALE, ELIHU, born at New Haven, Conn., in 1648; removed with his father, to England, in 1658, and never returned to America. He went to India in 1678; was Governor of Fort St. George, Madras, and afterwards President of the East India Company. During his life he acquired a large fortune, and made numerous gifts to Yale College, Conn., which was named after him. Died in London, in 1721.

YANCEY, WILLIAM LOUNDES, an American statesman, born at Ogeechee Shoals, Florida, in 1814; received a liberal education at the North; became a lawyer at Abbeville, S. C., and removed to Alabama (1836); was engaged for some time in editorial work; became prominent in politics; was a member of Congress (1844–47); was an ardent advocate of pro-slavery doctrines and secession; represented the Confederate government in Europe, during the civil war, and was afterwards a member of the Confederate Congress. Died in South Carolina, in 1863.

YAQUIS, or HIAQUIS, a tribe of partially civilized indians, at Sonora, Mexico. They number about 20,000, are peaceably disposed, and are devoted to agriculture. Many of them are Roman Catholics.

YATES, RICHARD, born at Warsaw, Ky., in 1818; educated at Illinois College, and became a lawyer; was sent to congress by the Whigs (1851–55); was elected governor of the state of Illinois, in 1861, and in that position, was an energetic supporter of the national government during the civil war; and was U. S. Senator (1865–71). Died at St. Louis, Mo., in 1873.

YELL'OW THROAT (*Trichas Marylandica*), a species of warblers occuring in N. America. Its length is about 5 inches, and the color olive-green above, with a yellow breast and throat, the male exhibiting a black band on the forehead as part of its summer plumage. The nest is built on the ground, and the song is musical, but not very strong.

YEOLA, a town in Nassick district, Bombay Presidency, British India, 130 miles N.E. of Bombay. Pop. (1872) 17,461. It has special manufactures of silk and cotton cloth, woven on the hand-loom with elaborate designs, with broad borders of gold or silver thread.

YOO'SUFZYE ('children of Joseph'), a numerous Afghan tribe, on the N. W. frontier of India, occupying about 2000 sq. miles within the British district of Peshawur and also the hills beyond the N. boundary. Their total number is estimated at 246,000, including 73,000 fighting men. Of these 80,000 are British subjects; 800 are serving in the Bengal army, and 360 in the Punjaub irregular force. The crops of their territories are wheat, barley, millets, maize, cotton, and mustard-seed. The Y. export iron, cattle, and wool; and their transit trade is considerable. Those within British territory have become good subjects.

YORKTOWN, a village on York River, and in York Co., Va. In 1781 Lord Cornwallis was besieged here by American and French forces, commanded by Washington and La Fayette, and on Oct. 17, 1781, was forced to surrender. The force so surrendered consisted of 7,247 regular troops, and 840 sailors. During the civil war the Confederate general Johnston with a force of 53,000 men was here beseiged by a Union army, commanded by Gen. McClellan. On May 4, 1862, the confederates evacuated their works.

YOR'UBA, or YARR'IBA, a county of W. Africa, lying between the kingdoms of Dahomey, Benin, and Gando. Its northern portion, which is subject to Fulah Mohammedans, is open and well cultivated, resembling a great garden. To this region there succeeds, on the S., an undulating, wooded country, which in turn merges into the dense belt of primeval forests, which, as on the Gold Coast, separates the coast district from the interior. The coast natives are pagans of a debased type, but are improving under the efforts of missionaries. The total pop. of the country is estimated at about 3,000,000, and several of the towns are of large size. The chief are Abeokuta, Illori (60,000), Oyo, and Ibadan. The last is a walled town 18 miles in circumference, and with a pop. of 150,000. Palm-oil, cotton, and ivory are the staple products of the country, whose foreign trade is carried on chiefly through the British colony of Lagos.

YOUNG, CHARLES MAYNE, born January 10, 1777, was the son of a London surgeon eminent in his profession, but brutal to his family. During a visit to an uncle at Copenhagen, Charles so captivated the king that the monarch offered to educate and provide for him if he became a naturalized subject. This offer being declined, he was educated at Eton and the Merchant Tailors' School. After a short experience in a mercantile house, he went on the stage at Liverpool as Douglas in 1798. Next year he was engaged to 'lead' at Manchester. In 1804 he played lovers' parts in Liverpool with Miss Grimani, whom he married in that city, March 9, 1805. This lovely and estimable wife died in the following year. Charles Y. made his first appearance in London as Hamlet; and amid the tumultuous applause accorded to his performance the only hiss was that of his malignant father. Thenceforth he rivalled Kemble—some say, imitating him too much. His stately style, of what we call the Classical, though it is a highly artificial type, contrasted so well with Edmund Kean's that the two often played alternately in the same parts with much pecuniary gain. Up to 1829 he enjoyed uninterrupted favor on the stage and in society. In that year he was tempted to play in America by an offer of $60,000 for ten months. He declined the proposal, however, and at the age of fifty-three retired from his profession with a competency of $300,000. He died at Southwick, near Brighton, June 28, 1856. See *Life of Charles Mayne Y., by his Son, the Rev. Julian Y.* (2d ed. 1871).

YOUNGSTOWN, a city of Mahoning Co., O., on the Mahoning River. It has five railroads, and is engaged in iron manufactures, coal mining, and agriculture. It is also the center of a large trade. Pop. 24,000.

YPSILANTI, a town of Washtenaw Co., Mich., on the Huron River, at the junction of the Michigan Central and the Detroit & South-western Railroads, 30 miles from Detroit. It is surrounded by an agricultural district, and the river furnishes water-power for manufacturing. The State Normal School is located here. Pop. 6377.

YUMAS, a tribe of American Indians, occupying the territory along the Colorado River. The numbers of the tribe are small, and they now occupy a reservation assigned to them in 1865.

YU'THIA, the former capital of Siam, 40 miles N. of Bangkok, is almost encircled by the Méinan, whose fisheries furnish the town its principal employment. The German Mandelslohe in the 15th, and Portuguese Mendez Pinto in the 16th c., described the marvels of this 'Venice of the East;' but in 1768 it was razed to the ground by the king of Ava, and of its famous structures there only remains the 'Golden Mountain,' a neighboring pyramid 400 feet high, with a gilded colossal statue of Buddha. The modern town is the summer residence of many Bangkok merchants, and has an estimated pop. of 40,000, including many Chinese and Burmese.

Z.

ZAGAZIG, a town of Egypt, pop. 30,000. The ancient city was of great size, but nothing now remains of it but vast mounds. The position of two great temples can still be distinguished. From Z., as a center nearly all the railways of the Delta radiate.

ZE'A, Francisco Antonio, born at Medellin in Colombia, 20th October 1770, for sharing in a revolutionary movement was imprisoned at Cadiz, Spain (1797–99), but in 1805 became Professor of Botany at Madrid, and by Joseph Bonaparte was appointed Minister of the Interior and Governor of Malaga (1808–13). Retiring to S. America (1814), he joined Bolivar, and after rising to be Intendant-General of the forces, held the Vice-Presidency of Venezuela (1818–19). Ill-health, however, compelled him to revisit Europe, and having as minister-plenipotentiary concluded a Colombian loan of $10,000,000 with London bankers, he died at Bath, 22d November 1822.

ZEB'ULUN (Heb. 'dwelling') was the tenth son of Jacob (Gen. xxx. 20), and the tribe numbered 57,400 at the first census, and 60,500 at the second (Numb. i., xxvi.). The territory of Z. was one of the richest and most beautiful sections of the land of Canaan, stretching across the country almost from the Sea of Galilee on the E. to the plain of Phœnicia on the W. In after times the tribe was distinguished for its warlike spirit (*cf.* Jud. iv. 6, 10; v. 18), scientific skill (Jud. v. 14; 1 Chron. xii. 33), and commercial enterprise (Gen. xlix. 13; Deut. xxxiii. 18, 19).

ZEISBERGER, David, born in Moravia, in 1721; educated among the Moravians and joined their body; went to England and came from there to Georgia; went North and was one of the founders of Bethlehem, Pa. (1740); became an Indian missionary, and during the remainder of his life labored among various tribes with great success. Died in 1808. He published several religious and educational works in the language of the Delawares.

ZELKO'NA TREE, a name given to *Planera Richardi*, a large elm-like tree, native of the Orient. The timber is much prized, the heartwood when dry being exceedingly hard, capable of a fine polish, and is an excellent furniture wood.

ZELL, Karl, a well-known humanist, born at Mannheim, April 8, 1793, studied philology at Heidelberg, Göttingen, and Breslau, and became professor in the Rastatt Lyceum in 1814, and in the University of Freiburg in 1821. Here he founded a school of philology in 1830, and in 1835 was nominated to the ministerial council. In 1847 he became Professor of Archæology at Heidelberg, and from 1848 to 1853 he sat in the Second Chamber of Baden. At the diet of 1851 with Hirscher he exerted himself to promote the greater freedom of the Church. In 1855 he retired from his chair, and died at Heidelberg, January 24, 1874. His chief works are *Ferienschriften* (3 vols. Freib. 1826–23), *Handbuch der Römischen Epigraphik* (3 vols. 1850–57), and *Li-oba und die frommen Angelsächsischen Frauen* (Freib. 1860). He also published *Ueber die Ilias und das Nibelungenlied* (Karlsr. 1843), and his course of university lectures as *Opuscula Academica* (Freib. 1857).

ZENA'NA, or ZANA'NA (Pers. 'belonging to women'), that part of a house which among Hindus of good caste is set apart for the use of women. In Bengal a native gentleman's house consists of an outer and an inner part. Each of these is in the form of a quadrangle. The former, well furnished, with fine rooms, and windows looking out upon the public street, is for the use of the men; the latter, of a mean and even squalid appearance, is devoted to the women, who may go into each other's rooms, or take an airing in the courtyard, but must not be seen in public. From 50 to 100 Hindu ladies are sometimes gathered together in this dismal prison-house. Till about twenty years ago no Christian woman was permitted to enter a Bengal Z. The Rev. J. Fordyce was the first to organize the Z. Mission there, and Mrs. Mullens, an accomplished authoress in the Bengalee language, developed the system. In all the great centers of city and intellectual life in India, thousands of Hindu, and in some cases Mohammedan, ladies are now systematically taught in their own homes by Christian ladies, native, European, and American. A Government inspectress in many cases reports on the secular instruction imparted, and grants-in-aid are given accordingly. The sole difficulty is to train a sufficient number of vernacular Christian female teachers to meet the demand. Thus ever-increasing efforts are being made to reach the Hindus of the next generation by bringing the light of the gospel to brighten the cheerless hearths of Hindu mothers.

ZENICK (*Suricata Zenick*), a species of Carnivorous quadruped, allied to the Ichneumon, and also named the 'Suricate.' It is found in S. Africa, attains a length of 18 inches, and resembles a weasel, but has longer legs. The color is a greyish brown, marked on the back with cross bands of darker hue. The muzzle is sharp and the tail long, but sparsely covered with hairs. The Z. may be domesticated, and is a dreaded enemy of rats and mice. It also feeds on fruits.

ZERBST (Wend. 'belonging to the Sserbski'), a town of Germany, Duchy of Anhalt, formerly capital of the principality of Anhalt-Z., on the Nuthe, 26¼ miles S.E. of Magdeburg by rail. The chief buildings are the Nikolaikirche, dating from the 15th c.; the great Schloss, surrounded with a park; and the stately old Rathhaus, dating from the 15th c., but disfigured by additions in 1610, standing in the market-place, in the center of which are the Roland Column (1445), and the Butterjungfer, a slender column bearing a female figure. Z. contains a gymnasium of high repute —the Franciscenm—and has manufactures of silks, plush, cloth, leather, gloves, gold and silver lace, soap, starch, essences, tobacco, chemicals, pottery, umbrellas, musical instruments, and machinery. Gardening, iron-founding, and beer-brewing are also carried on. Pop. (1875) 12,877.

ZE'RO, in physics, is any convenient point with reference to which quantitatively estimable phenomena of the same kind are compared. Thus, on the centigrade scale, the Z. of temperature is chosen as the temperature of freezing water; while the absolute Z. of temperature is a point determined by thermodynamic principles. In electricity any object is at Z. potential when it is in contact with and is at the same potential as the earth. A Z. has the essential characteristics of what is known in analytical geometry as the origin.

ZEUSS, Johann Kaspar, the founder of Celtic philology, was born at Vogtendorf in Oberfranken, Bavaria, July 22d, 1806. From the Lyceum at Bamberg he passed to the University of Munich, where he devoted himself to philology and history. In 1839 he became professor of history in the Lyceum at Speier, and in 1847 in that at Bamberg. He died at Vorstendorf, near Kronach, Nov. 10th, 1856. His historical works are, *Die Deutschen und die Nachbarstamme* (Münch. 1837), *Die Herkunft der Bayern von den Markomannen* (1839), *Traditiones Possessionesque Wizenburgenses* (Speier, 1842), *Die freie Reichsstadt Speier vor ihrer Zerstörung* (1843). His great work is his *Grammatica Celtica* (2 vols. Leip. 1853; 2d ed. by Ebel, Berl. 1868–71), which for the first time placed Celtic philology on a scientific basis.

ZIB'ETH (*Viverra Zibethia*), a species of *Viverridæ* or civets found in E. Asia, and attaining a length of from 3 to 4 feet. The color is a brown mixed with white, and marked with spots and blotches of darker hue. The Z. has a musk-secreting pouch resembling that of its African neighbor the true civet (*Viverra civetta*).

ZIE''THEN, or ZIE'TEN, Hans Joachim von, one of the bravest and most popular generals of Friedrich the Great, was born at Wustran, May 18, 1699, entered the Prussian service in 1714, retired in 1724, but re-entered it as a lieutenant in 1726. A quarrel with his captain next brought him a year's imprisonment and his dismissal from the service. Restored to his rank in 1730, he became captain in 1731, and major in 1736. In 1741 he became colonel of a regiment of hussars, and in this capacity did much to increase the efficiency of the Prussian light cavalry. At the outbreak of the Second Silesian War (1744), at the head of the advanced guard he entered Bohemia, advanced to Budweis, then achieved a dexterous retreat behind the Elbe, inflicting a signal defeat on a force of 16,000 men at Moldau-Tein, 12th October. In 1745, at Jägerndorf, he led his regiment, which wore a uniform similar to that of an Austrian regiment of hussars, through an Austrian force of 20,000, in order to carry to the Markgraf Karl the orders of the king, and took an active part in the battles of Hohenfriedberg (June 4th) and Hennersdorf (November 23), soon afterwards being made major-general. During the peace he fell under the displeasure of the king, but was forgiven at the outbreak of the Seven Years' War, and appointed a lieutenant-general. He took part in the battles at Reichenberg and

Prague, commanded the left wing at Kollin, next remained near the Prince von Bevern, who wished to cover Lausitz and Schlesien, and on his defeat and capture, led the remnant of his army to join the king at Liegnitz. In the battle of Liegnitz (August 15, 1760) he held back the Austrian main army during the struggle before the camp, for which on the field of battle he was made general of cavalry. At Torgau he carried the Siptitz Heights, and thus decided the victory. In the spring of 1761 Z. watched the Russians, who, however, declined to give him battle. From this time until the close of the war he remained with the king, holding during his absence the supreme command. After the war he lived chiefly at Berlin, enjoying the especial favor of Friedrich, who was a frequent visitor of his 'old father Z.' He died at Berlin, January 26, 1786. A monument was erected to him at Berlin in 1794 by Friedrich Wilhelm II. His life has been written by Luise Joh. Leopold von Blumenthal (3d ed. Berl. 1806), and Hahn (5th ed. Berl. 1878).

ZIPH'IUS, a genus of whales belonging to the family of the *Rhynchoceti*, or 'Beaked whales.' Z. occurs in the Mediterranean Sea and S. Atlantic. The snout is pointed, there is a single blowhole, and a small dorsal fin is developed. There are no teeth in the upper jaw, but the lower jaw is provided with from 1 to 2 pairs. *Z. Sowerbiensis* is a familiar species. The average length is 16 feet.

ZIRCO'NIA LIGHT, an intensely brilliant light differing from the Drummond Light mainly in the employment of cones of the oxide of zirconium instead of the less durable cylinders of lime. In 1867 Tessié du Motay introduced the Z. L. into Paris, and it was there employed for several years to illuminate squares and public buildings and gardens. The cones were formed of burnt zirconia kneaded into a paste with aqueous boracic acid, and hardened in iron moulds at a red heat, and a mixture of oxygen and a highly carburetted gas was burnt to raise the cones to incandescence. The Z. L. was also some time used as an illuminant in public places of Brussels and Vienna, and in America in lighthouses and public works. The construction of the Brooklyn Bridge over East River, New York, was conducted by night under the radiant light from zircon cones acted on by oxygen. The Z. L. has been practically superseded by the electric light.

ZNAIM, a town of Moravia, Austria, on the Thaya, 50 miles N. by W. of Vienna by rail. It has a Rathhaus (1446), a circular church, said to have been a heathen temple, and the Gothic Church of St. Nicholas. The old ducal castle crowns a neighboring height. The trade is largely agricultural. Mustard, wine, and cucumbers are exported, and there are large potteries, at which fine Majolica is produced. Leather and chocolate are also manufactured. New waterworks were opened in 1877. Pop. (1869) 10,415. Formerly *Znoimo*, under which name it was the capital of Moravia, Z. was destroyed in 1145 by the Bohemian prince Vladislav, but was rebuilt in 1226. On 11th July 1809 the French under Massena and Marmont defeated the Austrians here, and from 13th July to 3d September 1866 it was held by the Prussians.

ZOANTHAR'IA, an order of *Actinozoa*, in which the sea anemones and most of the corals are contained. The tentacles and soft parts exist in multiples of 5 or 6. The Z. are divided into the *Z. malacodermata* (sea-anemones, &c.), *Z. sclerobasica* (*Antipathes*), and *Z. sclerodermata* (reef-building corals).

ZO'LA, Emile, born in Paris, 2d April 1840, is the son of an Italian engineer. Bred in Provence and educated at the Parisian Lycée Saint-Louis, he turned from bookseller a novelist, producing *Contes à Ninon* (1864), *La Confession de Claude* (1865), *Le Voeu d'une Morte* (1866), *Les Mystères de Marseille* (1867), &c., titles that indicate the scope of one who may fairly be called a realist of the foulest water. An immense success has attended his series, *Les Rougon-Macquart, histoire naturelle et sociale d'une famille sous le second Empire* (7 vols. 1874–77), the last volume of which, *L'Assommoir*, was dramatized by Charles Reade under the title *Drink* (1879). Z. himself brought out two comedies, *Club* and *Le Bouton de Rose*, in 1878, with small success.

ZONA'RAS, Joannes, a Byzantine writer of the 12th c. A.D., born at Constantinople, held various high offices at the courts of Alexius and Joannes Comnenus, but afterwards withdew to a monastery on Mount Athos, where he died at the age of eighty-eight. His *Chronicon*, from the creation to 1118 A.D., is valuable as preserving many fragments of perished histories, and was last edited by Dindorf (6 vols. Leip. 1868–75), and his Commentaries were edited by Beveridge (Oxf. 1672). He was also the reputed author of several other works, among them a Greek Lexicon (ed. by Tittman, 2 vols. Leip. 1808).

ZO'ÖIDS (Gr.), the name given to the beings produced by a sexual processes of *gemmation*, or budding, or by *fission*. The Z. collectively make up a compound 'individual'—as for example in a Zoophyte where the whole organism, including its hundreds of animals, is an 'individual' animal, its constituent elements being named '*zoöids*.'

ZOOT'OCA (Gr. *zootokos*, 'producing young alive'), a genus of lizards included in the family *Lacertidæ*, and represented by the *Z. vivipara*, the Viviparous or Scaly lizard, which, with the *Lacerta agilis* or Sand lizard, are the only members of the Lizard group inhabiting Britain. The viviparous lizard is common on heaths and in grassy places. It attains a length of 6 inches; the color is olive-brown above, with a dark line passing along the spine. The under parts are orange, marked with black in the male, and olive-brown in the female.

ZUCC'ARO, Federi'go, an Italian painter, born in 1543, was intrusted by Pope Gregory XIII. with the completion of the pictures in the Pauline Chapel, begun by Raphael. Falling into disgrace, however, he went abroad, and spent several years in Flanders, Holland, and England, where he painted portraits, among others, those of Queen Elizabeth and Mary Stuart. In 1582 he was employed in adorning with pictures the palace of the Doge of Venice. He founded the Academy of San Luca, was called to Spain in 1588 to decorate the Escurial, but soon returned to Italy, where he died in 1609. Both Federigo and his brother Taddeo (born 1529, died 1566), in spite of their artistic merits, are examples of the decadence of Italian art in the latter half of the 16th c., of its lack of originality, genuineness and power.

ZUMPT, Karl Gottlob, a well-known classical philologist, was born at Berlin, March 20, 1792, entered the University of Heidelberg in 1809, studied afterwards at Berlin, and became in 1827 extraordinary and in 1836 ordinary professor of Roman literature at the latter. In 1831 he traveled in Italy and in 1835 in Greece. He died at Karlsbad, June 25, 1849. Z. is best known by his *Lat. Grammatik* (Berl. 1818; 13th ed. 1874). His other works are *Annales Veterum Regnorum et Populorum* (1819; 3d ed. 1842); *Ueber den Röm. Ritterstand* (1839); *Ueber den Stand der Bevölkerung und die Volksvermehrung im Alterthum* (1841); *Ueber den Bestand der Philosophischen Schulen in Athen und die Succession der Scholarchen* (1843); *Ueber die bauliche Einrichtung des Röm. Wohnhauses* (1844; 2d ed. 1851); *Die Religion der Römer* (1845); *Ueber die Persönliche Freiheit des Röm. Bürgers und die Gesetzlichen Garantien derselben* (Darmst. 1846); and his editions of Quintilian (Leip. 1831), Curtius (Berl. 1826), and Cicero's *Orationes in Verrem* (2 vols. 1831), and *De Officiis* (Braunsch. 1838). See his nephew's *De C. Tim. Zumptii Vita et Studiis Narratio* (Berl. 1851).—August Wilhelm Z., nephew of the preceding, was born at Königsberg, December 4, 1815, in 1833 entered the University of Berlin, and became in 1851 professor at the Friedrich-Wilhelm gymnasium there. He died at Berlin, April 23, 1877. His chief works are *Commentationes Epigraphicæ* (2 vols. Berl. 1850–54); *Studia Romana* (1859); *Das Kriminalrecht der Röm. Republik* (2 vols. 1865–69); *Das Geburtsjahr Christi* (Leips. 1869); and *Der Kriminalprozess der Röm. Republik* (Berl. 1871).

ZUNZ, Leopold, the Nestor of modern Hebrew scholarship, was born at Detmold, Germany, 10th August 1794, and after some years in Wolfenbüttel gymnasium, studied philology at Göttingen and Berlin. Preacher at the New Berlin Synagogue (1820–22) and joint-editor of the *Spener'sche Zeitung* (1824–32), he also directed the Jewish School (1825–29), and after a visit to Prague (1835), the new Normal Seminary (1839–50). In 1845 he became a member of the Commission for the Education of Jews in Prussia. Among his numerous works are *Etwas über die rabbinische Literatur* (1818), *Die Gottesdienstlichen Vorträge der Juden* (1832); *Die synagogale Poesie des Mittelalters* (1855), *Literaturgeschichte der synagogalen Poesie* (1869), &c., republished in his *Gesammelte Schriften* (3 vols. Berl. 1875–76).

End of American Supplement.

BIOGRAPHY OF EMINENT AMERICANS.

ALLERTON, Isaac, was the fifth of the noble band who signed a constitution of government in the cabin of the *May Flower*, at Cape Cod. He survived the terrors of the first winter in New England, afterward became the agent of the settlers in negotiating the purchase of the new possessions from those of the company in London, who had furnished capital for the enterprise; and, as an enterprising trader, became the founder of the commerce of New England. He was accompanied in the *May Flower* by his wife and four children. The time and place of his death is not known, some asserting that he returned to England, and others that he died in the city of New Amsterdam (New York) in 1659.

ANDERSON, Richard Clough, was born at Louisville, Ky., August 4, 1788. He graduated at William and Mary College, studied law under Judge Tucker, and commenced its practice in his native town, then rapidly swelling toward the proportions of a city. He soon stood in the front rank of his profession as an able counsellor and eloquent advocate. Political life presented a high road to fame, and friends and ambition urged him to travel it. For several years he was a member of the Kentucky legislature; and, in 1817, he was elected to a seat in the Federal Congress, where he continued four years. It was a period of great excitement in that body, for, during A.'s membership, the admission of Missouri was the topic for long and angry debates. In these he took a prominent part, and was highly esteemed for his manly and conciliatory course. His constituents were anxious to reëlect him, in 1822, but he declined the honor, because he considered his services to be more valuable, at that juncture, in the legislature of his own State, to which he was elected. He was chosen Speaker of the Assembly, but did not preside in that body long, for, in 1823, President Monroe appointed him the first United States minister to the new Republic of Colombia, South America. There he was received with joy and great honor, and during his residence at Bogota, the capital, he won for himself and family the unaffected love and esteem of all classes. In 1824, he negotiated an important treaty. In 1826, President Adams appointed him envoy extraordinary and minister penipotentiary to the diplomatic Congress held at Panama, to consider the welfare of the South American Republics. On his way thither he was taken ill at the village of Tubaco, where he died, on the 24th of July, 1826, at the age of thirty-eight.

BALDWIN, Thomas, one of the most eminent lights of the Baptist Church in America, was born at Bozrah, Conn., Dec. 23, 1753. When he was sixteen years of age his parents went to Canaan, then a frontier town in New Hampshire, to reside, and there his youth was spent in the laborious vocation of a blacksmith. Only a few books could then be obtained, yet so thoroughly did he study all that fell in his way, that, when arrived at manhood, he possessed a stock of miscellaneous knowledge much greater than that of most young men of his time. He was ordained for the Christian ministry in the summer of 1783; and at about the same time he was elected to a seat in the Connecticut legislature. He soon declined political office, because it interfered with his ministerial labors. The fame of B., as a zealous preacher, was soon in all the churches; and, in November, 1790, he was installed pastor of the Second Baptist Church, in Boston. In 1803, the Faculty of Union College, New York, conferred upon B. the degree of Doctor of Divinity; and the same year he commenced the publication of the *American Baptist Magazine*. He was its sole editor until 1817, and senior editor until his death. It was a powerful auxiliary in his hands, in promoting the growth of the Baptist Church in this country; and, for a long time, it was the only publication issued by that denomination on this side the Atlantic. He died on the 29th of August, 1825, at the age of seventy-two.

BARD, Samuel, was the son of an eminent physician, in Philadelphia, where he was born on the 1st of April, 1742. He was graduated at Columbia College, in 1761, and the same year he went to Europe, to obtain a thorough medical education. He was absent in France, England, and Scotland, five years; and such was his skill in Botany, that he obtained the annual medal given by Professor Hope, at Edinburgh, for the best collection of plants, in 1765. He there received his degree, returned home, and entered into partnership with his father. He made New York his residence the same year, and there he formed and executed the plan of founding the Medical School of New York, where degrees were conferred in 1769. In 1813, he was elected president of the College of Physicians and Surgeons, of New York, and held that office until his death, which occurred on the 24th of March, 1821, at the age of seventy-nine.

BARNEY, Joshua, was born in the city of Baltimore on the 6th of July, 1759. He made several sea voyages while yet a lad, and at the beginning of the War for Independence, he entered the sloop, *Hornet*, as master's mate, and accompanied the fleet of Commodore Hopkins to the West India seas, in 1775. He was at the capture of New Providence, and for his bravery there was promoted to a lieutenantcy. In 1782, he was placed in command of the *Hyder Ally*, of sixteen guns, belonging to the State of Pennsylvania. In April, of that year, he captured the British ship, *General Monk*, after an action of twenty-six minutes. This vessel was bought by the United States, and in September, it sailed for France, with Barney as commander, who bore dispatches for Dr. Franklin, at Paris. In that vessel he brought back the French loan to the United States in chests of gold and barrels of silver. Peace soon came, and he left the service, for awhile. In 1796, Captain B. went to France, with Mr. Monroe, as the bearer of the American flag to the National Convention. Commodore B. was among the most efficient commanders in service, when the United States declared war against England in 1812; and the following year, he had charge of a flotilla in

the Chesapeake Bay for the protection of the coast. When the British invaded Maryland, and pressed forward toward Washington City, near the close of the summer of 1814, B. abandoned his flotilla, and with his marines, engaged in a battle with the enemy at Bladensburg, where he was wounded in the thigh by a musket ball, which was never extracted. He died on the 1st of December, 1818, at the age of fifty-nine.

BARTLETT, Josia, was born at Amesbury, Massachusetts, in November, 1729. He was a maternal relative of Daniel Webster, and, like that statesman, he arose to eminence by the force of his own character, without the factitious aid of wealth or family influence. He lacked a collegiate education, but having acquired a knowledge of Greek and Latin in the family of a relative, he was prepared for the study of medicine, his chosen profession. He commenced its practice at Kingston, New Hampshire, was skilful, and soon acquired a moderate fortune. In 1774, he was a member of the general Committee of Safety. The appointment of that committee alarmed the governor. He dissolved the Assembly; but the members, with Dr. B. at their head, reassembled, and, like those of Virginia, appointed delegates to the Continental Congress. One of these was B. Wentworth soon afterward took away his magistrate's and military commissions; but the governor, in turn, was speedily deprived of his office, and became a fugitive. B. was re-elected to Congress, in 1775, and was one of the committee chosen to devise a plan for a confederation of the States. He earnestly supported the proposition for independence, and was the first man to sign it, after John Hancock. He remained in Congress until 1778, when he obtained leave to return home and superintend his deranged private affairs. He did not again resume his seat in that body, for the following year he was appointed chief justice of the Court of Common Pleas of his native State. He was afterward raised to the bench of the Superior Court; and was very active in favor of the Federal Constitution. The legislature elected him first United States Senator, under the new government, but he declined the honor, having been previously chosen president, or governor of New Hampshire. That office he held, by successive election, until 1794, when he retired to private life. He died on the 19th of May, 1795, in the sixty-sixth year of his age.

BARTON, William, was born in Providence in 1750. He passed through the several grades of office, until, in 1777, he held the commission of lieutenant-colonel of militia, and performed good service in preparations for driving the British from Rhode Island. General Prescott, an arrogant, tyrannical man, was the commander-in-chief of the enemy there, and the people suffered much at his hands. They devised various schemes to get rid of him, but all failed until a plan, conceived by Colonel B., was successfully carried out. Prescott's head-quarters were at the house of a Quaker, five miles north of Newport. On a sultry night in July, 1777, B., with a few trusty followers, crossed Narragansett Bay from Warwick Point, in whale boats, directly through a British fleet, and landed in a sheltered cove a short distance from Prescott's quarters. They proceeded stealthily in two divisions, and secured the sentinel and the outside doors of the house. Then B. boldly entered, with four strong men and a negro, and proceeded to Prescott's room on the second floor. It was now about midnight. The door was locked on the inside. There was no time for parley. The negro, stepping back a few paces, used his head as a battering-ram, and the door flew open. Prescott, supposing the intruders to be robbers, sprang from his bed and seized his gold watch. The next moment B.'s hand was laid on his shoulder, and he was admonished that he was a prisoner, and must be silent. Without giving him time to dress, he was conveyed to one of the whale-boats, and the whole party returned to Warwick Point, undiscovered by the sentinels of the fleet. Prescott's mouth was kept shut by a pistol at each ear. The prisoner first spoke after landing, and said, "Sir, you have made a bold push to-night." B. coolly replied, "We have been fortunate." At sunrise the captive was in Providence, and in the course of a few days he was sent to the head-quarters of Washington, in New Jersey. For this brave service, Congress presented their thanks and an elegant sword, to lieutenant-colonel B., and in December following, he was promoted to the rank and pay of colonel in the Continental army. He was also rewarded by a grant of land, in Vermont. In the action at Butt's Hill, near Bristol Ferry, in August, 1778, Colonel B. was so badly wounded, that he was disabled for the remainder of the war. In after years, the grant in Vermont proved to be an unfortunate gift. By the transfer of some of it he became entangled in the meshes of the law, and was imprisoned for debt, in Vermont, for many years, in his old age. When La Fayette was "our nation's guest," in 1825, he heard of the situation of his old companion-in-arms, paid the debt and set him at liberty! Colonel B. died at Providence, in 1831, at the age of eighty-four years.

BARTRAM, John, was the first American who conceived the plan of establishing a botanic garden for American plants and vegetables. He carried his plan into execution, by devoting about six acres, near Philadelphia, to the purpose. He traversed the country in every direction, from Canada on the north to Florida on the south, in search of new productions, and his garden was enriched and beautified by the results of his explorations. His philosophical knowledge attracted the attention of learned and scientific men, at home and abroad, and with these his intercourse became extensive. He sent many botanical collections to Europe, and their beauty, novelty, and admirable classification, won universal applause. Literary and scientific societies of London, Edinburgh, Stockholm, and other cities, placed his name among those of their honorary members; and finally, George the Third of England appointed him "American Botanist to his Majesty." He held that honorable position until his death, which occurred in September, 1777, when he was in the seventy-sixth year of his age.

BAYARD, James A., was born in the city of Philadelphia, on the 28th of July, 1767. His studies were completed in the College at Princeton, New Jersey, where he was graduated with the highest honors, in 1784, at the age of seventeen years. He chose the profession of law, studied it with great assiduity, under General Joseph Reed and Jared Ingersoll, and was admitted to the bar, in August, 1787. In 1796 he was a successful Federal candidate for a seat in Congress, where he first appeared in May, 1797. There he was noted for his industry, integrity, and consistency; and during his services as a member of the House of Representatives, from 1797 until 1804, no man was more highly esteemed for talents and personal worth than B. When, in the winter of 1801, the choice between Jefferson and Burr, the Republican candidates for president of the United States, devolved upon the House of Representatives, and B. and three other Federal members held the choice in their own hands, his colleagues submitted the matter to his judgment, and he fortunately gave the office to Jefferson. A few days afterward President Adams appointed B. minister plenipotentiary to France, but he patriotically declined it for political reasons. In 1804, he was elected to a seat in the United States Senate, to fill a vacancy; and, in February, 1805, he was re-elected for the full term of six years. In that body, also, he was an esteemed leader; and, in 1811, the legislature of Delaware again elected him United States Senator, for another full term. He opposed the declaration of war against Great Britain, in 1812, but, when a majority in

Congress gave sanction to the measure, he cheerfully acquiesced, and, it is said, actually labored with his own hands in the erection of defences at Wilmington, where he resided. In 1813, the emperor of Russia offered his mediation between the United States and Great Britain, and B. and Albert Gallatin were sent to St. Petersburg to negotiate. There they remained six months, when, hearing nothing from England, they proceeded to Amsterdam. They arrived in that city in March, 1814. There they were informed that England would not accept the mediation of Russia, but was ready to treat for peace with the United States. They were also informed that Messrs. Adams, Clay, and Russell, had been added to the commission. All finally met with the British commissioners at Ghent, in August, 1814, where they remained until the 24th of December following, when a treaty was agreed upon and signed. Fourteen days afterward, B. left Ghent for Paris; and on the 4th of March, 1815, while in that city, he was seized with a fatal, but lingering disease. He died on the 6th of August, 1815, when a little more than forty-eight years of age.

BLAND, Richard, was one of the committee to prepare a remonstrance with parliament, in 1768; and in 1773, he was one of the first general committee of correspondence, proposed by Dabney Carr. He was chosen a delegate to the first Continental Congress in 1774, but declined the appointment the following year, because, as he said, he was "an old man, almost deprived of sight." Francis Lightfoot Lee, who signed the Declaration of Independence the following year, was appointed in his place; and three years afterward, the aged patriot went to his final rest.

BOUDINOT, Elias, was born in Philadelphia, on the 2d of May, 1740. He inherited a love of freedom and religious devotion from his Huguenot ancestors, and when the colonists began to question the right of Great Britain to tax them without their consent, he took a stand for his countrymen. He had received a classical education, studied law with Richard Stockton, one of the signers of the Declaration of Independence, and married that patriot's sister. B. practiced his profession in New Jersey, and soon rose to distinction. In 1777, he was appointed commissary-general of prisoners, by Congress, and the same year he was elected to a seat in the Continental Congress. In November, 1782, he was elected president of that body, and in that capacity he signed the preliminary treaty of peace with Great Britain. At the close of the war he resumed the profession of the law, but was again called into public life in 1789, by an election to a seat in Congress, under the Federal Constitution. In 1812, he was elected a member of the American Board of Commissioners for Foreign Missions, to which he made a donation of five thousand dollars; and when he was elected president of the American Bible Society, in 1816, he gave that institution ten thousand dollars. He died at Burlington, on the 24th of October, 1821, eighty-one years of age.

BOWDOIN, James, was born in Boston on the 18th of August, 1727. His grandfather fled from France in 1685, and came to America by way of Ireland, two years later, and settled at Falmouth (now Portland) in Maine. James was the son of an eminent merchant, and was educated at Harvard College, where he was graduated in 1745. He was remarkable for his application, while a student, and his deportment was always correct. He had just laid the foundation of a good character, when, at the age of twenty-one years, his father died, and left him an ample fortune. In 1749, he commenced a system of literary and scientific research. He was elected to represent Boston in the General Court, in 1753, where his learning and eloquence soon made him a conspicuous leader. He was chosen a delegate to the first Congress in 1774, but the illness of his wife prevented his attendance. The following year he was chosen president of the council of Massachusetts, and he held that important office most of the time until the adoption of the State Constitution in 1780. He was president of the convention which formed that instrument; and in 1785, when John Hancock resigned the chair of chief magistrate of the State, B. was chosen to succeed him in office. It was during his administration that the troubles, known as *Shay's Rebellion*, took place in Massachusetts. By his orders, four thousand troops were placed under the command of General Lincoln, to suppress the insurrection; and he was one of the largest contributors to a voluntary subscription of money, which was raised in Boston, within a few hours, to pay the expenses of the troops. He was a member of the Massachusetts convention, called to deliberate on the Federal Constitution, and he gave that instrument his hearty support. Governor B. was a patron of letters. He subscribed liberally for the restoration of the library of Harvard College, destroyed in 1764; and from 1779 till 1784, he was a fellow of the corporation. In 1780, he was instrumental in founding the American Academy of Arts and Sciences, in Boston; and his fostering care was given to other societies, humane and scientific. The University at Edinburgh conferred upon him the degree of Doctor of Laws, and he was chosen a member of the Royal Societies of London and Dublin. He died at Boston, in 1790, at the age of sixty-three.

BOYLSTON, Zabdiel, M.D., introduced the practice of inoculation for the small-pox, at Boston. He was a man of courage and benevolence; a native of Brookline, Massachusetts, where he was born in 1680. He studied medicine and surgery at Boston, and soon became an eminent practitioner and man of fortune. His attention was first called to the subject of inoculation by Dr. Cotton Mather, who had read an account of its successful practice at Smyrna, in the East. The small-pox was then raging with fearful fatality in Boston; but of all the physicians there, B. was the only one who possessed sufficient courage to try the experiment. On the 26th of June, 1721, he inoculated his little son, aged six years, and two servants. He was successful, and began to enlarge the practice. The other physicians opposed him, and in the course of the next month the selectmen of Boston forbade its practice. At that moment six venerable clergymen of the city gave their influence in its favor, and benevolence and good sense triumphed over prejudice and ignorance. In the course of a year he inoculated two hundred and forty-seven persons in Boston; and of two hundred and eighty-six inoculated by himself and physicians in neighboring towns, only *six* died, while of five thousand seven hundred and fifty-nine persons who had the small-pox the natural way, *eight hundred and forty-four* died. Notwithstanding this triumphant vindication of the utility of the practice, B. was mercilessly persecuted by other physicians; and the common people became so exasperated against him, that it was unsafe for him to be seen out after dark. They went so far at one time, as to parade the streets with halters, declaring their intention to hang him, and those who submitted to his practice were grossly insulted. Dr. Mather and others adhered to him, and he triumphed. He died on the 1st of March, 1766.

BRADFORD, William, was a Quaker, and native of Leicestershire, England. He learned the printer's trade in London, and married the daughter of his master, through whom he became acquainted with George Fox, the founder of his sect. The Almanac printed by him was for the year 1687, and was made at Burlington, New Jersey. He printed several controversial pamphlets, and among them was one by George Keith against some of the Quakers of Philadelphia. It was deemed seditious, and Keith and B. were arrested and imprisoned, in 1692. They were tried and acquitted; but having incurred the ill-will of the dominant party of Quakers, B. took up his residence in New York the

following year, where he was appointed government printer, and for a period of about thirty years he was the only practitioner of his art in that province. His first production was a folio volume of laws of the province. In the autumn of 1725, B. commenced the publication of the first newspaper printed in that colony, which he called *The New York Gazette*. John Peter Zenger, one of his apprentices, became a business competitor in 1726; and in 1733 he, too, published a newspaper, called *The New York Weekly Journal*. Much enmity existed between them, and their respective papers became the organs of the two political parties then existing in New York. B. always supported the government party, while Zenger spoke boldly for the people. He owned a paper-mill at Elizabethtown, New Jersey, in 1728, which is believed to have been the first one established in America. He died on the 23d of May, 1752, when he was ninety-four years of age.

BROOKS, John, was born at Medford, Mass., in 1752. At the age of fourteen years he was apprenticed to Dr. Simon Tufts. He commenced the practice of medicine at Reading, and then, in 1774, he took command of a company of minute-men. With these, he assisted in annoying the British forces in their retreat from Concord, on the 19th of April, 1775, and soon afterward he was commissioned a major in the army that gathered around Boston. He assisted Prescott in throwing up the redoubt on Breed's Hill, but was absent on duty during the battle the next day. He remained with the Continental army at Boston, until the following year, and then participated in the battles on Long Island and at White Plains. He was with Arnold in his expedition against St. Leger, at Fort Schuyler, on the Mohawk, in 1777, and bore the commission of lieutenant-colonel. Washington always had the greatest confidence in his integrity and patriotism; and in the crisis at Newburgh, in the spring of 1783, when sedition and mutiny appeared rife, the commander-in-chief made B. his special confidant. When war with England was declared in 1812, General B. was appointed adjutant-general of Massachusetts, by Governor Strong; and in 1816, he succeeded that gentleman as chief magistrate of his native State. He died on the 1st of March, 1825, at the age of about seventy-three.

BROWN, Jacob, was a native of Bucks county, Pennsylvania, and the son of Quaker parents. He was born on the 9th of May, 1775. He was well educated. From eighteen to twenty-one years of age he taught a school at Crosswicks, in New Jersey. Then, for about two years, he was employed as a surveyor in the vicinity of Cincinnati; and, in 1798, he was teaching school in the city of New York. There he commenced the study of law, but finding it not congenial to his taste, he abandoned it, purchased some wild land in the present Jefferson county, near the foot of Lake Ontario, and settled upon it, in 1799. He pursued the business of a farmer with skill and industry; and, in 1809, he was appointed to the command of a regiment of militia. The governor of New York commissioned him a brigadier, in 1811; and when, the following year, war with Great Britain commenced, he was intrusted with the command of the first detachment of New York militia, which was called into the service of the United States, and charged with the defence of the frontier, from Oswego to Lake St. Francis, a distance of almost two hundred miles. In October of that year, he gallantly defended Ogdensburg, with only about four hundred men, against eight hundred Britons. At the expiration of his term, the government offered him the commission of colonel in the regular army, but he declined it. In the Spring of 1813, he drove the enemy from Sackett's Harbor. In his operations there he displayed so much judgment and skill, that Congress gave him the commission of a brigadier-general in the Federal army. In the autumn of that year he was active and efficient on the banks of the St. Lawrence; and after the retreat of the American troops from Canada, in November, the illness of General Wilkinson made the chief command devolve upon General B. Toward the close of January, 1814, he was promoted to major-general, and he was assiduous during the few weeks preceding the opening of the campaign for that year, in disciplining the troops and giving them encouragement. He was ordered to the command on the Niagara frontier, in the spring of 1814, and during the succeeding summer and autumn he won imperishable honors for himself and country. For his gallantry and good conduct in the successive battles of Chippewa, Niagara Falls, and Fort Erie, he received the thanks of Congress and a gold commemorative medal, and the plaudits of the nation. He was twice severely wounded in the battle at Niagara Falls, but he was in service at Fort Erie, a few weeks later. In 1821, he was appointed general-in-chief of the armies of the United States, and held that office until his death, which occurred at his head-quarters, in Washington city, on the 24th of February, 1828, at the age of fifty-three.

BURKE, Ædanus, was a native of Galway, Ireland, where he was born about the year 1743. At the commencement of the American Revolution, he came to fight for liberty. He made his abode in Charleston, and was active in the early military events in that vicinity. He was a lawyer by profession, and considering his services more valuable in civil than in military affairs, the provincial legislature appointed him a judge of the Supreme Court of the newly-organized State, in 1778. When Charleston fell, and the South lay prostrate at the feet of British power, in 1780, B. took a commission in the army. He resumed the judicial office when the Republicans regained the State, early in 1782. He served as the first United States Senator from South Carolina, and while in Congress was the favorite friend of Aaron Burr. He afterward became Chancellor of the State of North Carolina. Wit, humor, and conviviality, were his distinguishing social characteristics. The former were ever visible whether he was on the bench or in the drawing-room; while the latter finally became such a habit that he was its slave. He died at Charleston, on the 30th of March, 1802, at the age of fifty-nine.

BURNET, Robert. Of all the officers who participated in the parting scene between the principal officers of the army and Washington, at Fraunce's Tavern, after the evacuation of New York by the British, Major Robert Burnet, of Little Britain, Orange county, was, for many years, the sole survivor. His father was a Scotchman, and his mother was a native of Ireland. She was one of those who accompanied the first members of the Clinton family, who settled in the vicinity of Newburgh. B. was born in Little Britain, on the 22d of February, 1762, and was engaged in agricultural pursuits until about 1779, when he entered the revolutionary army, in the artillery branch of the service, under Captain Ebenezer Stevens. He was a lieutenant in Stevens' company, and commanded Redoubt No. 3, at West Point, at the time of Arnold's defection, in September, 1780. He was afterward promoted to the rank of major, and was one of the delegates who attended a meeting of the officers, convened by Washington, on account of the seditious tendency of the anonymous Address put forth by Major Armstrong, at Newburgh, in the spring of 1783. He continued in the army, under the immediate command of the chief, until it was disbanded. In the march into the city of New York, on the day when the British evacuated it, B. commanded the rear-guard. He was the last to grasp the hand of Washington at that solemn parting at Fraunce's; and then he returned to his rural pursuits in the town of his nativity. There he lived in the enjoyment of great domestic happiness, until his death. He lived to see, what few men

in modern times have beheld—the living representatives of seven generations of his kindred. These were his great-grandfather of the ancestral part of the connection, and the great-grandchildren of his own posterity. B. died at his residence, in Little Britain, on the 1st of December, 1854, when almost ninety-three years of age. His funeral was attended by his neighbor, Uzal Knapp, who was almost three years his senior. Mr. Knapp, the last survivor of *Washington's Life-Guard*, died about a year afterward.

CAREY, Mathew. Few men have exerted so wide and beneficial an influence, in the domain of letters, in the United States, as Mathew Carey, an eminent author and publisher, who was born in the city of Dublin, on the 28th of January, 1760. His first effort in authorship was made when he was seventeen years of age. His topic was *Duelling*. Two years afterward (1779) he prepared and advertised a political pamphlet, which alarmed the Irish Parliament, and caused that body to suppress its publication. A prosecution was determined upon, and his friends judiciously advised him to leave the country. He escaped to Paris, where he became acquainted with Dr. Franklin, and learned much concerning America. The storm subsided; and, in the course of the following year, young Carey, then only twenty years of age, returned to Dublin, and became editor of the *Freeman's Journal*. In 1783, his father furnished him with means to establish a paper called the *Volunteer's Journal*. It exerted a wide and powerful political influence; and in consequence of the publication in its columns, in 1784, of a severe attack upon the British government, and an alleged libel upon the Prime Minister, C. was arrested, taken to the bar of the House of Commons, and consigned to Newgate prison. The Lord Mayor of London released him in the course of a few weeks; and in the autumn of 1784, he sailed for America. He landed at Philadelphia with a few guineas in his pocket, chose that city for a residence, and, in January, 1785, commenced the publication of the *Pennsylvania Herald*. That paper soon became famous for its legislative reports, prepared by C. himself. Bold, and faithful to his convictions, in editorship, he often offended his opponents. Among these was Colonel Oswald, of the artillery corps of the Revolution, who was then editing a newspaper. Their quarrel resulted in a duel, in which C. was severely wounded. In 1786, he commenced the publication of the *Columbian Magazine*. The following year he issued another publication, called the *American Museum*, which he continued for six years, when the prevalence of yellow fever, in Philadelphia, suspended it. During that season of pestilence the courage and benevolence of C., as an associate with Stephen Girard and others as health commissioners, was nobly exhibited. Their labors for the sick and orphans were incessant and beneficent. His experience led him to the publication of an able essay on the origin, character, and treatment of yellow fever, in 1794. At about the same time he was active in founding the *Hibernian Society*, for the relief of emigrants from Ireland. In 1796, he was zealously engaged, with others, in establishing a Sunday School Society in Philadelphia; and the same year he entered into a controversy with the celebrated William Cobbett, with so much logic and energy, that he silenced his antagonist. The most important effort, made by C. in publishing, was in 1802, when he put forth a handsome edition of the standard English Quarto Bible. His chief travelling agent for its sale was Reverend Mason L. Weems, who disposed of several thousand copies. It was profitable and creditable to C. During the whole exciting period just previous to the breaking out of the war with Great Britain, in 1812, his pen was continually busy on topics of public interest; and in the midst of the violent party excitement, in 1814, he published his famous *Olive Branch*. It was intended to soften the asperities of party spirit, create a thoroughly American sentiment among all classes, and produce peace and conciliation. It was eminently successful; and for this effort, C. deserved a civic crown. Ten thousand copies were sold, and its salutary influence is incalculable. In 1818, C. commenced the preparation of his most important historical work, the *Vindiciæ Hiberniæ*. He died on the 17th of September, 1839, at the ripe old age of almost eighty years.

CARY, Lott, was born a slave, near Charles City Courthouse, in Virginia, on the plantation of William Christian. In 1804, he was hired out as a common laborer in the city of Richmond, where he became intemperate, and was very profane. Three years afterward deep religious impressions changed his habits and thoughts, and he became a member of the Baptist Church. He could not read, but procuring a New Testament, and applying himself faithfully, he acquired a knowledge of the alphabet and words, and finally succeeded in learning to both read and write. He soon became an itinerant preacher on the plantations in the vicinity of Richmond, and labored with the most earnest zeal for the spiritual good of his race. In 1821, the American Colonization Society sent its first band of emigrants to Africa, and C. volunteered to leave a salary of several hundred dollars a year, to accompany those people to a field where he felt that he might be of vast service to his benighted nation. He participated in all the hardships and dangers of that little colony, yet he persevered, and became one of the founders of the now flourishing republic of Liberia, on the western coast of Africa. He became health-inspector and physician of the colony, having received some instruction in the healing art, from Dr. Ayres; and, in 1824, he had more than a hundred patients. As early as 1815, he assisted in forming an African Missionary Society, in Richmond; and in Africa he performed its work as well as he could. Through his agency, a school was established about seventy miles from Monrovia. In September, 1826, he was appointed vice-agent of the colony; and when, in 1828, Mr. Ashmun, the agent of the Society, was compelled to withdraw on account of ill-health, he cheerfully and confidently left the entire control of affairs in C.'s hands. He managed well, as chief of a colony of twelve hundred freemen, for about six months, when, on account of a difficulty with the natives, he prepared for a military expedition against them. While making cartridges, an explosion took place, which killed the venerated C. and seven others, on the 8th of November, 1828.

CHITTENDEN, Thomas, was born at East Guilford, Connecticut, on the 6th of January, 1729; received only the meagre rudiments of an English education, then furnished by the common schools, and married at the early age of twenty years. Then he made his residence at Salisbury; and his natural abilities, combined with a pleasing person and address, soon made him popular. For several years he represented his district in the legislature of Connecticut. Agriculture was his delight. His family had a rapid growth, and he emigrated to the borders of the Onion river, in 1774, on what was known as the *New Hampshire Grants*, on the east side of Lake Champlain, for the purpose of laying the foundations of a fortune for his children. There, separated by an almost trackless wilderness from his early friends, he opened many fertile acres to the blessed sunlight, and invited settlers to come and form the nucleus of a State. Soon, political agitations disturbed his repose; and, in 1775, he was appointed one of a committee to visit the Continental Congress at Philadelphia, and ask political advice. He was one of the committee who drafted a declaration of the independence of Vermont, adopted on the 15th of January, 1777. He also assisted in the formation of a State constitution, in July, 1777, and was elected the first governor under it. That office he held until his death, with the exception of one year. He died on the 25th of August, 1797, in the sixty-ninth year of his age.

CHURCH, Benjamin, next to Miles Standish, the warrior-pilgrim of the *May Flower*, was the most distinguished military hero in early New England history. He was born at Plymouth, Massachusetts, in 1639, and was instructed in the trade of a carpenter, by his father. He went to Duxbury to reside, and was pursuing his vocation there when King Philip's war broke out. That great chief of the Wampanoags had long kept inviolate the treaty made with the white people by his father, Massasoit; but when provocations multiplied his patriotism was aroused, and he willingly listened to the hot young warriors aronnd him, who counselled a war of extermination against the English. For almost a year the dreadful war went on. Nearly all of the New England tribes joined Philip in his enterprise. The white people banded, and struck the savages with vigorous blows in all directions. Among their leaders, C. was the bravest of the brave; and in the spring of 1676 he completely broke the power of the New England tribes, King Philip being shot by a faithless Indian. Almost three thousand Indians had been slain or had bowed in submission. C. lived many years after the war, at different places in the vicinity of Narraganset Bay, in Rhode Island. His last place of residence was Little Compton, where, on the 17th of January, 1718, he was thrown from a horse. He was very corpulent, and the shock of his fall ruptured a blood vessel, which caused his death in the course of a few hours, at the age of seventy-nine.

CLAIBORNE, William Charles Cole, was born in Virginia, in 1775. He was a student in William and Mary College, for a while, but completed his education at an academy in Richmond. With a determination to help himself, he went to New York, and sought employment under Mr. Beckley (with whom he was acquainted), then clerk to the Federal House of Representatives. He succeeded, and at the age of sixteen the accomplished and resolute boy ate bread earned by his own industry. He left New York, studied Blackstone, in Richmond, for three months, was admitted to the bar, and established himself in Sullivan county, Tennessee. When Tennessee prepared to enter the Union as a sovereign State, C. was chosen a member of a convention to form a constitution. In that convention he began his political career; and he was regarded by all as a prodigy, for he was then only about twenty-one years of age. The people, by an immense majority, elected him their representative in Congress. He was again triumphantly re-elected. In that Congress he greatly distinguished himself by his learning, logic, and eloquence. Soon after President Jefferson's accession he appointed C. governor of the Mississippi Territory, on the request of the people there; and on the 23d of November, 1801, he was enthusiastically received at Natchez, the seat of government. He found society heaving with the turbulence of faction; he poured the oil of conciliation upon the billows, and they soon became calm. His duties as governor of Louisiana, to which office he was appointed early in 1804, were more arduous and perplexing, yet he performed them with signal ability and success. His justice and urbanity endeared him to all classes; and when, in 1812, Louisiana became an independent State, the people chose him for their governor, by an almost unanimous vote. He was in the executive chair during the memorable invasion of the British, and their repulse at New Orleans by General Jackson, early in 1815. On that occasion C. wisely and generously surrendered to Jackson all power and command, and, under that general's orders, the magistrate led a large body of the militia of his State. His long career as governor of Louisiana terminated in 1817, when he was chosen to represent that State in the Federal Senate. He died November 23, 1817, in the forty-second year of his age.

CLARKE, George Rogers, was born in Albemarle county, Virginia, on the 19th of November, 1752, and first appeared in history as an adventurer beyond the Alleghanies, in 1772. He had been engaged in the business of land-surveyor for some time, and that year he went down the Ohio, in a canoe, as far as the mouth of the Great Kanawha, in company with Rev. David Jones, then on his way to preach the gospel to the western tribes. He was captain of a company in Dunmore's army, which marched against the Indians on the Ohio and its tributaries, in 1774. Ever since his trip in 1772, he ardently desired an opportunity to explore those deep wildernesses in the great valleys; and in 1775, he accompanied some armed settlers to Kentucky, as their commander. During that and the following year, he traversed a great extent of country south of the Ohio, studied the character of the Indians, and made himself master of many secrets which aided in his future success. When Arnold invaded Virginia, in 1781, C. joined the forces under the Baron Steuben, and performed signal service until the traitor had departed. In the autumn of 1782, he penetrated the Indian country between the Ohio and the Lakes, with a thousand men, and chastised the tribes severely for their marauding excursions into Kentucky, and awed them into comparatively peaceful relations. For these deeds, John Randolph afterward called C. the "American Hannibal, who, by the reduction of those military posts in the wilderness, obtained the lakes for the northern boundary of our Union, at the peace in 1783." He died near Louisville, Kentucky, in February, 1818, at the age of sixty-six.

COLBURN, Zerah, was born at Cabot, Vermont, on the 1st of September, 1804, and until he was almost six years of age, he appeared the dullest of his father's children. At about that time he exhibited extraordinary powers of calculation, by a mental process wholly his own, and which he could not explain. His father was led to expect great achievements by his gifted boy, and at the same time, with the avowed purpose of procuring money to have him educated, he took him to different places in New England, to be examined, hoping to meet with some generous aid. It was offered by the president of Dartmouth College, who proposed to educate Zerah at his own expense. Hoping for a more favorable offer, his father took him to Boston, where his wonderful powers created a great sensation. They were indeed wonderful. The most difficult questions on the various arithmetical rules, were solved almost instantly, by a mental process, for the manual labor of making figures was altogether too tardy for his calculations. Several gentlemen in Boston offered to educate the lad, but his father would not consent. He travelled with him through many of the Middle and Southern States, exhibiting him for money; and, in 1812, he went with him to England, for the same purpose. After travelling through much of Great Britain and Ireland, they went to France, and young C. became a student in the *Lycée Napoleon*, for a short time. In 1816, they returned to England. There the lad found a generous patron in the Earl of Bristol, who placed him in Westminster school, and kept him there about three years. Young C. was making fine progress, when his father refused to comply with some wishes of the earl, and the patronage of that peer was lost. Zerah finally opened a school on his own account, and he earned some money by making astronomical calculations for Dr. Young, then Secretary of the Board of Longitude. The elder Colburn died in 1824, and the Earl of Bristol and others, assisted Zerah with means to return to his native country. He was then twenty years of age. He became assistant teacher in an academy connected with Hamilton College, in the State of New York. He soon afterward went to Burlington, Vermont, where he gained a precarious living by teaching the French language. Then he united himself with the Methodist Society, and soon afterward become an itinerant preacher. He was an indifferent speaker. Finally, in 1835, he settled at Nor-

wich, Connecticut, and became Professor of Latin, Greek, French, and Spanish languages, in the "Norwich University." Two years previously, he had written and published a memoir of himself, which contains a great deal of curious narrative. He died at Norwich, on the 2d of March, 1840, in the thirty-fifth year of his age.

COLDEN, Cadwallader, was born in Dunse, Scotland, on the 17th of February, 1688. He completed his collegiate studies at the university of Edinburgh, in 1705, and after devoting three years to the study of mathematics and medical science, he came to America, where he remained five years, as a practicing physician. He went to Great Britain in 1715, and formed the acquaintance of Halley and other leading men of science; and the following year he married a Scotch girl, returned to America, and settled in the city of New York. C. soon abandoned his profession, for public employment. He was made surveyor-general of the province, a master in chancery, and finally became one of the governor's council. About the year 1750, he obtained a patent for a large tract of unsettled land near Newburgh, in Orange county. There, after the year 1755, he resided most of the time. Many learned essays from his pen enriched the medical and scientific publications of his day; and his *History of the Five Nations of Indians*, is a noble monument in testimony of his careful and judicious researches in that special field of inquiry. Botany was his favorite study, and he was a constant and valued correspondent of Linnæus, the great master of the science, for a series of years. His voluminous papers are now among the choice treasures of the New York Historical Society. In 1760, he was appointed lieutenant-governor of the province of New York, and became the acting magistrate, at eighty years of age. He managed public affairs with great prudence during all the trying scenes of the Stamp-Act excitement; and the *Sons of Liberty* respected him, while they defied his delegated power. He was released from office, by Governor Tryon, in 1775, and retired to his country seat, at Flushing, Long Island, where he died on the 28th of September, 1776, in the eighty-eighth year of his age.

COLLES, Christopher, was born in Ireland about the year 1757. Under the instructions of Richard Pococke, the celebrated Oriental traveller, he acquired much scientific knowledge and considerable expertness in the use of different languages. His patron died in 1765, and C. came to America soon afterward. He first appeared in public here as a lecturer on canal navigation, at about the year 1772; and he is unquestionably the first man who suggested the importance of a navigable water-communication between the Hudson river and the Lakes. He presented a memorial on the subject to the New York State legislature, in the autumn of 1784, and in April following, a favorable report was made. C. made a survey of the Mohawk, and the country to Wood creek, by which a water-communication with Oneida and Ontario lakes might be effected. The results of that tour were published in a pamphlet, in 1785. More than ten years before, C. had matured a plan for supplying the city of New York with wholesome water, and steps were taken for the purpose, when the Revolution interfered. Year after year he was engaged in his favorite projects. In 1797, his name appeared among applicants for a contract to supply the city of New York with water; and it was unquestionably his fertile mind that conceived the idea, then first put forth, of obtaining water from Westchester county. The *Bronx*, instead of the *Croton*, was the proposed fountain of supply. In 1789, C. published a series of sectional Road Maps, for the use of travellers in New York, New Jersey, Pennsylvania, Maryland, and Virginia; and, in 1794, he issued the first number of "The Geographical Ledger." Dr. Mitchell was his warm friend; Jarvis thought it an honor to paint his portrait; and Dr. Hosack commemorated him in his life of Clinton. He died in 1821.

COXE, Tench, was a grandson of Dr. Daniel C., physician to the queen of Charles II., and of Queen Anne, of England, who became one of the principal proprietors of the soil of West Jersey. His son, William C., married the daughter of Tench Francis, attorney-general of the province of Pennsylvania, and these were the parents of Tench C., who was born in Philadelphia, on the 22d of May, 1755. His chief distinction is that of a lucid and powerful advocate of the cultivation of cotton in the United States, and of other industrial pursuits. From 1787, until the death of C., on the 17th of July, 1824, there was never any important movement in favor of the introduction and promotion of manufactures, in which his name did not appear prominent.

CRAIK, James. Of the family physician of the great Washington, and the companion-in-arms of that beloved leader in his earlier military career, there are but few records left, and these cluster like parasites around the biography of the Father of his country. Dr. Craik was a native of Scotland, and settled in Virginia, while yet quite a youth. He accompanied lieutenant-colonel Washington in his expedition against the French and Indians in Western Pennsylvania, in 1754, and was a surgeon in one of the provincial corps, under Braddock, the following year. He dressed that officer's fatal wounds on the night of the battle of the Monongahela, and stood by Colonel Washington when he read the impressive funeral service of the Church of England, over the body of the fallen commander. Fifteen years afterward, while C. was exploring some wild lands near the mouth of the Great Kenhawa, he met a venerable chief, who said, that in the battle when Braddock was killed, he fired his rifle at Washington fifteen times, but could not hit him ! His young warriors did the same, with a like result, and all believed that the Great Spirit specially protected the young hero. C. served in his professional capacity during portions of the War for Independence; and at the siege of Yorktown, he was director-general of the hospital there. He accompanied Washington to the death-bed side of Mr. Custis—one of the children of Mrs. Washington; and at the close of the war, he settled near Mount Vernon, by invitation of the chief, and became his family physician. When the good patriot was suddenly prostrated by the disease which terminated his life, a servant was dispatched, in great haste, for C. With all the attention of a dear friend, and the skill of a good physician, he watched his noble patient until the last. He lived to take an interest in another war for independence, but died in the midst of its tumult, on the 6th day of February, 1814, in the eighty-fourth year of his age.

DANA, Francis, was born at Charlestown, near Boston, in August, 1742. He was educated at Harvard University, and chose the law as his profession. In the midst of the confusion and distress incident to the closing of the port of Boston, by parliamentary decree, in 1774, D. went to England, and passed a year with his brother, a clergyman, at Wroxeter. He returned to America at the close of 1775, took an active part, as a patriot, in the exciting political proceedings of the time, and in the autumn of 1776, was elected a delegate to the Continental Congress. In that important station he remained until November, 1779, when he accompanied John Adams to Paris, as Secretary of Legation. Toward the close of 1780, Congress appointed D. minister plenipotentiary at the court of Russia. The Empress Catherine would not openly receive him, for fear of offending England, but he was allowed to remain in St. Petersburg until the close of the war, when he returned home, and was immediately chosen a delegate to the Congress of 1784. D.

was an efficient advocate of the Federal Constitution, in the Massachusetts convention, and exerted great influence in the political affairs of his State. President Adams appreciated his worth, and offered him the office of envoy extraordinary to France, with Messrs. Marshall and Pinckney, in 1797. He declined the honor. D. had then held the important office of chief justice of Massachusetts, for five years, to which he had been appointed by President Washington. He retained his seat on the bench until 1806, when he retired to private life. D. died at his residence in Cambridge, near Boston, on the 25th of April, 1811, at the age of sixty-eight.

DAY, Stephen, the first printer who practiced his art within the domain of the United States, was a native of London. The Rev. Jesse Glover, one of the earliest patrons of Harvard College, presented that institution with a font of type, and others contributed money to buy a press. In 1638, Mr. Glover, then in London, engaged Day to accompany him to America, to take charge of the printing-house at Cambridge. Glover died on the voyage, but D. arrived in safety, with his patron's widow and children, and commenced work in January, 1639. His first production was *The Freeman's Oath;* and soon afterward he printed an *Almanac* made by a mariner named Pierce, in which the year begins with March. The first *book*—the first one printed in America—was the *Psalms in Meter,* containing three hundred pages, and was known as *The Bay Psalm Book.* He printed several Almanacs, and also some astronomical calculations by Urian Oakes, then a youth, and afterward president of Harvard College. He expired at Cambridge, on the 22d of December, 1668, at the age of about fifty-eight years.

DICKENSON, John. The "Letters of a Farmer of Pennsylvania to the Inhabitants of the British Colonies," published in the *Pennsylvania Chronicle,* during the summer and autumn of 1767, had a powerful influence on the American mind, in preparing it for the great struggle for freedom, even then impending. The author was John Dickenson, a native of Maryland, where he was born, on the 13th of November, 1732. He first appeared in public life as a member of the Pennsylvania Assembly, in 1764, where the readiness of his pen attracted general attention. He was also a member of the Stamp Act Congress, in 1765. D. was a member of the first Continental Congress, in 1774, and his pen was instrumental in the preparation of two of the State papers put forth by that body. He wrote the Declaration of the Congress of 1775, setting forth the causes and the necessity for war; yet he steadily opposed the idea of political independence, for he hoped for a reconciliation. For that reason, he was intentionally absent from Congress on the 4th of July, 1776. He was again elected to Congress, in 1779, and there, as before, his pen was employed in the preparation of important State papers. In 1780, he took his seat, as a member, in the Delaware Assembly; and, in 1782, he was elected president or governor of Pennsylvania. He held that office until October, 1785. He was one of the most accomplished and efficient members of the convention that framed the Federal Constitution. In 1792, he assisted in forming a Constitution for Delaware. He died on the 14th of February, 1808, at the age of seventy-five. Dickenson College, at Carlisle, Pennsylvania, is a noble monument to perpetuate his memory.

DOWNING, Andrew Jackson. No American ever contributed so much toward the creation and cultivation of a taste for beautiful rural architecture, landscape gardening, and the arrangement of fruit and ornamental trees, as A. J. Downing, who was drowned on the occasion of the destruction of the steamer *Henry Clay,* near Yonkers, in July, 1852, at the age of thirty-seven. D. was born at Newburgh, Orange County, New York, in 1815. From early boyhood he delighted to commune with nature, and loved flowers with a passionate delight. At the age of twenty-six he published the results of his practice, observations and reflections, in a valuable book on *Landscape Gardening.* D. next turned his attention to the kindred art of Architecture, and soon produced a volume on *Cottage Residences.* Then appeared his *Architecture of Country Houses,* in which he gave designs for Cottages, Farm Houses and Villas, exterior and interior, with valuable suggestions respecting furniture, ventilation, etc. In 1845 his large work on *Fruit and Fruit Trees of America,* was published in New York and London, which has passed through many editions. His mind and hands were ever actively employed in his favorite pursuit; and through the *Horticulturist,* a monthly repository of practical knowledge on the subject of cultivation of every kind, which he edited, D. communicated the results of his observations and personal experiences. In addition to his large works, he published *Rules of American Pomonology,* and edited the productions of others.

DRAYTON, William Henry, was born in September, 1742. For about eleven years he was a student at Windsor and Oxford, in England; and on his return to South Carolina, he prepared for the profession of the law. In September, 1774, D. published a pamphlet, addressed to the Continental Congress, in which the grievances of the Americans were clearly stated, and an able Bill of Rights presented. He yet held the position of one of his majesty's justices, to which he had been appointed in 1771, and was the only native-born citizen who had ever been honored with that office. He retained his position until the spring of 1775, when the royal judges made their last circuit. During the following summer he labored manfully in the cause of freedom, as President of the Provincial Congress of South Carolina; and in the autumn, when the British sloops of war, *Tamar* and *Cherokee,* menaced Charleston with bombardment, because of the rebellious movements of its citizens, he was appointed, by the committee of safety, to the command of the armed ship, *Prosper,* employed to oppose them. Commodore D. returned their fire promptly several times, and thus actual hostilities at the South commenced. In March, 1776, D. was chosen chief justice of the then revolted colony of South Carolina, by the unanimous voice of his Whig countrymen; and his admirable charge to the grand jury, delivered a month afterward, was hailed throughout the land as one of the noblest expressions of patriotic public sentiment yet uttered. It placed the author in the same honorable position as John Hancock and Samuel Adams, of Massachusetts, who were denounced as arch-traitors. From that time, until the close of his career, he was regarded as one of the chief leaders of the rebellion in the South, and yet he found time to chronicle, in minute detail, the preliminary and current events of the great struggle. He became a member of the Continental Congress, and died suddenly while in the discharge of his legislative duties, in Philadelphia, on the 3d of September, 1779, at the age of thirty-seven. "*A Memoir of the American Revolution, from its commencement to the year* 1776," prepared by Judge D., was revised and published by his son, Governor John D., in 1821.

DUNLAP, William, was born at Perth Amboy, New Jersey, on the 19th of February, 1766, and at the house of a kind neighbor, his taste for pictures and reading was early developed by familiarity there with paintings and books. The storm of the Revolution produced great confusion in New Jersey, and young D.'s education was almost utterly neglected, until his father removed to the city of New York, in 1777, which was then in possession of the British. There, while at play, William lost an eye, by accident. He had become very expert in copying prints, in India ink, and this

accident perilled all his future career as a painter, of which he now dreamed continually. The difficulty was soon overcome by habit, and he used his pencil almost incessantly, with occasionally a word of instruction from an artist. He commenced portrait-painting at the age of seventeen years, and at Rocky Hill, in New Jersey, he was allowed to paint the portrait of Washington. In 1784, young D. went to England, and became a pupil of the great Benjamin West. His progress was slow, for he spent much of his time in the enjoyments of the amusements of London. At the age of fifty-one years, he first became permanently a painter, and his true artist-life began. He went from place to place in the United States and Canada, painting portraits with considerable success. He also turned his attention to the higher walks of art, and produced, in succession, three large pictures—*Christ Rejected, Death on the Pale Horse,* and *Calvary.* The exhibition of these in various parts of the Union, contributed materially to the support of his family, for many years. He painted other and smaller pieces, some of which, and especially *The Historic Muse,* were productions of great excellence. In 1830, D. commenced lecturing on Fine Art topics, and attracted much attention; and, in 1832, he published a *History of the American Theatre.* It was very favorably received, and was followed by his history of the *Arts of Design in the United States.* In the meanwhile (February, 1833), he received a complimentary benefit at the Park theatre, New York, which gave him over two thousand five hundred dollars. In 1839, he published the first volume of a *History of the State of New York.* The second volume was unfinished at the time of his death. He died in New York city, on the 28th of September, 1839, in the seventy-fourth year of his age. D. was the author of several dramas; also a biography of Charles Brockden Brown.

ELLSWORTH, Oliver, was born at Windsor, the point of earliest settlement in Connecticut, on the 29th of April, 1745. His father was a respectable farmer, and with the strong common sense of his class, he prepared Oliver for the stern duties of life, by habits of labor, application, and frugality. He entered Yale College at the age of seventeen, but greater advantages appearing at Princeton, he completed his studies there, where he was graduated in 1766. He labored with unceasing energy upon a rough farm. His evenings were devoted to the study of the law, and at the age of about twenty-five, he commenced its practice in the vicinity of Hartford. Increase of legal business induced E. to make Hartford his residence, and there he received the appointment of State's Attorney. As the quarrel with Great Britain progressed, he was always found on the side of the people. He even went to the field with the militia of his State, when the war broke out. In 1777, he was chosen a delegate to the Continental Congress, and in 1780, took a seat in the council of his native State. He continued a member of that body until 1784, when he was appointed a judge of the superior court of Connecticut. E. was a warm friend of the Federal Constitution, did much toward effecting its ratification, in his State, and in 1789, was elected the first representative of Connecticut in the Senate of the United States. In the spring of 1796, he was appointed chief justice of the United States. He bore the ermine with majesty, and cast it off in unsullied purity when, toward the close of 1799, President Adams appointed him, with Davie and Murray, an ambassador to the French court, at the head of which was the youthful Bonaparte. He returned home early in 1801, and was immediately elected to the council of his State. His health was now becoming impaired; and when, in May, 1807, he was appointed chief justice of Connecticut, he declined the office. He died November 26, 1807, at the age of sixty-two.

FITCH, John, was born between Hartford and Windsor, in Connecticut, on the 21st of January, 1743. At eight years of age, he was taken from school, and put to labor on a farm; after which he had but one month in each year to devote to study under instruction. But most of the leisure moments of childhood were employed with his books; and at eleven years of age, he planted and raised some potatoes, for the express purpose of purchasing a complete Geography. His health was naturally feeble, and he appears to have been overworked on the farm. He ran away from home, and was afterward apprenticed to a clock-maker. He learned the business imperfectly, and abandoned it, at his majority, for that of a brass-founder. He was a silversmith in Trenton, New Jersey, when the British army entered it, and destroyed his shop and contents, in the winter of 1776, because he was engaged in repairing American arms. He joined the army, and was with Washington at Valley Forge. There he heard some officers speak of the fertility of Kentucky. He procured the appointment of deputy surveyor, and, in the spring of 1780, set out on foot, for that untraversed wilderness beyond the Alleghanies. He returned to Philadelphia the following year, the owner of sixteen hundred acres of fine land in the Ohio Valley, and filled with dreams of future opulence. He now conceived the idea of "gaining a force by steam;" and in August, 1785, he presented the subject to the Continental Congress, and asked for aid to try experiments in applying the power to the propulsion of vessels, by means of wheels and paddles. At about this time, Mr. Rumsey, of Virginia, had conceived a similar idea, and F., disappointed and exasperated by what he deemed the stupidity of Congress, went from state to state, in search of aid, but without success. He engaged in a bitter controversy with Rumsey, in relation to priority of invention; and in the meanwhile, new claimants appeared. Yet all seemed to have distinct plans, with identical aim—the moving of a boat by means of steam-power. F. and Rumsey procured protective statutes from different state legislatures. The former organized a stock company, to carry out his designs, in 1786, but little was effected by it. The state of Pennsylvania refused to lend him one hundred and fifty pounds, to procure an engine from England. With another mechanic, he succeeded in constructing an engine and boat; and on the 1st of May, 1789, the *first steamboat* was seen moving upon the waters of the Delaware. The boat went at the rate of eight miles an hour, and yet there was not confidence enough in the project to sustain the persevering inventor. To him success was as "clear as any problem in Euclid;" and in a letter to Franklin, he expressed his full belief that "*steamboats would answer for sea voyages, as well as inland navigation.*" Despairing of gaining funds to perfect his invention, in America, F. went to France and England, in 1792; but, disappointed and almost penniless, he returned home, and retired to Kentucky. He foretold the time of his death by a mathematical calculation, and on the 2d of July, 1798, he died at Bardstown, Kentucky, and was buried there.

GADSDEN, Christopher, was a native of Charleston, South Carolina, where he was born in 1724. He was appointed a delegate to the Congress which assembled at New York in 1765, in consequence of the passage of the Stamp Act; and from that period, through all the storms of the Revolution, until the fall of Charleston, in 1780, he was regarded as the most reliable of the patriot leaders, both civil and military. He was chosen a delegate to the first Continental Congress, in 1774; and in that body, urged an immediate attack upon General Gage at Boston, before he should be reinforced by fresh troops from Great Britain. He was considered rash, but the measure was only delayed a few months. In 1775, G. was elected senior colonel of three regiments raised at Charleston, and was subsequently made a brigadier. He was active at the time of the attack on Charleston, in 1776; and two years afterward he gave his efficient aid in forming a republican constitution for his

native State. He resigned his military commission in 1779, and was lieutenant-governor of the State, when Charleston was captured by Sir Henry Clinton, in May, 1780. He was elected governor of his State, in 1782, but declined the honor. He remained in private life until his death, on the 28th of August, 1805, at the age of eighty-one.

GALLOWAY, Joseph, was born in Maryland, in 1730, and early in life he went to Philadelphia to practice law, in which profession he soon took a high rank. He was a member of the Assembly of Pennsylvania, in 1764, and his sympathies, as manifested by his words and actions, were always on the side of the people. So well convinced were the people of his staunch republicanism, that he was elected a member of the first Continental Congress in 1774, and was a very active participant in the debates in that body. He submitted a plan of union between Great Britain and the colonies, by which the latter might be comparatively independent, with a president at their head, appointed by the king. His plan was not adopted; and when the Congress agreed upon a non-importation, non-consumption, and non-exportation scheme, called the *American Association*, G. signed it. He was never in favor of a political separation from Great Britain, yet he was always in favor of the most stringent measures for compelling the government to redress the grievances of the colonists. In 1775, he began to show signs of wavering, by earnestly asking to be excused from serving as a delegate in the Continental Congress; and in 1776, when the question of independence began to be agitated, he abandoned the Whigs, and became one of the most violent and proscriptive Loyalists. Afraid to remain in Philadelphia, he joined the royal army in New York, where he remained until early in the summer of 1788, when he went to England, accompanied by his only daughter. In 1779, he was summoned before parliament to testify concerning the state of affairs in America. He was severe upon General Howe and other British officers, in relation to their stupid management. G. never returned to America. He died in England, in September, 1803, at the age of seventy-three.

GODFREY, Thomas, was born about a mile from Germantown, in Pennsylvania, in the year 1704. His early education was limited; and at a proper age he was apprenticed to a glazier, in Philadelphia. He entered into the business on his own account in 1725, and was employed in glazing Christ Church and the State House, both of which are yet standing in the old part of Philadelphia. From his early boyhood G. exhibited great taste for figures; and, like Rittenhouse, he often exhibited his diagrams in his place of labor. In the summer of 1729, he was employed by James Logan to glaze some windows in his library, and there he first saw Newton's Principia. He borrowed the work; and early in 1730, he communicated his invention of the *Quadrant* (an astronomical and nautical instrument of great value) to that gentleman. That the sole honor was justly due to G., there can be no doubt, for the fact appears to be well authenticated, that the first instrument made of brass, from G.'s wooden model, was taken by the inventor's brother, captain of a vessel in the West India trade, to the island of Jamaica, and there exhibited to some English naval officers. Among these was a nephew of John Hadley. He purchased the instrument of Captain G. for a large sum of money, and took it to his uncle, in London, who was a mathematical instrument maker. That gentleman made another instrument like it, except a few alterations, and presented it to the Royal Society, with an explanatory paper, as his invention. That presentation occurred on the 13th of May, 1731, just about the time that Sir Hans Sloane called the attention of the Society to G.'s invention. The American inventor, like Columbus, lost the honor of having his name identified with the discovery, and the instrument is known as *Hadley's Quadrant*. G. died in Philadelphia, in December, 1749, at the age of forty-five.

GOODRICH, Samuel Griswold. "I stand before the public," wrote Mr. Goodrich in his *Recollections of a Lifetime*, "as the author and editor of about 170 volumes, 116 bearing the name of Peter Parley. Of all these, over seven million of volumes have been sold." Like Jacob Abbott, "Peter Parley" (the assumed name of G.) labored chiefly for the amusement and instruction of the young. He was born in Ridgefield, Conn., August 19, 1793. Having received a good common-school education, he began the publishing business at Hartford, on attaining his majority. In 1824 he visited Europe, and, on his return, established himself as a publisher in Boston. From 1828 to 1842 he edited and published *The Token*, an illustrated annual, to which he contributed several tales and poems, and in which first appeared the finest of Hawthorne's *Twice-Told Tales*, without attracting much attention. The entire annual, literary and artistic, was composed of the work of Americans. It was soon after G. removed to Boston that he began his popular series of "Peter Parley's" juvenile books. The 116 volumes comprised geographies, histories, travels, stories, and various illustrations of the arts and sciences. In 1841 he established *Merry's Museum and Parley's Magazine*, a juvenile periodical, which he edited until 1854. G. was appointed United States consul at Paris in 1851. While there he published a work in French on the geography and history of the United States of America. On his return to his native country he published a kind of autobiography entitled *Recollections of a Lifetime; or Men and Things I have Seen: in a series of Familiar Letters to a Friend, historical, biographical, anecdotal and descriptive.* In that work he gives the names of the books of which he was the author, the recital of which fills six closely printed pages. His latest production was an *Illustrated Natural History of the Animal Kingdom*, completed in 1859. G. died suddenly in the city of New York, May 9, 1860, at the age of sixty-six.

GORDON, William. The most faithful and impartial history of the American Revolution, by a cotemporary author, was written by William Gordon, an English independent clergyman, who was in America during the struggle of the colonists for civil and political freedom. He was born in Hertfordshire, England, about the year 1740, and at an early age was pastor of an Independent congregation at Ipswich, where his faithfulness in reproving Sabbath-breakers, made him many enemies, and gave him an uneasy place. He became successor to Dr. Jennings, as pastor of a church at Wapping, and was so much beloved, that he might have passed his life pleasantly there. But he had long yearned to make America his home, and, in 1770, he sailed for Boston. For about a year he preached in one of the churches at Roxbury; and in July, 1772, he was chosen its pastor. He was a republican, and soon became identified with the popular party in Massachusetts, in opposition to the crown. When the Provincial Congress of that colony was formed, in 1774, G. was chosen its chaplain, and he continued a faithful adherent to the patriot cause. After the promulgation of the Declaration of Independence, in 1776, he conceived the idea of writing a history of the progressing struggle, and he kept full notes during the entire war. When it was ended, he was allowed free access to public records, and to the papers of Washington, Greene, Gates, and other distinguished officers. In 1786, he returned to his native country, completed his history, and published it in London, in 1788. It was soon afterward re-published in New York, in three volumes. The work is now very scarce. The author received about fifteen hundred dollars for his service in its preparation. In 1793, he was settled as a pastor at St. Neots, in Huntingdonshire, but his unpopularity as a preacher, on account of evidently failing

intellect, caused his friends to persuade him to resign. He afterward made his residence at Ipswich, where he preached a few occasional sermons. Soon his memory became a blank, he sunk into imbecility, and thus remained, until his death, on the 19th of October, 1807, when about seventy-seven years of age.

GRAY, William, was born in Lynn, Massachusetts, in 1751, and when quite a small boy, was apprenticed to a merchant in Salem. He finished his commercial education with Richard Derby, of that port; and such was his character for enterprise and strict integrity during his apprenticeship, that when, soon after its close, he commenced business for himself, he had the entire confidence and good-will of the whole community. Prosperity waited upon him in all his transactions, and in less than twenty-five years after he commeneed business, he was taxed as the wealthiest man in Salem, notwithstanding some of the largest fortunes in the United States belonged to men of that town. His enterprise and industry was wonderful; and at one time he had more than sixty sail of square-rigged vessels on the ocean. G. was a demoerat, and his sincerity was evinced by the fact that during the embargo, he took sides with Jefferson, notwithstanding all New England was in a blaze against the president, and it was an injury to the amount of tens of thousands of dollars to the great merchant's business. In the midst of the commercial distress, he removed to Boston, and having pleased the people while a State Senator, he was chosen lieutenant-governor of the Commonwealth. He used his immense riches for the wants of government, and never took advantages of the exigeneies of the times, to speculate in government securities. He died on the 4th of November, 1825, at about seventy-four years of age.

GREENOUGH, Horatio, was born in Boston, on the 6th of September, 1805. His genius, and his taste for art, were developed simultaneously in his early childhood; and hours devoted by other boys in romping play, were employed by him in carving toys for his companions, the implements of his *atelier* being a pencil, knife and scissors. One day he sat upon the doorstep of a neighbor, and with his pen-knife and a nail, he fashioned from plaster, in miniature form, the head of a Roman, copied from a coin. He was watched by the lady of the house, who became the possessor of that earliest of his works of art, and in after years gave him his first commission. For her he produced that beautiful ideal bust, of the *Genius of Love*. Sometimes G. would express his thoughts in Painting; sometimes in Poetry, but most frequently in Sculpture. To the latter art he dedicated his genius; and soon after the close of his collegiate studies, he went to Italy as a pupil of art and nature there. He took up his residence in Rome, and was the first American student of art who made tbe Eternal City his permanent abiding place. We cannot follow the artist in all his pleasant, laborious life, from the modelling of his *Abel*, in 1826, until the completion of *The Rescue*, in 1851. The work in which he took the greatest pride, because of the subject, was his colossal statue of *Washington*, completed in 1843, and now occupying the public square eastward of the Federal Capitol. He executed more than twenty other ideal groups or single statues, and a great many busts of living men, but that will be his chief memorial in the public mind. For many years in Florence his studio, a model of its class, was on the Piazza Maria Antonia; and there he dispensed a generous but unostentatious hospitality. Finally, in the autumn of 1851, he returned to his native land, ostensibly to erect his group of *The Rescue*, but really to breathe again the free air of the Republic. He chose Newport as his place of residence, and there he resolved to erect a studio, and leave his country no more. He had become acclimated in Italy, and the changeful seasons here disturbed him. Here he lacked the quiet social routine of Florence. All around him was activity to which he had not been accustomed, and his whole being beeame exeited. A brain fever ensued, and he expired after a few days' illness, on the 18th of December, 1852, forty-seven years of age.

GRIDLEY, Richard. At the opening of the war, in 1775, Richard Gridley was the only efficient American engineer in the army. He was a native of Boston, where he was born in 1711. He first appeared as an engineer in the provincial army, sent to capture the strong fortress of Louisburg, on Cape Breton, in 1745. After that event, he entered the regular army, and in 1755, he was lieutenant-colonel of infantry, and chief engineer. In 1758, G. served under General Amherst, and was with Wolfe, at Quebec. When the War for Independence began, the patriotism and skill of G. caused his appointment of chief engineer of the army that soon gathered around Boston; and under his directions, all the fortifications erected during the summer of 1775, and winter of 1776, in that vicinity, were constructed. In September, 1775, Congress gave him the commission of a major-general, and made him commander-in-chief of the Continental artillery, to which office Colonel Henry Knox suceeeded in November following. After the British left Boston, in March, 1776, G. was engaged in throwing up fortifieations at several points about the Harbor. He died at Stoughton, Massachusetts, on the 21st of June, 1796, in the eighty-fifth year of his age.

GRUNDY, Felix, was born in Berkeley county, Virginia, on the 11th of September, 1777, but nurtured in the wilderness, at a time when, to use his own forcible expression, "death was in almost every bush, and when every thicket concealed an ambuscade." Three years later, his father went, with his famity, to Kentucky, then "the dark and bloody ground." His father died when he was a lad, and his mother had him educated for the purpose of preparing for the medical profession. He finished his studies under Dr. Priestly, at Bardstown, Kentucky, when, preferring law, he prepared himself for thel egal profession, under the charge of Colonel George Nichols, then one of the ablest counsellors west of the mountains. G. was admitted to practice, in 1798, soon rose to eminence, and, in 1799, was chosen a member of the committee called to revise the constitution of Kentucky. He was elected to a seat in the legislature, the same year, and served in that body with distinction until 1806, when he was appointed one of the judges of Supreme Court of Errors and Appeals. He was soon afterward appointed chief justice of Kentucky. The salary was insufficient for the wants of a growing family, and he resigned the office, in 1808, and removed to Nashville, Tennessee, where he prosecuted his vocation with industry and great success. He ranked highest among the criminal lawyers of the West, and practiced in the courts of several of the States. His eloquence was pure and forcible; and he took the proud position, by general consent, as the head of the Tennessee bar. G. was elected to a seat in the Federal Congress, in 1811. The tempest of war was then brooding in the horizon, and G. was placed upon the Committee of Foreign Relations—the most important section of the House, at that time. He remained in that body until 1814, and was always a hearty, consistent, and sincere supporter of the administration of President Madison. At the close of the contest he returned to Nashville, and resumed the practice of his profession, but was soon called to duty in the State legislature, where he served for six years. In 1829, he was elected a Federal Senator, and by re-election he held a seat there during the whole eight years of Jackson's administration. From first to last, he was that chief magistrate's firm and cordial adherent and supporter. In 1839, he was called to the cabinet of Mr. Van Buren, as attorney-general of the United States; and, in 1840, he was again elected to a seat in the Federal Senate. He was not per-

mitted to occupy that exalted position again, for, in December following, he died, at the age of sixty-three.

HALE, NATHAN, was a son of Richard H., of Coventry, Connecticut, and was born in that town, twenty miles from Hartford, about the year 1754. He was graduated at Yale College, with distinguished approbation, in 1773, when the tempest of the Revolution was gathering force. He joined the Connecticut troops that hastened to Boston after the skirmishes at Lexington and Concord, and was with Captain (afterward Colonel) Knowlton in the battle on Breed's Hill. He continued with the army under the immediate command of Washington, until the following year, and participated in the battle near Brooklyn, and the retreat of the American army, from Long Island. At that time Knowlton was in command of a regiment, called *Congress' Own*, that assumed a sort of body-guardianship to the commander-in-chief, and young H. held a captain's commission in it. While the American army were upon Harlem Heights, and the great body of the British were yet on Long Island (in the vicinity of Brooklyn, and of the present Astoria), Washington was very anxious to ascertain the exact condition of the enemy's forces. He applied to Colonel Knowlton for a judicious person to go as a spy into the British camp. H. volunteered for the service, and bearing instructions from Washington, he crossed Long Island Sound from the Connecticut shore, visited the British camps, made notes and sketches, unsuspected, and was about to embark from Huntington, to Connecticut, when he was discovered and exposed, it is said, by a Tory relative, and was made a prisoner. He was taken to Sir William Howe's head-quarters at Turtle Bay, confined in Beekman's green-house in the garden, until morning, and then, without the form of a regular trial, was handed over to Cunningham, the brutal provost-marshal in New York, for execution as a spy. He would not allow him to have the company of a clergyman, nor the use of a Bible; and even destroyed the letters which the victim had written to his mother and sisters during the night. He was hanged upon an apple-tree, and his body was buried in a grave beneath its shadow. H.'s last words were, "I only regret that I have not more lives to give to my country."

HARRISON, BENJAMIN, was born at Berkeley, the seat of his father, on the James River. He was educated at the college of William and Mary, at Williamsburg, but on account of the sudden death of his father, and some difficulty with one of the professors, he was not graduated, and never took his degree. In 1764, young H. was elected a member of the Virginia House of Burgesses, where he soon became an influential leader. He was chosen speaker of that body, and when the Stamp Act excitement shook royal power in Virginia, the governor tried to win him to the support of government, by offering him a seat in his council. H. rejected the offer, boldly avowed his republican principles, and from that time became identified with the revolutionary party in Virginia. He was one of the representatives of Virginia in the first Continental Congress, when his relative, Peyton Randolph, was chosen its president. In the autumn of 1775, he was one of the committee of Congress who visited the American army at Cambridge, to devise plans for the future, with Washington; and the following year he warmly supported, and affixed his signature to, the Declaration of Independence. He was a member of the *Foreign Committee* until its dissolution in 1777, and at that time he returned to Virginia, and took his seat in the House of Burgesses. He was chosen speaker, and held that station until 1782, when he was elected governor of Virginia. H. served as governor two terms, and then retired to private life. He was again brought into public service by being chosen governor, in 1791. He died in April, 1791. William Henry H., the ninth President of the United States, was his son.

HAYNE, ROBERT Y. The names of Daniel Webster and Robert Y. Hayne will ever be associated in the legislative annals of the Republic, because their great debate in the United States Senate, in 1830, was one of the most remarkable for logic and eloquence which ever occurred in that body. H. was more that nine years the junior of his powerful New England antagonist, having been born on the 10th of November, 1791, near Charleston, South Carolina. His education was obtained at a grammar-school in Charleston, and at the age of seventeen he commenced the study of law. He had not yet reached his majority, when the clouds of impending war between the United States and Great Britain gathered darkly. Having secured his admission to the bar, he volunteered his services, early in 1812, for the military defence of the sea-board, and entered the army as lieutenant. He rose rapidly to the rank of major-general of his State militia, and was considered one of the best disciplinarians in the South. H. first appeared as a legislator, in 1814, when he was elected to a seat in the South Carolina Assembly. There he was distinguished for his eloquence, and his firm support of President Madison's administration, in its war measures. In 1818, he was chosen Speaker of the Assembly; and the same year he received the appointment of attorney-general for the State. In every duty to which he was called, young H. acquitted himself nobly; and the moment he had reached an eligible age, he was elected to a seat in the Senate of the United States, where, for ten years, he represented South Carolina with rare ability. He was an ever-vigilant watchman upon the citadel of State Rights, and as a member of the famous "Union and State Rights Convention," held towards the close of 1832, he was chairman of the committee of twenty-one who reported the "ordinance of nullification," which alarmed the country, and called forth President Jackson's puissant proclamation. About a fortnight after the adoption of the celebrated "ordinance," H. was chosen governor of the State, and a few days after President Jackson's proclamation reached him, he issued a counter-manifesto, full of defiance. Civil war seemed inevitable, but the compromise measures proposed by Mr. Clay, and adopted by Congress early in 1833, averted the menaced evil. H. filled the executive chair, with great energy, until 1834; and, on retiring from that exalted office, he was elected mayor of Charleston. His attention was now specially turned to the great subject of internal improvements; and, in 1837, he was elected president of the "Charleston, Louisville, and Cincinnati Railroad Company." He held that office until his death, which occurred at Ashville, North Carolina, on the 24th of September, 1841, when in the fiftieth year of his age.

HENDERSON, RICHARD, was born in Hanover county, Virginia, on the 20th of April, 1735. His father emigrated to Granville county, North Carolina, in 1745, and being appointed sheriff of that district, Richard had an opportunity of learning many useful lesssons in matters pertaining to law. He prepared himself for the legal profession, arose rapidly to the highest rank, accumulated a competent fortune, and, when the insurrectionary movements in that section of the county, known as *the Regulator War*, occurred, he was a judge of the superior court. Bold, ardent, and adventurous, he resolved to go beyond the mountains, and there, in the beautiful country traversed by Boone, he commenced a scheme of land speculation, in 1774, more extensive than any known in the history of our country. He formed a company, of which he was chosen president, and by a treaty held at Wataga, with the heads of the Cherokee nation, he purchased the whole land lying between the Cumberland river and mountains, and the Kentucky river, which comprised more than one-half of the present State of Kentucky. H. took possession of the country in the name of the company, in the spring of 1775. Governor Martin, of North Carolina, proclaimed the purchase to be illegal.

The legislature of Virginia did the same, but H. paid no regard to their fulminations against him, and proceeded to establish a proprietary government, in imitation of the old colonies. Its capital was Boonesborough, and its title was TRANSYLVANIA. The State of Transylvania as an independent republic did not long exist, for Virginia and Carolina took efficient means to destroy it. The treaty with the Cherokees, and the purchase of their lands, were declared null. Yet they did not deprive the company of all advantages. North Carolina and Virginia each granted to them two hundred thousand acres. Relinquishing all political claims, H. opened a land office on the site of Nashville, in 1779, for the sale of this legally-granted domain. He died on the 30th of January, 1785, fifty years of age.

HOLMES, ABIEL, was born at Woodstock, Connecticut, in December, 1763. He was graduated at Yale College at the age of twenty years, and went immediately to South Carolina as an instructor in a private family. He entered the ministry, as pastor of a church at Midway, Georgia, in the autumn of 1785. There he remained until the summer of 1791, when he visited New England, and accepted an invitation to become pastor of the first Congregational Church at Cambridge, Massachusetts. He was ever studious, and Biography and History had great charms for him. In 1798, he wrote and published a Life of President Stiles, of Yale College; and, in 1805, his *Annals of America* was first published. An edition was printed in England, in 1813; and, in 1829, a much-improved edition, in which the record is continued until 1827, was published at Cambridge. With this edition of *Holmes' Annals*, the *American Register* from 1826 to 1830 inclusive, and the *American Almanac* from 1830 to the present time, a library has an unbroken record of events in the United States from the earliest settlements. In addition to his works just mentioned, H. published about thirty pamphlets, consisting chiefly of sermons and historical disquisitions. He died at Cambridge, Massachusetts, June 4th, 1837, almost seventy-four years of age.

HOOKER, THOMAS. A remarkable man was the Rev. Thomas Hooker, the first minister of Cambridge, Massachusetts, and one of the pioneer settlers in Connecticut. He was born in Leicestershire, England, in 1586, and was educated in Emanuel College, Cambridge. He began his labors as a Christian minister at about the time of the death of James the First, when Archbishop Laud began to harass the non-conformists. In 1630, H. was silenced, because of his non-conformity to the Established Church, and he founded a grammar school at Chelmsford. His influence was great; and falling under the ban of Laud, he was obliged to fly to Holland, where he became an assistant minister to Dr. Ames, both at Delft and Rotterdam. He came to America with the Rev. Mr. Cotton, in 1633, and was made pastor of the church at Cambridge in the autumn of that year. H. was one of the most powerful preachers of his time, and wrote much and well, on religious subjects. He was a man of great benevolence, and in every sphere of life he was eminently *useful*. Died at Hartford, of an epidemic fever, July 7, 1647, sixty-one years of age.

HOPKINS, STEPHEN. Next to Doctor Franklin, Stephen Hopkins, of Rhode Island, was the oldest member of the Continental Congress, who signed the Declaration of Independence. He was born in that portion of the town of Providence now called Scituate, March 7, 1707. H. was a delegate from Rhode Island in the first colonial convention, held at Albany, in 1754, and two years afterward he was elected governor of Rhode Island. That position he held, with but a single interruption, until 1767; and he was very efficient in promoting the enlistment of volunteers in his province, for the expeditions against the French and Indians. He even took a captain's commission, and placed himself at the head of a volunteer corps, in 1757, but a change in events rendered their services unnecessary, and they were disbanded. When the quarrel with the mother country commenced, H. took a decided stand in favor of the colonists, and officially and unofficially he labored incessantly to promote a free and independent spirit among his countrymen. When, in 1774, a general Congress was proposed, H. warmly advocated the measure, and was chosen one of the delegates for Rhode Island. In 1775, he was a member of the Committee of Public Safety, in Rhode Island, and was again elected to Congress. There he advocated political independence; and in the summer of 1776, he affixed his remarkable signature to the noble manifesto which declared it. H. was elected to Congress, for the last time, in 1778, and was one of the committee who perfected the *Articles of Confederation* for the government of the United States, then fighting under one banner, for independence. He was a distinguished mathematician, and rendered efficient service to scientific men in observing the transit of Venus, in 1769. He died on the 19th of July, 1785, in the seventy-eighth year of his age.

HOPKINSON, JOSEPH. The author of our spirited national song, *Hail Columbia*, was highly distinguished for other intellectual achievements. But that production was sufficient to confer upon him the crown of earthly immortality. He was a son of Francis Hopkinson, one of the signers of the Declaration of Independence, and was born in Philadelphia, on the 12th of November, 1770. He was educated in the University of Pennsylvania, and then studied law, first with Judge Wilson, and afterward with William Rawle. He was admitted to the bar, at the close of 1791, and commenced its practice at Easton, on the Delaware. He was beginning to be quite successful there, when he returned to Philadelphia, and there took a high rank in his profession. In 1815, and again in 1817, H. was elected a representative of Philadelphia in the Federal Congress, and ranked among the first of the many sound statesmen who graced that body at that interesting period of our political history. In 1828, President Adams appointed him a judge of the United States Court, for the Eastern District of Pennsylvania. That office had been filled by his father and grandfather; and he performed its duties with dignity and marked ability, until his death, which occurred at Philadelphia, January 15, 1842, at a little more than seventy-one years of age.

HOWARD, JOHN EAGAR, was born in Baltimore county, Maryland, on the 4th of June, 1752. He was a very young man when the War for Independence commenced, and entered eagerly into the plans of the republicans. He became a soldier in 1776, and commanded a company of militia in the service known as The Flying Camps, under General Hugh Mercer. In that capacity he served at White Plains, in the autumn of that year; and when, in December, 1776, that corps was disbanded, he accepted the commission of major in one of the Continental battalions of his native State. Then commenced his useful military career. In the spring of 1777, he joined the army under Washington, at Middlebrook, in New Jersey, but returned home in June, on account of the death of his father. He again joined the army, a few days after the battle on the Brandywine, in September; distinguished himself for cool courage in the engagement at Germantown; and afterward wrote a graphic account of the whole affair. He was also at the battle on the plains of Monmouth the following year; and in June, 1779, he was commissioned a lieutenant-colonel in the 5th Maryland regiment, "to take rank from the 11th day of May, 1778." In 1780, he went to the field of duty, in the South, when DeKalb marched thither with Maryland and Delaware troops, with the vain hope of aiding the besieged Lincoln, at Charleston. He served under Gates until after

the disastrous battle near Camden, in August, and his corps formed a part of the Southern army, under General Greene, at the close of that year. In January following, he won unfading laurels by his skill and bravery at the Cowpens, under Morgan, and received a vote of thanks and a silver medal from Congress. At Guilford, a month afterward, he greatly distinguished himself when Greene and Cornwallis contended for the mastery. There he was wounded, returned home, and did not engage in active military services afterward. In autumn of 1788, he was drawn from his retirement, to fill the chair of chief magistrate of his native State. In 1794, he declined the proffered commission of major-general of militia, and the following year he also declined the office of Secretary of War, to which President Washington invited him. He was then a member of the Maryland Senate; and in 1796, he was chosen to a seat in the Senate of the United States, where he served until 1803. Then he retired from public life. He died on October 12, 1827, at the age of seventy-five.

HOWE, Robert, was born in Brunswick, North Carolina, but both history and tradition are silent respecting the time of his birth and his death. He was appointed colonel of the first North Carolina regiment, in 1775, and in December of that year, he joined Woodford, of Virginia, at Norfolk, in opposition to Governor Dunmore and his motley army. For his gallantry there, Congress appointed him a brigadier in the Continental army, and ordered him to Virginia. He was with the army, at the North, during portions of 1776 and 1777; and in the spring of 1778, he was promoted to major-general, and placed in chief command of the Southern army. At his head-quarters at Savannah, he planned a campaign against the British and Tories in Florida, in the summer of 1778. It failed in its execution; and at the close of that year, he was driven from Savannah, by a British force under lieutenant-colonel Campbell. These reverses caused him to be censured unjustly; and when General Lincoln took command of the Southern army, H. attached himself to that of the northern department, the following year. He co-operated with Wayne in his attack upon Stony Point, on the Hudson, in 1779. He was on duty in the vicinity of West Point and the Hudson Highlands from that time until near the close of the war. Washington appointed him, in two instances, to discharge the important duty of quelling a mutiny, first in the New Jersey line, and then in that of Pennsylvania. He always had the unbounded confidence of the commander-in-chief.

HUMPHREYS, David, was born in Derby, Connecticut, in 1753, and was graduated at Yale College, in 1771. A few months afterward, he went to reside, as a tutor, in the family of Colonel Philipse, on the Hudson. When the war of the Revolution began, we find him at the head of a company of Connecticut militia. He afterward joined the Continental army, with a captain's commission, and was under the immediate command of General Putnam until 1778, when that officer made him one of his aids, with the rank of major. He held that commission until the autumn of 1780, when he was promoted to the office of aid to Washington, with the rank of colonel. He remained in the military family of the commander-in-chief until the close of the war. For his valor at Yorktown, where Cornwallis was captured, Congress honored him with a vote of thanks, and the present of an elegant sword. In May, 1784, he was appointed secretary to the commission for negotiating treaties with foreign powers, and with his friend Kosciusczko, accompanied Mr. Jefferson to Paris. He returned in 1786, and was elected to a seat in the Connecticut legislature. He was appointed to the command of a regiment raised for the western service, but was not called to the field; and from 1786 till 1788, he resided at Hartford. By invitation of Washington, he resided in the family of the great Patriot from 1788 until appointed by his illustrious friend minister to Portugal, in 1790. He went thither in 1791, and returned in 1794. He was soon afterward appointed minister to Spain, and took up his abode at Madrid, early in 1795. While there he negotiated treaties with Tripoli and Algiers, and was successful in all his diplomatic duties. He died February 21, 1818, aged sixty-five years.

HUTCHINSON, Thomas, was born in Massachusetts, in 1711, and was graduated at Harvard College in 1727. His father had been a public man, and Thomas studied English constitutional law, with the intention of becoming a statesman. He first embarked in commercial pursuits, however, but did not succeed. For ten consecutive years he was elected a member of the Massachusetts Assembly, and he was Speaker of that body for three years. In 1752, he succeeded his uncle as judge of probate; and from 1749 until 1756, he was a member of the governor's council. In 1758, he was elected lieutenant-governor of the province, and held that office until 1771, when he was appointed governor. In the meanwhile he had held the office of chief justice, after the death of Judge Sewall, in 1760. That office had been promised to the elder Otis, and the disappointment gave a keener point to the opposition of the younger Otis to the person and administration of H., when the dispute between Great Britain and her colonies was progressing. Other things had made him unpopular with many of the people. In 1748, he was chiefly instrumental in abolishing the paper currency of the colony, and substituting gold and silver therefor; and he favored the law granting writs of assistance, or general search-warrants for contraband goods, by which no man's house was safe from prying officials. He was also active, with Governor Bernard, in bringing troops to Boston, in 1768, to awe the people; and much of the odium of the massacre in Boston, in March, 1770, was cast upon him. These things created a strong popular feeling against him; and when, in 1772, certain letters which he had written to a former member of Parliament, were sent back from England to Boston by Dr. Franklin, and published, in which he gave advice, in disparagement of popular liberty in America, the people could scarcely be restrained from manifesting their indignation by inflicting personal violence upon him. He was compelled to leave the country in 1774, when he went to England. He died at Brompton, in that realm, on the 3d of June, 1780, sixty-nine years of age.

IZARD, Ralph, was born in 1742, at the family estate called *The Elms*, about seventeen miles from Charleston, South Carolina, and at a very early age was sent to England to be educated. He pursued preparatory studies at Hackney, and completed his education at Christ College, Cambridge. On arriving at his majority, he returned to America, took possession of his ample fortune left by his father, and, having no taste for the professions, he divided his time between literary and agricultural pursuits, and the pleasures of fashionable life. In 1771, he went to London. His ample fortune allowed the indulgence of a fine taste, and books, painting, and music, were his chief delight. Yet he possessed a thoroughly republican spirit, and refused offers to be presented to court, because etiquette would compel him to bow the knee to the king and queen. War commenced, and, finding it difficult to return to America, he went to France, in 1777, when Congress appointed him commissioner to the Tuscan court. Circumstances prevented his presenting himself to the Duke of Tuscany, for a long time, and he asked permission of Congress to resign his commission and return home. In the meanwhile the false representations of Silas Deane had induced Congress to recall him. That body afterward made ample amends for the injustice. He remained in Paris until 1780, and in the meanwhile had served his country efficiently in many ways, officially and unofficially. On one occasion he pledged his

whole estate as security for funds needed by Commodore Gillon, who had been sent from South Carolina to Europe, to purchase frigates. On his return to America, in 1780, he immediately repaired to the head-quarters of Washington, and was there when the treason of Arnold was discovered. It is evident from his correspondence that he was chiefly instrumental in procuring the appointment of General Greene to the command of the Southern army, toward the close of that year. For that service he received the thanks of the governor of South Carolina. Early in 1781, he was elected to a seat in the Continental Congress, where he remained until peace was established. He was chosen the first United States Senator from South Carolina, for the full term of six years, during which time he was a firm supporter of the administration of President Washington. In 1795, he took final leave of public life, and once more sought repose, with the pleasant anticipations of many years of earthly happiness. But two years afterward he was suddenly prostrated by paralysis. He died on the 30th of May, 1804, at the age of sixty-two.

JACKSON, James. When the British army was about to leave Savannah, in July, 1782, General Wayne, then in command in Georgia, chose an accomplished young man of twenty-five, whose valor was the theme for praise in the Southern army, to receive the keys of the city from a committee of British officers. That young officer was Major James Jackson, a native of Devonshire, England, where he was born on the 21st of September, 1757. He came to America, with his father, in 1772, and studied law in Savannah. He loved his adopted country, and in 1776, shouldered his musket, and was active in repelling an invading force that menaced Savannah. In 1778, he was appointed brigade major of the Georgia militia, and was wounded in a skirmish on the Ogeechee, in which General Scriven was killed. At the close of that year he participated in the unsuccessful defence of Savannah; and when it fell into the hands of Colonel Campbell, he was among those who fled into South Carolina and joined Moultrie's brigade. His appearance was so wretched and suspicious, during that flight, that he was arrested by some Whigs, and tried and condemned as a spy. They were about to hang him, when a gentleman of reputation, from Georgia, recognized him, and saved his life. He was active in the siege of Savannah by Lincoln and D'Estaing, in October, 1779, and in 1780, he was in the battle at Blackstocks under Colonel Elijah Clark, of Georgia. General Andrew Pickens made him his brigade major, in 1781, and his fluent speech expressing his ardent patriotism, infused new zeal into that corps. He was at the siege of Augusta, in June, 1781, and when the Americans took possession, Jackson was left in command of the garrison. Subsequently he performed more active and arduous services, as commander of a legionary corps; and at Ebenezer, on the Savannah, he joined General Wayne, and was the right arm of his force until the evacuation of the Georgia capital, in 1782. As some reward for his patriotic services during the war, the legislature gave him a house and lot in Savannah. He married in 1785, and the next year was commissioned brigadier-general of the State-militia. In 1788, he was elected governor of Georgia, but modestly declined the honor on account of his youth and inexperience, being then only little more than thirty years of age. He was one of the first representatives of Georgia in Congress, after the organization of the Federal Government; and from 1792 to 1795, was a member of the United States Senate. In the meanwhile he was promoted to major-general, and never failed in the faithful performance of his duties, civil and military. The State Constitution of Georgia, framed in 1798, was chiefly the work of his brain and hand. From that year until 1801, he was governor of the State, when he was again chosen United States senator. He held that office until his death, which occurred at Washington city, on the 19th of March, 1806, at the age of forty-nine.

JONES, David, was born in New Castle county, Delaware, on the 12th of May, 1736, and, as his name imports, was of Welsh descent. He was educated for the gospel ministry under the Rev. Isaac Eaton, at Hopewell, New Jersey, and for many years was pastor of the Upper (Baptist) Freehold Church. In 1776, he was appointed chaplain to Colonel St. Clair's regiment, and proceeded with it to the Northern Department. He was on duty at Ticonderoga, when the British approached, after the defeat of Arnold on the Lake below, and there preached a characteristic sermon to the soldiers, which was afterward published. He served through two campaigns under General Gates, and was chaplain to General Wayne's brigade in the autumn of 1777. He was with that officer at the Paoli Massacre, where he narrowly escaped death, but lived to make an address at the erection of a monument there, over the remains of his slaughtered comrades, forty years afterward. He was in the battles at Brandywine and Germantown, suffered at White Marsh and Valley Forge, and continued with Wayne in all his varied duties from the battle at Monmouth in June, 1778, until the surrender of Cornwallis, at Yorktown, in October, 1781. Such was his activity as a soldier, that General Howe offered a reward for him, while the British held possession of Philadelphia; and on one occasion a detachment of soldiers were sent to the Great Valley to capture him. At the close of the war, he returned to his farm, and resumed his ministerial labors. When General Wayne took command of the army in the North-western Territory, in 1794, J. was appointed his chaplain, and accompanied him to the field; and when, again, in 1812, a war between the United States and Great Britain commenced, the patriotic chaplain of the old conflict entered the army, and served under Generals Brown and Wilkinson, until the close of the contest. He was then *seventy-six years of age.* He died on the 5th of February, 1820, aged eighty-four.

KINNISON, David, was the latest survivor of the notable band of patriots, in 1773, known as *The Boston Tea Party.* He was born in Old Kingston, Maine, on the 17th of November, 1736, and was employed in farming until the tempest of the Revolution began to lower. He was a member of a secret club, who were pledged to destroy the obnoxious article of Tea, wheresoever it might be found; and when the East India Company's ships had arrived at Boston, K. and others hastened thither, were among the "Mohawks" in the gallery of the Old South Church, and assisted in casting the two cargoes of tea into the waters of Boston harbor, on the evening of the 16th of December, 1773. K. remained in the vicinity of the New England capital, working on a farm, until the spring of 1775, when, as a minute-man, he participated in the events at Lexington and Concord. With his father and two brothers, he fought in the battle of Bunker's Hill; and after the British were driven from Boston, he accompanied the American army to New York. From that time until the autumn of 1781, he led the life of a Continental soldier, under the immediate command of Washington most of the time. Then, while engaged as a scout in Saratoga, he was captured by some Mohawk Indians, and did not regain his liberty until peace came, after a captivity of more than eighteen months. At the close of the Revolution, he resumed the labors of agriculture, at Danville, Vermont, where he resided about eight years, and then removed to Wells, in Maine. There he lived until the commencement of the war with Great Britain, in 1812, when he again went to the field as a private soldier. He was under General Brown at Sackett's harbor; and in the battle at Williamsburg, on the St. Lawrence, he was badly wounded in the hand by a grapeshot. That was the first and only injury he had ever received in battle, but

by accidents afterward, his skull had been fractured; his collar bone and both legs, below the knees, had been broken; the heel of a horse had left a deep scar on his forehead, and rheumatism had dislocated one of his hip joints. As he forcibly expressed it, he had been "completely bunged up and stove in." K. was an illiterate man, and possessed none of the elements of greatness. He was eminent because of the peculiar associations of his life, his long experience, and his remarkable longevity. He learned to write his name when in the revolutionary camp; and he was sixty-two years of age when his granddaughter taught him to read. He had married and buried four wives, who had borne him twenty-two children. When he related this narrative, he had lost all trace of his relatives, and supposed himself childless. His pension of eight dollars a month was insufficient for his wants, and until his one hundred and tenth year, he added sufficient for a livelihood, by the labor of his hands. Then a benevolent stranger, in Chicago, gave him a home. He was little less than six feet in height, with powerful arms, shoulders, and chest; and at the age of one hundred and two years, he was seen to lift a barrel of cider into a wagon, with ease. When one hundred and ten, he walked twenty miles in one day. At eighty, his sight and hearing failed. Both were restored at ninety-five, and remained quite perfect until his death. That venerable man died at Chicago, Illinois, on the 24th of February, 1852, in the one hundred and sixteenth year of his age.

KIRKLAND, Samuel, was born at Norwich, Connecticut, on the 1st of December, 1741, and through life exhibited the indomitable courage, energy, and perseverance of his Scotch lineage. Of his childhood we know very little. In early youth he entered Dr. Wheelock's school at Lebanon, and prepared to be a missionary among the Indians. There he was much beloved for his gentleness, a quality which endeared him to his fellow-students at Princeton, where he pursued a collegiate course of studies from 1762 until 1764. He left the institution before completing his education, and dwelt among the Seneca Indians from 1764 until 1766. He received his collegiate degree, however, in 1765; and in June, 1766, he was ordained, at Lebanon, as a missionary to the Indians, under the sanction of the Scotch Society for propagating the gospel among the heathen. K. was chaplain at Fort Schuyler (formerly Fort Stanwix, now Rome, in Oneida county) for some time, and in that capacity he accompanied General Sullivan in his expedition from Wyoming, against the Senecas, in 1778. After that he was at Fort Schuyler and vicinity, or with his family at Stockbridge, until peace was declared. In subsequent treaties with the Indians, he was very active and useful. He accompanied a delegation of Senecas to Philadelphia, in 1790, and was rewarded by the conversion to Christianity of the great chief, Cornplanter, with whom he travelled, instructed, and convinced. In 1791, he made a census of the Six Nations, and at the same time he succeeded in establishing an institution of learning, which was incorporated in 1793, under the title of *The Hamilton Oneida Academy*. This was the origin of Hamilton College. K. continued his labors among the Oneidas until his death, which occurred after a brief illness, at his residence in Paris, Oneida county, on the 28th of February, 1808, in the sixty-seventh year of his age.

LAMB, John, was born in the city of New York, on the 1st of January, 1735. He received a good common education, and learned the business of his father, that of an optician and mathematical instrument maker. He abandoned it in 1760, and became an extensive wine merchant. Through all the exciting times until the kindling of the War for Independence, he was extensively engaged in the liquor trade, and, at the same time, was one of the most active politicians of the day, after the passage of the Stamp Act had aroused the American people. He spoke French and German fluently, was a good scholar, and was exceedingly expert in the use of his tongue and pen. In 1775, he entered the artillery service of the army, with the commission of captain. He accompanied Montgomery to Quebec at the close of that year. He was severely wounded there, in the cheek, by a grape-shot, and was made prisoner. Soon after that he was promoted to major, and appointed to the command of the artillery in the Northern Department, but was not exchanged, and allowed to enter the service again, until early in 1777, when Congress gave him the commission of lieutenant-colonel, under the immediate command of General Knox. He shared in the dangers and honors of the final victory at Yorktown. After the war, he served his fellow-citizens faithfully in the legislature of his native State. After the organization of the federal government, Washington appointed him collector of customs at the port of New York, and he held that office until his death, on the 31st of May, 1800, at the age of sixty-five.

LANGDON, John, was born in the town of Portsmouth, New Hampshire, in 1740. He was educated at a public grammar school, prepared himself for mercantile life, and prosecuted business upon the sea until the great ocean of public feeling began to be agitated by the tempest of the Revolution. Then he espoused the republican cause, and his first overt act of rebellion and treason was the seizure of the powder and arms at Portsmouth. In January, 1775, he was chosen a delegate to the Continental Congress. There he remained until 1776, when affairs in his own State demanded his presence there. In 1777, he was Speaker of the New Hampshire Assembly; and when Burgoyne was approaching the Hudson with his invading army, and the whole North and East were in commotion, L. offered to loan the State three thousand hard dollars, and the avails of his silver plate and some West India goods, to equip men for the army under Gates, remarking that if the American cause should triumph, he would get his pay, if not, his property would be of no value to him. With many members of the New Hampshire legislature, he served as a volunteer in the battles at Saratoga, which resulted in the capture of Burgoyne. L. was president of the New Hampshire convention that framed the State Constitution, in 1779; and the same year he was appointed Continental agent to contract for the building of some ships for the service of Congress. He was again elected to a seat in Congress, in 1783, and in March, 1785, he was chosen chief magistrate of his native State. He represented New Hampshire (with Nicholas Gilman) in the convention which framed the Federal Constitution, was its zealous supporter, and after serving another term as governor, or president of his State, was chosen to a seat in the United States Senate, where he served about ten years. He was afterward an active member of the State Legislature, and was governor of the State almost four years. He retired into private life, in 1812, whither he carried the most profound respect of his countrymen. He died at his birth-place, on the 18th of September, 1819, seventy-eight years of age.

LAWRENCE, Abbott, was born at Groton, Massachusetts, on the 16th of December, 1792, and received his education at the local school in the place of his nativity. At the age of sixteen years young L. entered the store of his brother Amos, in Boston, as clerk. After five years of faithful service, his brother took him into partnership. Soon the business horizon was clouded by the gathering storm of war between the United States and England, and Abbott became a bankrupt. He applied to the War Department for a commission in the army, but before his application was acted upon, peace was proclaimed. With the generous aid of his brother Amos, the two commenced business again, after the war, and Abbott went to England

to purchase goods, and forward them to Boston. About 1819 his mind was much occupied with the subject of domestic manufactures, and with uncommon foresight, Amos and Abbott L. ceased importing British goods, and employed their energies and capital in the establishment of home manufactures. From the period of the establishment of cotton manufactures, that subject occupied much of the thought and labors of Abbott L.; and in 1827, he was a delegate in a convention held at Harrisburg, in Pennsylvania, whose memorial to Congress resulted in the tariff act of 1828, that so aroused the violent opposition of the cotton-producing States. In 1834 Mr. Lawrence was elected a member of the Federal House of Representatives, and served on the important Committee of Ways and Means. Having no desire for official station, other than a willingness to serve the public when absolutely necessary, he declined a re-election; but, four years later, he yielded to the importunities of friends, and was again sent to Congress. At Washington city he suffered long sickness from fever, and was compelled to resign his seat, and return home. There he was efficient in quieting the public feeling aroused by the suspension of specie payments by the banks. In his judgment the people had implicit confidence; and Daniel Webster showed great sagacity when he suggested L. as the proper person to negotiate with the British Commissioner upon the settlement of the North-eastern boundary question. In 1843, L., with his family, embarked for England, in quest of health. The vessel in which they departed was wrecked, but L. and his family arrived safely at Halifax, and from there continued their voyage. President Taylor afterward invited him to a seat in his cabinet, but he declined the honor. Then the mission to England was offered him, and this he accepted. The duties of the station he performed with great credit to himself, and the honor of his country. After three years' service as a diplomat, he resigned, and returned home, followed by the warmest expressions of regard from the best men of England. He died on August 18, 1855, at the age of almost sixty-three years.

LEDYARD, John. The world has scarcely produced a more indefatigable traveller and explorer than L., the eldest son of a sea captain, who resided at Groton, Connecticut. There L. was born in 1751. His father died while he was yet a lad; and after his mother had married again, he was taken into the family of his grandfather, at Hartford, and treated as a son. His guardian died, when he was about eighteen years of age, and he entered Dortmouth College as a divinity student. He became dissatisfied, and resolved to leave the institution. He had already been a wanderer among the Five Nations in New York for three months, and tasted the pleasures of exciting travel. Having no money to pay travelling expenses to Hartford, he constructed a canoe, laid in "sea stores" contributed by kind friends, and all alone he made a perilous voyage down the winding Connecticut and its numerous rapids, to Hartford, a distance of one hundred and forty miles. This first adventure revealed the spirit within. He soon made his way to New London, and shipped as a common sailor, for Gibraltar. There he joined the army, but being released, he made his way back by way of the Barbary coast and the West Indies in 1771. He then sailed from New York to England, where he entered the navy, and as corporal of marines, accompanied Captain Cook in his third and last great voyage. Ever brave and resolute, he became the favorite of his commander, and was frequently intrusted with little enterprises, which required skill and courage. He was with Cook when he was killed by the people of the Sandwich Islands, in 1778. After visiting the shores of Kamschatka, the expedition returned to England, and L. came to America. He arrived after an absence of eight years, and took lodgings under his mother's roof at Southold, Long Island, without being recognized by her, for some hours. The war of the Revolution was then in progress, and L. could not consistently remain among the enemies of his country, so he crossed over to Connecticut, joined his friends at Hartford, and there wrote an account of the voyage with Captain Cook. L. now planned a voyage to the north-west coast of America, but received very little encouragement. He sailed for Cadiz, thence to L'Orient, and going to Paris, he had an interview there with Mr. Jefferson and La Fayette. They approved of his projected voyage, for commercial purposes, to the north-west coast, and Paul Jones, then in Paris, entered heartily into the scheme. The plan failed, however, and L. conceived the bold project of making a journey by land, through the Russian dominions, to Behring's Straits, by way of Kamschatka, and thus reach the north-west coast. He went to London, and Sir Joseph Banks and other scientific gentlemen contributed funds to aid him in his enterprise. He proceeded to Hamburg, thence to Copenhagen and Stockholm; and without a companion he traversed the country north of the Gulf of Bothnia, under the Arctic circle, and made his way to St. Petersburg. There he procured a passport from the Empress Catharine, and started for Siberia, over the Ural Mountains. After dreadful hardships, which few men could have endured, he reached Yakutsk, on the great Lena river, six thousand miles eastward of St. Petersburg. He pushed on further to the Kamschatkan Sea, but finding much ice, he returned to Yakutsk, to await the opening of spring. There, for reasons unknown to him, he was suspected of being a spy, and was seized by two Russian soldiers, in the name of the Empress. In the depth of winter he was conveyed through the north of Tartary, by the way of Moscow, to the confines of Poland, and there his conductors wished him a pleasant journey, and told him he would be hanged if he entered the Russian dominions again. Ragged and penniless, he made his way to Konigsberg, where a correspondent of Sir Joseph Banks gave him five guineas, with which he proceeded to England. There he found a project on foot, for exploring the interior of Africa. L. at once engaged, with enthusiasm, in the enterprise. When one of the managers of the association, which had been formed for the purpose, asked L. how soon he would be ready to start, he promptly replied, "To-morrow morning." After writing to his mother, he sailed from London, in June, 1788, reached Cairo on the 19th of August, and then prepared to penetrate the interior. He joined a caravan for Sennaar, and was on the point of departure, with high hopes, when he was attacked by a bilious fever, which terminated his life on the 17th of January, 1789, at the age of thirty-seven.

LEE, Ann, was born in Manchester, England, about the year 1736. Her father was a blacksmith, and she was taught the trade of cutting fur for hatters. She married young, and had four children, who all died in infancy. At the age of twenty-two years, she became a convert to the doctrines of James Wardley, a Quaker, who preached the holiness of celibacy, and the wickedness of marriage, and whose followers, because of the great agitations of their bodies when religiously exercised, were called Shakers. After nine years of discipline, she opened her mouth as a teacher; and in 1770, while confined in prison as a half-crazed fanatic, she pretended to have had a revelation of great spiritual gifts. She declared that in her dwelt the "Word;" and her followers say, "the man who was called Jesus, and the woman who was called Ann, are verily the two great pillars of the church." She was acknowledged to be a spiritual mother in Israel, and is known by the common appellation of "Mother Ann." She came to New York in 1774, with her brother and a few followers; and in the spring of 1776, they settled at Niskayuna (now Watervliet, opposite Troy), where the sect still flourishes. Some charged Mother Ann with witchcraft; and vigilant Whigs, knowing that she preached against war in every shape, suspected her of secret correspondence with her countrymen,

the British. A charge of high treason was preferred against her, and she was imprisoned in Albany during the summer of 1776. In the autumn she was sent as far as Poughkeepsie, with the intention of forwarding her to New York, within the British lines. She remained a prisoner at Poughkeepsie until some time in 1777, when she was released by Governor Clinton. She then returned to Watervliet. Persecution had awakened sympathy for her, and her followers greatly increased. A wild revival movement in the vicinity, in 1780, poured a flood of converts into her lap, and she deluded the silly creatures with the assertion that she was the "woman clothed with the sun," mentioned in the Apocalypse. She told them that she daily judged the dead of all nations, who came to her, and that no favor could be had, except through a confession of sins to her. She became a *Pontifix Maximus*—a second Pope Joan—and under her directions, the faithful discarded all worldly things, and gave into her hands all their jewels, knee-buckles, money, and other valuables. She excited their fear and admiration by mutterings, groans, and strange gestures; and introduced dancing, whirling, hopping, and other eccentricities, into the ceremonials of pretended worship. Mother Ann declared to her deluded followers that she would not die, but be suddenly translated into heaven like Enoch and Elijah. Notwithstanding she did actually die at Watervliet, on the 8th of September, 1784, her followers believe that it was not real death.

LEE, Charles. "Boiling Water" was the significant name which the Mohawk Indians gave to L., when he resided among them, and bore the honors of a chief. His character was indeed like boiling water—hot and restless. He was a native of Wales, where he was born in 1731. Love of adventure brought him to America, in 1756, as an officer in the British army, and he remained in service here during a greater part of the French and Indian war. He then returned to England; and, in 1762, he bore a colonel's commission, and served under Burgoyne, in Portugal. After that he became a violent politician, in England; and, in 1770, he crossed the channel, and rambled all over Europe, like a knight-errant, for about three years. His energy of character and military skill made him a favorite at courts, and he became an aid to Poniatowski, King of Poland. He came to America toward the close of 1773, and, at the solicitation of Colonel Horatio Gates, whom he had known in England, he was induced to buy an estate in Berkeley county, Virginia, and settle there. He resigned his commission in the British army, and became an American citizen. When the Continental army was organized, in June, 1775, L. was appointed one of the four major-generals, and accompanied Washington to Cambridge. He was active there until the British were driven from Boston, in the spring of 1776, when he marched, with a considerable force, to New York, and afterward proceeded southward to watch the movements of Sir Henry Clinton. He participated in the defence of Charleston, as commander-in-chief; and after the British were repulsed, he joined Washington at New York. After the battle at White Plains, and the withdrawal of a great portion of the American army to New Jersey, he was left in command of a force on the east side of the Hudson. While Washington was retreating toward the Delaware, at the close of autumn, L. tardily obeyed his orders to reinforce the flying army, and was made a prisoner while tarrying in the interior of New Jersey. His services were lost to the country until May, 1778, when he was exchanged for General Prescott, captured in Rhode Island, by Colonel Barton. A month afterward he was in command at Monmouth, where, during the hot contest of battle, he was sternly rebuked by Washington, for a shameful and unnecessary retreat. That rebuke on the battle-field wounded L.'s pride, and he wrote insulting letters to the commander-in-chief. For this, and for misconduct before the enemy, he was suspended from command, pursuant to a verdict of a court-martial. Congress confirmed the sentence, and he left the army in disgrace. The event made his naturally morose temper exceedingly irascible, and he lived secluded on his estate in Berkeley, for awhile. Then he went to Philadelphia, and there died in neglect, at the age of fifty-one years. L. was a brilliant man in many respects, but he lacked sound moral principles, was rough and profane in language, and neither feared nor loved God or man. In his will, he bequeathed his "soul to the Almighty, and his body to the earth;" and then expressed a desire not to be buried within a mile of any Presbyterian or Anabaptist meeting-house, giving as a reason that he had "kept so much bad company in life, that he did not wish to continue the connection when dead."

LEGARE, Hugh Swinton, was born at Dorchester, near Charleston, South Carolina, about the year 1800. He was of Huguenot descent. His father died when he was an infant, and he was left to the charge of an excellent mother. At the age of nine years he was placed in the school of Mr. King (afterward promoted to the bench in South Carolina) in Charleston, and was finally prepared for college by the excellent Reverend Mr. Waddel. He learned rapidly, and at the age of fourteen years he entered the College of South Carolina, where he was graduated with the highest honors. The profession of the law became his choice, and for three years he studied assiduously under the direction of Judge King, his early tutor. He then went to Europe, where he remained between two and three years. Soon after his return, he was elected to a seat in the South Carolina legislature. While there, some of those measures which tended toward political disunion were commenced, but L. was always found on the Federal side of the question, for he regarded the Union with the utmost reverence. In 1827, L. and other cultivated gentlemen in the South commenced the publication of the "Southern Review," a literary and political periodical, which soon acquired great influence. L. was one of the chief and most popular of the contributors. He was soon called to fill an important public station, by receiving the appointment of attorney-general of South Carolina. He performed the duties of that office with great ability, until 1832, when he was appointed minister to Belgium, by President Jackson. There he remained until early in 1837, when he returned to Charleston, and was almost immediately elected to a seat in Congress. He first appeared there at the extraordinary session called by President Van Buren to consider the financial affairs of the country. There he displayed great statesmanship and fine powers of oratory, and was regarded by friends and foes as a rising man. At the end of his congressional term, he resumed the practice of law in Charleston, and was pursuing his avocations with great energy and *eclat*, when President Harrison, in 1841, called him to his cabinet as attorney-general of the United States. He continued in that station, under President Tyler, until the summer of 1843, when, on the occasion of a visit to Boston, with the chief magistrate, in June, he was seized with illness, and died there, on the 20th of that month, at about forty-three years of age.

LILLINGTON, John Alexander, was the son of a British military officer, who was a member of the royal council of Barbadoes, in 1698. His son John, captivated by the glowing accounts given of North Carolina, emigrated thither, and scttled within the present limits of New Hanover county; and in 1734, built a fine mansion there, which he called *Lillington Hall*. L. inherited the military tastes of his father; and when the notes of preparation for the Revolution were heard all over the land, his skill was brought into requisition. He was also a member of the Wilmington committee of safety in 1775; and when the Scotch Highlanders and others in the vicinity of Cross Creek (Fayette-

ville), took up arms for the king, under Donald McDonald, in the winter of 1776, L. commanded one of the provincial corps which marched against, and defeated them, at Moore's Creek, under the general command of Colonel Caswell. It was the initial battle of the Revolution in the South, and the victory was hailed with delight. L. was made a brigadier; and from that time, until the approach of Gates, in 1780, he was active in the council and field. Both he and his son joined the army of Gates, and participated in the disgrace of defeat at Camden. L. remained in service until the close of the war, when he withdrew from public life.

LIVINGSTON, John H., was born at Poughkeepsie, Dutchess county, New York, on the 30th day of May, 1746. He received parental instruction, only, until his seventh year, when he was placed under other tutors, among whom was the father of the late Chancellor Kent. At the age of twelve years, he entered Yale College, as a student, and was graduated in 1762, when only sixteen. The profession of the law opened a brilliant future for him, and he commenced its study under Bartholomew Crannel, of Poughkeepsie. His habitual seriousness was deepened into strong religious convictions, by hearing a sermon from the lips of the eminent Whitefield, and he resolved to abandon the law, and become a minister of the gospel. He accordingly went to Holland, in 1766, to prosecute theological studies in the University of Utreeht, and there he remained until 1770, and acquired the degree of Doctor of Divinity. He returned to America the same year, and became pastor of the Dutch Reformed Church in the city of New York. When the Revolution broke out, all was confusion in New York, and L. went to reside at Kingston, in October, 1775. In 1781, he took up his abode at his father's mansion, in Poughkeepsie, and occupied the pulpit of the Dutch Church there, for about two years. When the British left New York, L. resumed his pastoral charge there, and the following year he was chosen, by the first convention, Professor of Theology. He performed his new duties, with those of his ministerial services, with great zeal, in New York and its immediate vicinity, until 1810, when, on the removal of Queens College (the theological school in which he was professor) to New Brunswick, in New Jersey, he was chosen its president. His inaugural address is a model of its kind, full of learning and the purest Christian spirit. As the college under his charge did not flourish as a *literary* institution, an effort was commenced, in 1815, to make it a Theological Seminary, exclusively. That measure was carried into effect, and from that time, until the present, it has held that character. Its name has been changed to *Rutger's College*, in honor of a distinguished citizen of New York who nobly patronized it. He died on the 28th of January, 1825, at the age of seventy-nine.

LOVELL, John. "The Master" of many of the leading men of the War for Independence, in New England, was John Lovell, a descendant of one of the first settlers in the Massachusetts colony. He was born in 1708, and was graduated at Harvard College, at the age of twenty years. He succeeded Jeremiah Gridley as assistant in the South Grammar School of Boston, and in 1738, was placed at its head, where he exercised pedagogue authority for almost forty years. He wrote several political and theological pamphlets; and in 1743, he delivered a funeral oration, on the death of Peter Faneuil, the founder of Faneuil Hall, which was published. Unlike a great proportion of his earlier pupils, Master Lovell was a Loyalist, and left Boston, with other refugees, when the British were driven from that city in March, 1776. He died in Halifax, Nova Scotia, in 1778, seventy years of age.

LYMAN, Phineas, was born in Durham, Connecticut, in the year 1716. He was one of the Berkeleyan scholars in Yale, and received his first degree in 1738. The following year he was appointed a tutor in that institution, in which avocation he was engaged for three years, at the same time he was studying the theory of law. He commenced its its practice at Suffield, in 1743, and he soon arose to the front rank at the bar of Hampshire county. He was elected a member of the Colonial Assembly, in 1750, and in 1753, was chosen to a seat in the council. At the age of thirty-nine years, he was appointed major-general of the Connecticut forces, and took the field in the spring of 1755. He concentrated between five and six thousand troops on the upper waters of the Hudson, built Fort Edward, and there awaited the arrival of his commander-in-chief, General William Johnson, who was to lead the provincials against the French on Lake Champlain. The fortress was first called Fort Lyman, in honor of the Connecticut general, but its name was changed in deference to a scion of royalty. In the severe battle with the French and Indians, near the head of Lake George, in September of that year, L. bore the most conspicuous part, and yet Johnson, jealous of his merits, withheld praise. The patriotic hero did not allow personal considerations to stand in the way of public duty, and he served with distinction during the whole war. He was the commander of the expedition which captured Havana, in 1762; and after the peace in 1763, he went to England, as agent of a company called *The Military Adventurers*—soldiers of the war—who asked for an appropriation of land for a colony in the Mississippi and Yazoo country. The same company had purchased an extensive tract of land on the Susquehannah, and L. was intrusted with the management of matters connected with that purchase. Deluded month after month by idle promises from the changing ministry, in England, he at length came back, after wasting eleven years abroad, and almost losing his mind. He returned in 1774, and at about that time, a tract of land having been granted, in the Mississippi and Yazoo country, he went thither with his eldest son. Both died in "West Florida," in 1775. A few years afterward, difficulties with the Spaniards caused the whole company of settlers, near Natchez, to fly for their safety across the country, a thousand miles, to Savannah. The history of L.'s family is a melancholy one. He died at the age of fifty-nine years, a victim of ingratitude and injustice.

MACDONOUGH, Thomas, was born in Newcastle county, Delaware, on the 23d of December, 1783. At the age of fifteen years he obtained a midshipman's warrant, and in the war with Tripoli he was distinguished for his bravery. He was one of the daring men selected by Decatur to assist him in burning the *Philadelphia* frigate, and he partook of the honors of that brilliant exploit. When war with Great Britain was proclaimed in 1812, M. held a lieutenant's commission, having received it in February, 1807. He was ordered to service on Lake Champlain, and in July, 1813, he was promoted to master-commandant. The war in Europe having been suspended early in 1814, by the abdication of Napoleon and the capture of Paris by the allied armies, the British forces in America were largely augmented. Quite a strong army, under Sir George Prevost, invaded New York from the St. Lawrence; and a fleet, under Commodore Downie, sailed up Lake Champlain to co-operate with the land forces. They were called "the flower of Wellington's army, and the cream of Nelson's marines." General Macomb was in command of a small land force, composed chiefly of local militia, and M. had a little squadron of four ships and ten galleys, with an aggregate of eighty-six guns. Such was the force which stood in the way of the sanguine invader. On the 11th of September, 1814, the British land and naval forces both approached. The conflict was short but decisive. M., by superior nautical skill and dexterity in the management of guns, soon caused the British flag to fall, when Prevost, in dismay, hastily retreated, leaving victory

with the Americans on both land and water. Congress awarded M. a gold commemorative medal, and gave him the commission of a post captain. Other substantial rewards were bestowed. The State of New York gave him one thousand acres of land; that of Vermont, two hundred acres; and the cities of New York and Albany each gave him a lot of ground. He died on the 10th of November, 1825, at about forty-two years of age.

MACON, NATHANIEL, was born in Warren county, North Carolina, in 1757. His early youth gave noble promise of excellent maturity, and it was fulfilled in ample measure. After a preparatory course of study, he entered Princeton College. The tempest of the Revolution swept over New Jersey, toward the close of 1776, and that institution was closed. Young M. returned home, his heart glowing with sentiments of patriotism, which had ripened under the genial culture of President Witherspoon, and he entered the military service with his brother, as a volunteer and private soldier. While in the army the people elected him to a seat in the House of Commons of his native State. Then, as ever afterward, he was unambitious of office as well as of money, and it was with great difficulty that he was persuaded to leave his companions-in-arms, and become a legislator. He yielded, and then commenced his long and brilliant public career. He served as a State legislator for several years, when, in 1791, he was chosed to represent his district in the Federal Congress. In that body he took a high position at once; and so acceptable were his services to his constituents, that he was regularly re-elected to the same office until 1815, when, without his knowledge, the legislature of North Carolina gave him a seat in the Senate of the United States. During five years of his service in the House of Representatives [1801–1806], he was speaker of that body. He continued in the Senate until 1828, when, in his seventy-first year, he resigned, and retired to private life. At that time he was a trustee of the University of North Carolina, and justice of the peace for Warren county. These offices he also resigned, and sought repose upon his plantation. M. was called from his retirement, in 1835, to assist in revising the Constitution of North Carolnia. He was chosen president of the convention assembled for that purpose; and the instrument then framed bears the marked impress of his genius and thoroughly democratic sentiments. The following year he was chosen a presidential elector, gave his vote in the Electoral College for Martin Van Buren, and then left the theatre of public life, forever. He died on the 29th of June, 1837, eighty years of age. M. was a member of Congress thirty-seven consecutive years; a longer term of service than was ever given by one man. He was appropriotely styled the Father of the House, and men of all creeds looked up to him as a Patriarch for counsel and guidance.

MADISON, JAMES, D.D., the first Bishop of the Protestant Episcopal Church in Virginia, was a native of Rockingham county in that State, and for many years president of William and Mary College. He was born near Port Republic, on the 27th of August, 1749. His early education was acquired at an acadamy in Maryland; and, in 1768, he entered William and Mary College, as a student. He was graduated in 1772, and in addition to other collegiate honors, he received the gold medal assigned by Lord Botetourt as a prize for the encouragement of classical literature. On leaving the college, young M. commenced the study of law under the afterward celebrated Chancellor Wythe, and was admitted to the bar, but he felt called to the gospel ministry, and prepared himself for its duties. He visited England, and received priest's orders; and on his return, in 1773, he was chosen Professor of Mathematics in William and Mary College. When only twenty-eight years of age (1777), he was chosen president of that institution, and then again visited England to become better instructed in those acquirements which his station demanded. He returned in 1778, and then "commenced that long career of usefulness, which entitles him to be considered as one of the greatest benefactors of Virginia." In 1784, he resigned his Professorship of Mathematics, and became Professor of Natural and Moral Philosophy, and International Law. These and the presidency he retained until his death. Until 1776, the Church of England had been the established religion in Virginia. That year the Virginia Assembly repealed all laws requiring conformity thereto. There had never been a resident Bishop in Virginia. At a convention held in Richmond, in 1785, presided over by M., the subject of a resident Bishop was considered; and the following year Rev. Dr. Griffith was requested to proceed to England, with White and Provost, and receive consecration. Circumstances prevented his going; and, in 1790, M. was elected to fill the episcopate. He was consecrated at Lambeth, in September of that year. M. made his first episcopal visitation in 1792. He died on the 6th of March, 1812, at about sixty-two years of age.

MANLY, JOHN, received his commission from Washington, at Cambridge, on the 24th of October, 1775, and was put in command of the schooner *Lee*, with instructions to cruise in Massachusetts Bay. He made a great many captures, and his services became the theme of eulogium throughout the whole country. Among his prizes was an ordnance brig, which contained heavy guns, mortars, and intrenching tools of great value to the army then besieging the British, in Boston. When Congress organized a navy, the services of M. were appreciated, and he was raised to the command of the *Hancock*, thirty-two guns. He cruised with success, but on the desertion of a colleague, while engaged with the *Rainbow* (afterward the flag-ship of Admiral Collier, in the autumn of 1777, when on our coast with a small fleet), he was made a prisoner, on the 8th of July, 1777. M. suffered a long and rigorous confinement in the *Rainbow*, and at Halifax, and his services were lost to the country for almost the entire remainder of the war. He was released in 1782, and the frigate *Hague* was placed under his command. While cruising in the West Indies, he was chased by a British seventy-four, and driven on a sand bank. Three other ships of the line attacked him, but after sustaining their heavy fire for four days, he got his vessel off, hoisted the continental flag, fired thirteen guns as a parting salute, and escaped. He died in Boston on the 12th of February, 1793, at the age of fifty-nine, and was buried with military honors.

MARTIN, FRANCOIS XAVIER, one of the most learned jurists and erudite scholars that ever adorned the profession of the law, in this country, and the accomplished historian of North Carolina, was born at Marseilles, in France, on the 17th of March, 1762. At the age of twenty years he came to America. The war of the Revolution was then just drawing to a close, and he took up his residence at Newbern, in North Carolina, and prepared himself for the profession of the law. On his first appearance at the bar, he gave evidence of that acuteness which marked his whole career, in whatever station in life he was called to act. His practice became extensive and lucrative, and he soon took a high social position in his adopted State. In 1806, he was called to represent Newbern district in the House of Commons of North Carolina. Soon after the close of his duties therein, President Madison (in 1809) appointed him United States Judge of the Mississippi Territory, and he made his residence at Natchez. On the 1st of February, 1815, he was elevated by Governor Claiborne to the bench of the Supreme Court of Louisiana, as one of the associate judges. He held that office for twenty-two years, when, in January, 1837, he became chief justice of the State, on the death of Judge Mathews. M. remained at the head of the Supreme

Court of Louisiana until the adoption of the present constitution of that State, in the autumn of 1845, when he retired to private life. He was then in the eighty-fourth year of his age. He died on the 10th of December, 1846. No man ever left an official station with fewer stains of sins of omission or commission upon his garment, than M., for through his long life not a syllable of disparagement of his honesty and integrity was ever uttered.

MASON, JOHN, was born in England about the year 1600. He was a soldier by profession, and had practiced his murderous art in that cock-pit of Europe, the Netherlands. In 1630, he came to America, and was one of the original settlers at Dorchester. He went to the Connecticut Valley in 1635, and assisted in founding a settlement at Windsor. The peace of the little colony was soon disturbed by the depredations of the powerful Pequods, whose chief rendezvous was between the Thames and Mystic rivers. They believed the white people to be friendly to their enemies, the Mohegans and Narragansetts, and they had resolved to exterminate them. They kidnapped children, stole cattle, and finally made murderous attacks upon the outskirts of the settlement at Saybrook, near the mouth of the Connecticut river. The danger became imminent, and M. went down to Saybrook, with some followers, to reinforce and command the garrison of the little fort there. In the spring of 1637, the settlers in the Connecticut Valley declared war against the Pequods, and the Plymouth and Massachusetts people promised to assist them. Through the influence of Roger Williams, the Narragansetts became allies of the English; and when, late in May, M., with eighty white men and seventy Mohegan Indians, anchored his pinnaces near Conannicut Island, he was joined by Miontonomoh, the great chief of the Narragansetts, with two hundred warriors. With these, M. proceeded toward the Pequod country, and was joined, on the way, by the Niantics. Sassacus, a fierce warrior, was the chief sachem of the Pequods. He could summon two thousand braves to the field, and his confidence in his great strength made him less vigilant than a weak leader would have been. He had no intelligence or suspicion of the approach of M. from the East. He was first informed of it by the seven survivors of a dreadful massacre. The invaders crept as stealthily along as a panther, and just at dawn, on the 5th of June, 1637, fell upon the chief fort of the Pequods, on the Mystic river. Before sunrise, more than six hundred men, women, and children, had perished by weapons, or by the flames of their own burning wigwams. Only seven escaped to arouse the nation to vengeance. The English, aware of their danger, hastened toward Saybrook; but the power of the Pequods was broken. When, a few days afterward, about one hundred Massachusetts men joined M., Sassacus and his followers fled westward, hotly pursued by the English. They took shelter in Sasco swamp, near Fairfield, where, after a severe battle, they all surrendered, except Sassacus and a few others, who fled to the Mohawks for refuge. There the great sachem was treacherously slain. The blow was terrible. A nation had disappeared in a day. Soon after the war, the governor of Connecticut appointed M. major-general of all the forces of the colony, which office he filled until his death. He was also a civil magistrate for eighteen consecutive years; and in 1660, he was elected deputy-governor. He retired from public life in 1670; and in 1673, he died at Norwich, seventy-two years of age.

M'INTOSH, LACHLIN, "the handsomest man in Georgia," at the commencement of the Revolution, was born near Inverness, in 1727, and was a son of the head of the Borlam branch of the clan M'Intosh, who, when Lachlin was nine years of age, came to America with General Oglethorpe. He accompanied that gentleman in an expedition against the Spaniards, in Florida, was made prisoner and sent to St. Augustine, where he died; and Lachlin, at the age of thirteen years, was left to the care of an excellent mother. The newly-settled province afforded small means for acquiring an education, and Mrs. M'Intosh was unable to send her son to Scotland, for the purpose. His naturally strong mind, excited by a love for knowledge, overcame, as usual, all difficulties. Just as he approached manhood, he went to Charleston, where his fine personal appearance, and the remembrance of his father's military services in Georgia, procured him many warm friends. Among these was the noble John Laurens, and he entered that gentleman's counting-room as under clerk. Disliking the inaction of commercial life within doors, he left the business, returned to his paternal estate and the bosom of his family, on the Alatamaha, and commenced the business of a land-surveyor. Success attended his efforts; and, inheriting the military taste of his father, he made himself familiar with military tactics, and thus was prepared for the part he was called upon to act in the War for Independence. He was a leading patriot in his section of Georgia; and when the war broke out, he entered the army, received the commission of colonel, and was exceedingly active in the early military movements in that extreme Southern State. He was commissioned a brigadier, in 1776, and a rivalry between himself and Button Gwinnett, one of the signers of the Declaration of Independence, resulted in a fierce quarrel, which ended in a duel. The challenge was given by Gwinnett. Both were wounded; Gwinnett mortally. M. was tried for murder, and acquitted; but the trouble did not end there. The feud spread among the respective friends of the parties, and, at one time, threatened serious consequences to the Republican cause at the South. To allay the bitter feeling, M. patriotically consented to accept a station at the North, and Washington appointed him commander-in-chief in the Western department, with his head-quarters at Pittsburg. Early in 1778, M. descended the Ohio with a considerable force, erected a fort thirty miles below Pittsburg, and after considerable delay, he marched toward the Sandusky towns in the interior of Ohio, to chastise the hostile Indians. The expedition accomplished but little, except the building of another fort near the present village of Bolivia, which M. named Laurens, in honor of his old employer, then president of Congress. He returned to Georgia, in 1779, and was second in command to Lincoln at the siege of Savannah, in October of that year. He remained with Lincoln during the following winter and spring, and was made a prisoner, with the rest of the Southern army, on the surrender of Charleston, in May, 1780. After his release, he went, with his family, to Virginia, where he remained until the close of the war. Then he returned to Georgia, a poor man, for his little estate was almost wasted. He lived in retirement and comparative poverty, in Savannah, until 1806, when he died, at the age of seventy-nine.

M'KEAN, THOMAS, was born in Chester county, Penn., on the 19th of March, 1734. He studied law with his relative, David Finney, at New Castle, in Delaware; and during his student life, he was clerk of the prothonotary Court of Common Pleas, for that county. He was admitted to practice before he was twenty-one years of age, and his upward course in his profession was rapid and highly honorable. In 1756, he was appointed deputy of the attorney-general, to prosecute in the county of Sussex, and the following year he was admitted to the bar of the Supreme Court of Pennsylvania. He was appointed clerk of the assembly of Delaware, at about the same time; and that body, in 1762, appointed him a colleague, with Cæsar Rodney, to revise and print the laws of the province enacted during the preceding ten years. That same year he was chosen a member of the Delaware Assembly, and then he commenced his distinguished political career in earnest, which continued for about half a century. He was annually re-elected to the Assembly for

seventeen years, against his continually expressed desire to leave public life, and even while, for six years of the time, he was a resident of the city of Philadelphia. In 1764, the legislature appointed him one of three trustees of the provincial loan office, and he performed the duties of that station until 1772. He was a delegate to the "Stamp Act Congress" held in New York, in 1765, and was one of the most energetic friends of popular liberty in that assembly. In 1771, he was appointed collector of the customs at New Castle, and was a commissioner of the revenue. In the autumn of 1772, he was chosen Speaker of the Assembly. He was a delegate for his adopted province in the first Continental Congress, in 1774; and he was a member of the national council from that time until the return of peace, in 1783. He advocated independence, and signed the great Declaration. He was one of the committee appointed to draw up the Articles of Confederation; and while acting as a senator in Congress, and president of the newly-organized State of Delaware, he was also distinguished as a soldier, in New Jersey, with the commission of colonel. In July, 1777, he was commissioned chief justice of Pennsylvania, and held that exalted office for twenty years. He was president of Congress, in 1781; and, in 1787, he was a member of the Pennsylvania convention which ratified the Federal Constitution. He was its earnest advocate, and was extremely influential in procuring its ratification, by Pennsylvania. In 1789, M. assisted in amending the constitution of his native State; and ten years afterward, at the end of a warm party contest, he was elected governor of Pennsylvania. For nine years he governed Pennsylvania with firmness, ability, and great discretion, and then retired from public life. Only once again did he appear in a popular assembly. It was in Independence Hall, in 1814, when the safety of Philadelphia seemed in jeopardy from the British. He presided, and reminded the people that there were then only two parties, "our country and its invaders." The venerable patriot died on the 24th of June, 1817, when past the eighty-third year of his age.

MEIGS, Return Jonathan, was born at Middletown, Connecticut, in December, 1740. He received a good common education, and learned the trade of a hatter. Of his earlier life we have no important information; and he first appears in public at the opening of the Revolution. He was then thirty-five years of age; and one of the companies of minute-men, in his native town had chosen him their captain. When intelligence of bloodshed at Lexington reached him, he marched his company to Cambridge, and soon received the appointment of major from Governor Trumbull. In the ensuing autumn, he accompanied Arnold in the memorable expedition from the Kennebec to the St. Lawrence. He participated in the attack on Quebec, at the close of the year, and was made a prisoner there. His fellow-captives were much indebted to him for comforts during the remainder of the dreary winter. In the course of the following year he was exchanged, and, receiving the commission of colonel from the Continental Congress, he raised a regiment in Connecticut, which was known as The Leather-cap Battalion. With a part of his force (seventy in number), he made a bold attack upon the British post at Sag Harbor, east end of Long Island, in May, 1777, where he destroyed a great deal of property, and carried off almost a hundred prisoners, without losing a man. Congress gave him thanks and a sword for that exploit. In the capture of Stony Point, on the Hudson, in 1779, M. and his regiment, under the direction of General Wayne, performed a gallant part. He was one of the first to mount the parapet and enter the fort. He remained in active service until the close of the war, and then sat down quietly in his native town, to enjoy the honors he had so bravely won. His knowledge of surveying, acquired in early life, was now called into practice. He was appointed one of the surveyors of the Ohio Land Company, and in the spring of 1778, he went over the mountains, and halted at Marietta, the head-quarters of emigrants to that region. In 1798, M. was elected a member of the Territorial legislature; and, in 1801, President Jefferson appointed him Indian agent, among the Cherokees, where he resided until his death, which occurred at the Cherokee agency, on the 28th of January, 1823, at the age of eighty-three. The Indians with whom he lived so long, loved and revered him as a father.

MERCER, Hugh. On the first day of December, 1853, Colonel Hugh Mercer, the foster-child of the Republic, died at Fredericksburg, Virginia, at the age of little more than seventy-seven years. He was a son of the brave General Hugh Mercer, who was mortally wounded in the battle at Princeton, on the morning of the 3d of January, 1777, and who is revered as one of the eminent martyrs of liberty, who fought for American Independence. That brave soldier was a native of Scotland, and was a surgeon on the bloody field of Culloden, in 1745. Ten years later he was the companion-in-arms of Washington, in the sanguinary conflict on the Monongahela, where Braddock was killed; and when another ten years had elapsed, he left his apothecary shop, his medical practice, and his beloved family, and drew his sword for the liberties of his adopted country. Sixty-three days after he had fallen on the battlefield, the Continental Congress resolved to erect a monument to his memory, in Fredericksburg, with a suitable inscription; and also resolved, "That the eldest son of General Warren, and the youngest son of General Mercer, be educated, from this time, at the expense of the United States." That "youngest son of General Mercer" was the subject of this brief memoir. He was born at Fredericksburg, Virginia, in July, 1776. He was educated at William and Mary College, during its palmiest days, while under the charge of the good Bishop Madison. For a long series of years he was colonel of the militia of his native county (Spottsylvania), and for twenty years he was an active magistrate. For five consecutive years he represented his district in the Virginia legislature, when, preferring the sweets of domestic life, to the turmoils of politics and public office, he declined a re-election. He was soon afterward chosen president of the branch bank of Virginia, located at Fredericksburg, and held that situation until his death.

MILLER, William, the author of *Millerism*, familiarly known, like the founder of Mormonism, as *The Prophet*, was a plain, uneducated, religious zealot, who was born in Pittsfield, Massachusetts, in 1771. Of his early life we have no important record. He seems not to have been distinguished from his fellow-men by anything remarkable, except that he was an honest man and good citizen. When war between the United States and Great Britain was kindled in 1812, M. was captain of a company of volunteers on the northern frontier, and did good service at Sacketts Harbor, Williamsburg and Plattsburg. When peace came he resumed his farm labors, and we hear nothing more of him until about 1826, when, almost simultaneously with Joe Smith's annunciation of his pretended visions, M. began to promulgate his peculiar views concerning prophesy. It was not until 1833, that he commenced his public ministry on the subject of the approaching Millenium. Then he went forth from place to place throughout the Northern and Middle States, boldly proclaiming the new interpretation of Scripture, and declaring that Christ would descend in clouds, the true saints would be caught up into the air, and the earth would be purified by fire, in 1843. No doubt the aged zealot was sincere. He labored with great fervor; and during the ten years of his ministry he averaged a sermon every two days. As the time for the predicted consummation of all prophesy approached, his disciples rapidly increased. Hundreds and thousands embraced his doctrine, withdrew

from church-fellowship, and banded together as *The Church of Latter Day Saints.* Other preachers appeared in the field. The press was diligently employed; and an alarming paper, called *The Midnight Cry,* was published in New York, embellished, sometimes, with pictures of hideous beasts, and the image seen by the Babylonian Emperor in his dream; at others with representations of benignant angels. The office of that publication was the head-quarters of the deluded sect, and the receptacle of a large amount of money continually and bountifully contributed by the disciples, even up to the very evening before "the last day," in the autumn of 1843. The excitement became intense. Many gave up business weeks before. Some gave away their property to the managers of the solemn drama. Families were beggared, and scores of weak men and women were made insane by exeitement, and became inmates of mad houses. The appointed day passed by. In the course of a few weeks the exeitement subsided, and soon the rushing torrent of delusion dwindled into an almost imperceptible rill. M. acknowledged his error, and seldom preached about the Millennium. He died at Hampton, Washington County, New York, on the 29th of Deeember, 1849, seventy-eight years of age.

MILNOR, James, was the son of Quaker parents, and was born in Philadelphia on the 20th of June, 1773. He was educated partly in the Philadelphia Academy, and partly in the University of Pennsylvania. To relieve his father of heavy expenses on his account, James left the University before taking his degree, and at the age of about sixteen years, commenced the study of law. He was admitted to the bar in 1794, before he was quite twenty-one years of age, and commeneed practice in Norristown. There, among a preponderating German population, he was very successful, he having acquired a knowledge of the language at an early age. After remaining there three years, he returned to Philadelphia, and, in 1799, married. That ceremony having been performed by "a hireling priest" (the bride was an Episcopalian, by education), eontrary to the discipline of Friends, M. was disowned, and his membership in the Society eeased forever. In the year 1800, he was chosen a member of the city eouneil. He held the same position from 1805 until 1809; and during the latter year, he was its President. He was extremely popular among all classes; and in 1810, he was elected to a seat in Congress by the Federal vote in his district. There he remained until the spring of 1813, and was a steady and consistent opponent of the war, and the belligerent measures of the Administration. He took a prominent part in the debates; and on aceount of a report of one of his speeches, which appeared in a Philadelphia paper, Henry Clay, then Speaker of the House, challenged him to fight a duel. M. bravely refused, first because Mr. Clay had no right to call him to account for his public acts, and secondly because he was opposed, in principle, to the cowardly practice of duelling. There the matter ended, and in after years, when he was an eminent minister of the Gospel, he and the great statesman met on the most friendly terms. When his term of service in the national council had ended, he abandonded the legal profession and prepared for entrance upon the Gospel ministry. He was admitted to the communion by Bishop White, and was ordained a deacon by that excellent prelate, in August, 1814. Twelve months afterward he was ordained a presbyter, and labored for about a year as an assistant minister in the Associated Churches, in Philadelphia. In 1816, he was ealled to the rectorship of St. George's Church, in New York, and eommenced his long and useful labors there in September of that year. He was extremely active in the promotion of schemes of Christian benevolence. He was one of the founders of the American Tract Society, in 1824, and continued to be one of its most active members until his death. The Institution for the Deaf and Dumb; the Orphan Asylum; the Home for aged indigent Females, and many kindred institutions, felt his fostering care. He died on the 8th of April, 1845, in the seventy-second year of his age.

MITCHILL, Samuel L., was a native of North Hempstead, Queen's county, Long Island, where he was born of Quaker parents, on the 20th of August, 1764. He was educated by private tutors, supplied chiefly by his maternal uncle, Dr. Samuel Latham. Young M. ehose the medieal profession as a life-pursuit, and eommenced study with his unele. In 1780, he was placed under the instructions of Dr. Samuel Bard, and after a little more than three years, he went to Edinburgh, in Scotland, then the seat of science, in Great Britain. There he had Thomas Addis Emmet and Sir James M'Intosh for his elass-mates and friends; and when he left the institution, he bore its highest honors. The fame of his aequirements preceded him, and when he returned home he was received into the first intellectual circles of New York. The Faculty of Columbia College gave him the degree of Master of Arts. For awhile he turned his attention to constitutional law, with the intention of engaging in legislative duties. In 1788, he was one of the commissioners who treated with the heads of the Six Nations, at Fort Stanwix (now Rome), and obtained from them the cession of Western New York. In the meanwhile he practiced his profession, and was indefatigable in his study of the natural scienees. In 1790, he was elected to a seat in the New York Legislative Assembly; and, in 1792, he was chosen Professor of Chemistry, Natural Sciences, and Agriculture, in Columbia College. He was then considered the best naturalist and practieal chemist, in America. In 1796, he made his famous report of a mineralogical survey of the State of New York; and the following year he commenced the publication of the *Medical Repository,* of whieh he was chief editor for sixteen years. He was the founder (and a long time president) of the Lyceum of Natural History, of New York; and he took a great interest in the New York Historieal Society, and kindred institutions. For about twenty years, M. aeted as one of the physieians of the New York Hospital. Notwithstanding his immense labors in the field of seientific research, and his voluminous publications upon almost every variety of subjects, he found time to mingle in political strife, and share in the labors and honors of offieial station. He represented the city of New York, in Congress, six consecutive years, and was afterward United States Senator. He was possessed of vast and varied knowledge; and yet, because he sometimes advanced opinions of which the world had not yet dreamed, he was sneered at by the sciolist, and ridiculed by shallow upstarts in scienee. He was thoroughly appreciated in Europe, where almost every literary and scientific institution thought it an honor to enrol his name upon its list of members. He died on the 7th of September, 1831, in the sixty-seventh year of his age.

MONTGOMERY, Richard. In September, 1759, the accomplished General Wolfe perished in the arms of victory on the plains of Abraham, at Quebec, at the early age of thirty-two years. Near him, when he fell, was a handsome young soldier, ten years his junior, who, a little more than sixteen years later, was the commanding general in a siege of the same city, and also perished in the midst of his troops. That young soldier was Richard Montgomery, who was born in the north of Ireland, in 1736, and entered the British army at the age of twenty years. After the conquest of Canada, he was in the campaign against Havana, under General Lyman; and at the peace in 1763, he took up his residence in New York. He finally left his regiment, returned to England, and made unsuccessful attempts to purchase a majority. He sold his eommission in 1772, came to America, and purchased a beautiful estate on the Hudson, in Dutehess county, New York. He soon afterward married a daughter of Robert Livingston. It was a happy union,

but those dreams of long years of domestic peace were soon disturbed by the gathering tempest of the Revolution. M., with all the ardor of the people of his birth-land, espoused the patriot cause, joined the army under General Schuyler, destined for the invasion of Canada, and was second in command, in the autumn of 1775, bearing the commission of a brigadier. Illness of the chief devolved the whole duty of leadership upon M., and he went on successfully until St. John, Chambly, and Montreal were in his power. Congress gave him the commission of major-general, and amid the snows of December, he pressed forward to join Arnold in an assault upon Quebec. For three weeks he besieged that city; and early on the morning of the 31st of December, while snow was fast falling, an attempt was made to take the town by storm. M. was killed while leading a division along the shores of the St. Lawrence, beneath the precipitous Cape Diamond. Arnold was also wounded at another point of attack, and the great object of the expedition failed. For forty years the remains of M. rested within the walls of Quebec. At the request of his widow, in 1818, they were disinterred, conveyed to New York, and placed beneath a mural monument, erected by order of Congress, on the external wall of the front of St. Paul's church, in that city. Millions of people, passing along Broadway, have looked upon that monument, the memorial of one whose praises were spoken in Parliament by the great Chatham and Burke, and of whom Lord North said, "Curse on his virtues; they have undone his country." He was in the fortieth year of his age when he fell.

MORGAN, Daniel, was of Welsh descent, and was born in Pennsylvania, in the year 1736. His family were in humble circumstances, and his education was only such as could be acquired at an ordinary country school, at that time. At the age of seventeen he wandered into Virginia, and there became a wagoner for one of the wealthy planters in Frederick county. He owned a team when Braddock marched to the fatal field of the Monongahela, and he accompanied that expedition as a bearer of supplies. For alleged insult to a British officer, he received five hundred lashes almost without flinching. A few days afterward the officer became convinced of the injustice of the charge, and apologized to young M. in the presence of the whole regiment. In 1756, M. was commissioned an ensign in the provincial army, because of his military skill and service in the former campaign, and then he first became acquainted with Washington. From that time until the Revolution commenced, he was much in service against the Indians; and tradition tells a hundred tales of his great daring. In 1774, he owned a fine farm in Frederick county, and that year he was in Dunmore's expedition beyond the Alleghanies. In May, 1775, Congress appointed him a captain, and in less than a week thereafter, ninety-six men—the nucleus of his celebrated rifle corps—were enrolled under his banner, and were on their way to Boston. He led the van of Arnold's wonderful expediton from the Kennebeek to the St. Lawrence, in the autumn of 1775; and in the siege of Quebec, he led the forlorn hope of Arnold's division. When Arnold was wounded there, M. took eommand, fought desperately, and was made prisoner. When exchanged, he was eommissioned a colonel in the Continental army, and from that time Washington considered M.'s rifle corps the right arm of his forces. He was the chief instrument in the capture of Burgoyne, in the autumn of 1777. He received the commission of brigadier, and was one of the most active officers in the Southern campaigns. His military glory eulminated when, on the 17th of January, 1781, he defeated the British, under Tarleton, at the Cowpens, west of the Broad river, in South Carolina. For that achievement Congress awarded him the thanks of the nation, and a gold medal. In consequenee of the infirm state of his health, he then left the service, and retired to his farm, where he devoted himself to agricultural pursuits. Washington desired him to be placed at the head of the expedition against the Western Indians, in 1791, but St. Clair was chosen. In 1794, he commanded the troops in Western Pennsylvania, designed to secure the power over the whiskey insurgents, obtained by General Lee. He was elected to Congress the same year, where he served two sessions. He removed to Winchester, Virginia, in the year 1800, where he expired, on the 6th of July, 1802, in the sixty-sixth year of his age.

MOTTE, Rebecca, was the youngest daughter of Robert Brewton, who emigrated to America in 1733. He made Charleston his residence, and there Rebecca was born on the 28th of June, 1738. At the age of twenty, she married Jacob Motte, a descendant of one of the Huguenot families of South Carolina. He owned a fine plantation near the banks of the Congaree, and there M., the mother of six children, and a widow, resided during the War for Independenee. After the fall of Charleston, in 1780, the British commander sought to hold military possession of South Carolina, by establishing fortified camps in the interior. The fine mansion of M. was taken possession of, fortified for the purpose, and named Fort Motte. The garrison was commanded by Major McPherson, in May, 1781, when Marion and Lee appeared and commenced a siege. M. had been driven from her mansion by the British, and had taken up her abode in her farm-house, whither her mother (who resided with her) had carried a beautiful bow and bundle of arrows, presented to her son by an East India captain. Having but one cannon, the Americans could make but little impression on the British works. Lee's fertile mind conceived the idea of dislodging the enemy by burning the mansion, that aet to be effected by hurling ignited combustibles upon the dry roof, by means of arrows. He suggested the plan to M. She heartily approved of it, notwithstanding it involved the destruction of her property; and she presented Lee with the East India bow and arrows, for the service. The hoped-for result was aceomplished; and after the British had surrendered, M. regaled the officers of both armies with a sumptuous dinner. One of her daughters married General Thomas Pinckney, one of the most valuable officers of the South. M. lived, greatly beloved by all, until the year 1815, when she died, at the age of seventy-seven years.

MUHLENBERG, Peter, was a native of Trappe, a village in Montgomery county, Pennsylvania, where he was born on the 1st of October, 1746. He was the son of Dr. Melchoir Muhlenberg (the founder of the Lutheran Church in America), and the daughter of Conrad Weiser, the great Pennsylvania Indian agent. Peter was educated for the ministry, partly in this eountry, and partly in Europe. He was ordained in 1768, and commenced his pastoral labors in Western New Jersey the following year. He was called to the eharge of a congregation in Virginia, in 1771, and it being necessary to obtain ordination from an English Bishop, before he could enter upon his duties there, he went to London for the purpose, at the beginning of the following year. He and Mr. (afterward Bishop) White were ordained at the same time. On his return, he became minister of the parish of Woodstoek, Virginia, and was soon an aeknowledged leading spirit of that seetion among those who opposed British aggressions. He was chairman of the eommittee of safety in that county, in 1774, and was elected to a seat in the House of Burgesses. At the close of 1775, he was appointed colonel of a Virginia regiment, and, relinquishing his pastoral duties, he joined the army, and was in the battle at Charleston, in June, 1776. Congress eommissioned him a brigadier, in February, 1777, and he was ordered to take charge of all the Viginia Continental troops. He joined the army, under Washington, at Middlebrook, in May, and was with the chief in all his movements from that time until 1779—

Brandywine, Germantown, White Marsh, Valley Forge, and Monmouth. He was with Wayne at the capture of Stony Point, in July, 1779, and was very active afterward, in Virginia, until the capture of Cornwallis, in the autumn of 1781. He was a brave participator in that last great battle of the Revolution. At the close of the war he was promoted to major-general, and removed to Pennsylvania. He never resumed his ministerial labors, but served his native State in several civil offices. He was a member of the first and third Congress, after the organization of the Federal Government, and was also a United States Senator in 1801. He was appointed supervisor of the revenue of Pennsylvania in the same year; and, in 1802, he was made collector of the port of Philadelphia. In that office he remained until his death, which occurred at his country-seat, near Philadelphia, on the 1st of October, 1807, when he was precisely sixty-one years of age.

NELSON, Thomas, Jr., was born at Yorktown, Virginia, on the 26th of December, 1738. According to the common practice among the wealthy, in Virginia, at that time, he was sent to England to be educated, where he remained until 1761, when he returned home. He first appeared in public life in 1774, when he was elected a member of the House of Burgesses, of Virginia, and he was one of eighty-nine members of that assembly who, when dissolved by the royal governor (Dunmore), met at the Raleigh tavern, organized, and appointed delegates to the first Continental Congress. He was a member of a provincial convention held in the spring of 1775, in which Patrick Henry uttered those sublime words, "Give me liberty or give me death!" and was one of the boldest patriots therein. He was elected to a seat in the Continental Congress, in 1775, and the following year he signed the Declaration of Independence. In 1777, severe and protracted illness compelled him to resign his seat and return home. By activity in military life, for awhile, N.'s health was improved, and he was again elected a delegate to Congress, in 1779. But ill health compelled him to resign in April following. When British depredators by land and sea menaced that portion of the country, N., at the head of the militia of Lower Virginia, was active in its defence. In 1781, he succeeded Jefferson, as governor of the State; and in both civil and military capacities, he was exceedingly active and efficient. He even pledged his private fortune as security for the State, in order to raise funds to keep the militia in the field; and the combined French and American armies found him a powerful auxiliary in the siege of Yorktown, in the autumn of 1781. During that siege, his own fine mansion, situated within the enemy's lines, was occupied by British officers. He observed that in the storm of balls which the besiegers were pouring upon the town and the British works, his own house was spared. He begged the cannoniers not to regard his property with favor, and actually directed a piece himself, so that the balls would fall upon his mansion. It had the effect to drive the officers from that strong retreat, and no doubt hastened the surrender of Cornwallis. The remainder of his days were spent in quiet, alternately at his mansion in Yorktown, and upon his estate at Offley. He died at the former place on the 4th of January, 1789, in the fifty-third year of his age.

OTIS, Harrison Gray, was a son of Samuel A. Otis, who, for about twenty-five years, was clerk of the Senate of the United States. Harrison was born in 1765. He was graduated at Harvard University, at the age of eighteen years. He had been a successful student, and he then entered upon the study of law with a preparation possessed by few young men. Before he was twenty-one years of age he had commenced his successful career as a practitioner. He soon stood foremost at the bar with such men as Parsons, Lowell, Gore, Cushing, Paine, Ames, Cabot, and other distinguished lawyers of New England, and was excelled by none of them in acuteness as an attorney, and in impressive and graceful oratory as an advocate. In 1797, O. represented the Suffolk (Boston) district in the Federal Congress, as the successor of Fisher Ames; and he held that station until 1801, when the Republicans came into power under the leadership of Mr. Jefferson. For many years he was a member, alternately, of both branches of the Massachusetts legislature, and, at different times, he was the presiding officer of both Houses. O. was chosen United States Senator, in 1817, and his course in that body during the exciting scenes preceding the admission of Missouri into the Union as a sovereign State, won for him the highest applause of his constituents. After five years service there he retired. He was nominated for governor, in 1823, but was defeated. After filling several local offices (judge of the Court of Common Pleas, mayor of Boston, and others of less note), O. withdrew from public life, in the full enjoyment of his intellectual vigor. He died in the city of Boston, on the 28th of October, 1848, at the age of about eighty-three.

PAINE, Robert Treat, was born at Taunton, Massachusetts, on the 9th of December, 1773, and was the second son of Robert Treat Paine, one of the signers of the Declaration of Independence. He was named Thomas, but on the death of his eldest and unmarried brother, Robert Treat, in 1798, he assumed his name, and had his choice legally confirmed by an act of the legislature, in 1801. P. was educated at Harvard, where his poetic genius was early developed. He was intended for the profession of the law, but soon after leaving college he became a merchant's clerk. He was quite irregular in his habits, and became greatly enamored of the theatre. He obtained a medal for a prologue, spoken at the opening of the new theatre in Boston, in 1793; and the following year he assumed the editorial control of a newspaper called the *Federal Orerry*. It was an unsuccessful enterprise, for the editor was idle, and it expired for want of proper food, in 1796. Paine had married the beautiful daughter of an actor, the year before, which offended his father, and an alienation ensued. In 1795, P. delivered a poem at Cambridge, entitled *Invention of Letters*, for which he received from the book-seller $1500. Two years afterward, his *Ruling Passion* brought him $1200; and his *Adams and Liberty*, written in 1798, at the request of the Massachusetts Charitable Fire Society, yielded him $750, or more than $11 a line. P. was appointed master of ceremonies at the theatre, with a salary, and that connection threatened his health and reputation with shipwreck. A happy change soon occurred. He abandoned dissipation, and, on the solicitation of friends, he left the theatre, moved, with his family, to Newburyport, entered the law-office of Judge Parsons, became a practioner, enjoyed reconciliation with his father, and gave his friends great hopes. In 1803, when fortune and bright character were within his grasp, he was again allured to the theatre, its associations and his habits, and he fell to rise no more. He neglected business, became intemperate, and died in wretchedness, on the 14th of November, 1811, when in the thirty-eighth year of his age.

PATTERSON, Robert M., was born in Philadelphia, in 1787, was educated at the University of Pennsylvania, and at an early age was graduated there, as a physician. He pursued medical studies in Europe, for several years, and returned to his native city in 1812, with the intention of engaging in his profession there. Being immediately appointed Professor of Natural Philosophy in the medical department of the University, and soon afterward of Mathematics and Natural Philosophy in the classical department, he was diverted from practice. At the age of twenty-seven years he was elected Vice-Provost of that institution. Having paid much attention to the science of engineering, he was invited by the Committee of Safety of Baltimore, in

1813, to lay out and superintend the construction of fortifications there, the city being menaced by the British. He performed the duty so satisfactorily, that he won a public vote of thanks. For fourteen years P. remained a professor in the University, and was always distinguished for extensive and varied scientific attainments. In 1828, he accepted an invitation to occupy the chair of Natural Philosophy in the University of Virginia. After seven years' service there, President Jackson appointed him Director of the United States Mint. He held that responsible station during several administrations, until 1851, when rapidly declining health compelled him to resign. He died at Philadelphia, on the 5th of September, 1854, sixty-seven years of age.

PEALE, Charles Wilson, was born at Charlestown, Maryland, in 1741, and in Annapolis he successively learned the trades of saddler, watch-maker, silver-smith, and carver. He studied art and practiced his mechanical trade, until an opportunity offered for him to go to England and place himself under the tutorship of the great West. He remained with that famous artist during the years 1770, and 1771, when he returned to America, and practiced his art, as a portrait-painter, without a rival for fifteen years. When the Revolution broke out, he joined the army, and was at the head of a company in the battles at Trenton, Brandywine, Germantown, and Monmouth. While at Valley Forge, in the Winter of 1777–'8, he conceived the grand design of making a gallery of portraits of all the distinguished actors in the Revolution, American and foreign, and commenced the task with vigor. In the spring of 1778, when the army moved, he gathered up his art materials, and, at the head of his company, he fought gallantly at Monmouth. He had commenced a full-length portrait of Washington, at Valley Forge; after the Monmouth battle, he had another sitting, and at Princeton he completed it. He lived temperately and frugally, and practiced his art in colors when past eighty years of age. He died in February, 1827, at the age of almost eighty-six.

PEIRCE, Benjamin, was born at Salem, Mass., April 4, 1809, and graduated at Harvard College, at the age of twenty years. He became a tutor there in 1831; university professor in mathematics and natural philosophy in 1833; and Perkins professor of astronomy and mathematics in 1842, in which position he continued until his death, a period of thirty-eight years. In 1849, P. was appointed consulting astronomer to the *American Ephemeris and Nautical Almanac*. He was one of the scientific council to which was intrusted the organization of the Dudley Observatory, at Albany, in 1855. He assisted Prof. Bache in the coast survey and rendered valuable aid in this great national work for several years. In 1867 he succeeded Prof. Bache as Superintendent of the coast survey, but resigned the office in 1874. P.'s labors in the realm of science were incessant and most valuable. While he was a pupil of Dr. Bowditch, he read the proof-sheets of the translation of La Place's *Mecanique Celeste*. He undertook the publication of the "Cambridge Miscellany of Mathematics, Physics, and Astronomy," of which only five numbers appeared. Between 1836 and 1846 he prepared a series of mathematical text-books which are used in Harvard College. His Boston lectures on the comet of 1843 aroused an interest which led to the foundation of the observatory at Cambridge; and his investigations relating to the discovery of Neptune by Leverrier, in 1846, attracted the attention of astronomers in Europe and America, and proved him to be a thinker of extraordinary power. Died at Cambridge, Mass., Oct. 6, 1880.

PETERS, Richard, the first Secretary of War of the United States, was born near Philadelphia, on the 22d of August, 1744, and was educated at the college in that city, where he was graduated in 1764. At the opening of the Revolution he appeared in the field as captain of a company of volunteers; and when, in June, 1776, a Board of War was appointed by Congress, P. was chosen its Secretary, and thus became the first incumbent of that office, now one of the cabinet bureaus. He held that position until 1781, and performed the duties of his station with great ability. He was then elected a member of Congress, and was a representative of his State therein for several years. On the organization of the Federal Government, in 1789, he declined a fiscal office tendered to him by Washington, but accepted that of judge of the United States District Court of Pennsylvania. He bore the ermine with great honor to himself and country, for thirty-six years. He died at Bloekley, near Philadelphia, August 21, 1828, eighty-four years of age.

PHYSIC, Philip Syng, who has been appropriately called the *Washington*—the Hero and Sage—of the medical profession, was born in Philadelphia, on the 7th of July, 1768. His father had been keeper of the great seal of the colony of Pennsylvania; and, prior to the Revolution, he had charge of the estates of the Penn family, as confidential agent. At eleven years of age, Philip was placed under the charge of Robert Proud, principal of an academy that belonged to the Society of Friends, and in due time entered the University of Pennsylvania, as a student. He was graduated in 1785, and immediately commenced the study of medicine with the distinguished Professor Kuhn. After attending a course of medical lectures at the university, he embarked for Europe, in the autumn of 1788, in company with his father, who procured the admission of Philip to the private instruction of the eminent Dr. John Hunter. On the earnest recommendation of Dr. Hunter, P. was appointed house surgeon to St. George's Hospital, in 1790, to serve one year. At the close of the term he received a diploma from the Royal College of Surgeons, in London, and Dr. Hunter offered him a professional partnership. The young man had resolved to make his native city the chief theater of his career, and after remaining with Hunter during 1791, he went to Edinburg, studied and observed diligently there, in the University and in the Royal Infirmary, obtained the degree of M.D., in May, 1792, and in September, returned to America. He entered upon the practice of his profession, in Philadelphia. In 1793, the yellow fever tested his skill, moral courage, and benevolence, to the utmost, and all appeared eminently conspicuous. The following year he was chosen to be one of the surgeons of the Pennsylvania Hospital; and, when the yellow fever again prevailed, in 1798, his services were of the greatest importance. In 1801, he was appointed surgeon extraordinray to the Philadelphia Almhouse Infirmary. The following year, on the earnest request of a number of medical students, he delivered a course of lectures on Surgery. In 1805, a professorship of surgery, distinct from anatomy, was instituted in the University of Pennsylvania, and P. was called to that chair. In 1819, he was transferred to the chair of anatomy, in the same institution. In 1821, he was appointed consulting surgeon to the Philadelphia Institution for the Blind; and, in 1824, he was elected president of the Philadelphia Medical Society, a station which he filled with great dignity until his death. In 1825, the French Royal Academy of Medicine made him an honorary member of that institution, the first dignity of that kind ever received by an American. He was also made an honorary fellow of the Royal Medical and Chirurgical Society of London. In 1831, failing health caused him to resign his professorship in the University, when he was immediately elected Emeritus Professor of Surgery and Anatomy, in that institution. He died, December 15, 1837, sixty-nine years of age.

PICKERING, Timothy, was born in Salem, Mass., July 17, 1745. At fourteen years of age, he entered Harvard

College, and was graduated at nineteen. He studied law, and entered upon its practice at the moment when the tempest of popular indignation, raised by the Stamp Act, was sweeping over the land. He had the honor of making the first resistance to the invasion of the province by British troops. He was informed that a body of them had landed at Marblehead, for the purpose of marching through Salem to seize some American stores in the interior. It was Sunday, the 25th of February, 1775. The ministers of the churches dismissed their congregations. The men gathered at the call of P., and when the invaders approached the Salem drawbridge, these minute-men boldly confronted them. Perceiving prudence to be the better part of valor, the British marched back to Marblehead, and returned to Boston. Early in the spring of 1775, P. was chosen judge of the Court of Common Pleas, of Essex; and when, on the 19th of April, intelligence of the skirmish at Lexington reached him, he hastened, at the head of his regiment, to intercept the invaders. After that he exercised the duties of his judgeship, until the autumn of 1776, when, at the head of seven hundred Essex men, he joined the army under Washington, near New York, and was with him in his memorable retreat across the Jerseys. He continued with the chief until the winter of 1777–'8, when he was appointed, by Congress, a member of the Board of War. In the battles at Brandywine and Germantown, he had acted as adjutant-general, and his military skill and experience commended him highly to his commander and the national council. In 1780, he succeeded General Green in the important office of quartermaster-general. At the close of the war he made Philadelphia his residence. In 1790, he was a member of the convention to revise the constitution of Pennsylvania; and the following year Washington appointed him Postmaster-general. He continued in that office until the resignation of General Knox, almost four years afterward, when he succeeded that officer as Secretary of War. The same year he was appointed Secretary of State, and held the position until 1800, when Mr. Adams removed him. The legislature of Massachusetts chose him to represent that State in the United States Senate, in 1803; and, in 1805, he was re-elected for six years. He was a member of the Board of War, of Massachusetts, in 1812, and, in 1814, he was elected a member of the United States House of Representatives. He retired from public life, in 1817. Died at Salem, January 29, 1829, when almost eighty-four years of age.

PIERCE, Benjamin, the father of the fourteenth President of the United States, was born in Chelmsford, Massachusetts, on Christmas day, 1757. At seventeen years of age, six days after the retreat of the British troops from Concord, he was enrolled as a regular soldier. He fought bravely on Breed's Hill seven weeks afterward· was with the army about Boston until the British were driven from thence, in the spring of 1776; followed the fortunes of Washington during the ensuing campaigns of that year, and was orderly sergeant of his company, before he was twenty years of age, in the glorious conflicts which resulted in the capture of Burgoyne at Saratoga, in the autumn of 1777. His valor there won for him the commission of ensign. The young man who bore that commission and the American flag, in the hottest of the fight, was killed. Young P. rushed forward, seized the banner, and bore it triumphantly to the American lines, amid the shouts of his companions. He remained in service during the whole war, and reached the rank of captain. When the American troops entered the city of New York, in the autumn of 1783, P. commanded the detachment sent to take possession of the military works at Brooklyn. About 1789, he was elected to a seat in the New Hampshire legislature, and was promoted to the command of a regiment. When, in 1798, Congress authorized the raising of a provisional army, in expectation of war with France, P. was offered the same commission in the regular service, but he declined it. In 1803, he was elected to the council of his State, and retained that office by re-election until 1809, when he was appointed sheriff of the county of Hillsborough. The governor had already commissioned him a brigadier-general of the militia. In 1827, he was chosen governor of New Hampshire; and, in 1829, he was again called to the same station. Three years afterward he held his last public office. It was in the autumn of 1832, when he was chosen, by the democratic party, a presidential elector. He died on the 1st of April, 1839, in the eighty-second year of his age.

PINCKNEY, Thomas, was born at Charleston, on the 23d of October, 1750, and at three years of age was taken to England, and there educated. In early boyhood he felt a martial spirit stirring within him. It grew with his growth, and his studies were almost exclusively military, on his arrival home. He became a thorough tactician in theory, and, on the organization of a military force in his native city, he was intrusted with the command of a company. He was a rigid disciplinarian, yet his men all loved him. He soon rose to the rank of major, and was very active in recruiting and disciplining the militia, until the arrival of General Lincoln in 1779, as commander-in-chief of the Southern army. Lincoln appointed P. one of his aids, and in that capacity he was engaged in the siege of Savannah, in the autumn of that year. Several months previously, he had gained great applause for his gallantry in the battle at Stono Ferry, just below Charleston. He was not among the captives at Charleston, in May, 1780; and when Gates took command of the Southern army, P. was appointed his aid. He fought gallantly at the battle near Camden, in August, and there had his leg badly shattered by a musket ball. He could not retreat, and was made a prisoner and sent to New York. His wound disabled him during the rest of the war, and he remained in private life until 1787, when he was elected to succeed General Moultrie as governor of South Carolina. He displayed statesmanship of the highest order; and, in 1792, President Washington appointed him minister plenipotentiary to the British court. He managed the complicated and important affairs of his mission with great skill. Toward the close of 1794, he was appointed minister to Spain, and took up his residence at Madrid the following year. He soon afterward concluded a treaty with the Spanish court, by which the free navigation of the Mississippi was secured to the people of the United States. He returned home the following year, to attend to his domestic affairs, and remained in private life until the proclamation of war with Great Britain, in 1812, called many a veteran hero to the field. President Madison appointed P. to the command of the Southern Department, and it was under his directions that General Jackson successfully prosecuted the war with the Indians. His forecast and generosity opened to Jackson that military career which he pursued so gloriously. He died on November 2, 1828, when a little more than seventy-eight years of age.

PINKNEY, William, was one of the most profound and brilliant of the orators and statesmen of his age, and equally renowned as a diplomatist. He was born at Annapolis, Md., March 17, 1764. He was admitted to the bar at the age of twenty-two years, and soon afterward he commenced the practice of his profession in Hartford county, Maryland. In 1792, he was elected to a seat in the executive council of Maryland; and, in 1795, was chosen a delegate to the State legislature. The following year, President Washington appointed him one of the commissioners under the provisions of Jay's treaty, and he proceeded to England. He performed his arduous and varied duties with great ability and success. Soon after his return to America, in 1805, he removed to Baltimore, and was appointed attorney-general of

Maryland. In 1806, he was again sent to England to treat concerning the impressment of American seamen into the British service, and other matters which finally resulted in war. After remaining in Europe several years, he returned in 1811, and became one of the most ardent supporters of Mr. Madison's administration. He was chosen a member of the Maryland Senate, and toward the close of 1811, President Madison appointed him attorney-general of the United States. He went to the field in defence of his native State, in 1814, and fought the British bravely at Bladensburg. He was soon afterward elected to Congress; and, in 1816, he was appointed minister to the court of St. Petersburg. There he remained until 1820, when he returned home, and was immediately chosen to a seat in the United States Senate. In that body, and in the Supreme Court of the United States, he labored intensely until the close of 1821, when his health suddenly gave way. He died on the 25th of February, 1822, in the fifty-ninth year of his age.

PORTER, David, was born in Boston, on the 1st of February, 1780. He had early manifested a great desire to become a sailor; and, at the age of nineteen years, that ardent aspiration was fully gratified. His talent and general energy of character attracted the attention of some influential friends, who procured for him a midshipman's warrant; and at the time when war with France was yet a probability, he sailed in the frigate *Constellation*. His first experience in naval warfare was during that cruise, when the *Constellation*, in February, 1799, captured the French frigate, *L'Insurgente*. His gallantry on that occasion was so conspicuous, that he was immediately promoted to lieutenant. He was also engaged in the severe action with *La Vengeanee*, a year later; and, in the autumn of 1803, he accompanied the first United States squadon to the Mediterranean, sent thither to protect American commerce against the Barbary pirates. He was on board the *Philadelphia*, when that vessel struck upon a rock in the harbor of Tripoli, and was among those who suffered a painful imprisonment in the hands of that barbarous people. After that [1806] he was appointed to the eommand of the brig *Enterprise*, and cruised in the Mediterranean for six years. On his return to the United States he was placed in eommand of the flotilla station in the vieinity of New Orleans, where he remained until war was declared against Great Britain, in 1812. Then he was promoted to captain; and, in the frigate *Essex*, he achieved, during the remainder of that year, and greater part of 1813, those brilliant deeds which made him so famous. From April to October, 1813, he captured twelve armed British whale-ships, with an aggregate of one hundred and seven guns, and three hundred men. He also took possession of an island of the Washington group, in the Pacific, and named it Madison, in honor of the then President of the United States. The English sent a number of heavy armed ships to capture or destroy P.'s little squadron; and near Valparaiso, on the coast of Chili, the *Essex* was captured, in February, 1814, after a hard-fought battle with immensely superior strength. Commodore P. wrote to the Secretary of the Navy, "We have been unfortunate but not disgraced." When he came home he was every where received with the highest honors. Congress and the several States gave him thanks, and by universal aeclamation he was called the Hero of the Pacific. He afterward aided in the defence of Baltimore. When peace came, he was appointed one of the naval commissioners to superintend national marine affairs. In 1817, he commanded a small fleet, sent to suppress the depredations of pirates and freebooters in the Gulf of Mexico, and along its shores. Commodore P. resigned his eommission in the summer of 1826, and was afterward appointed resident United States minister, in Turkey. He died near Constantinople, March 3, 1843, sixty-three years of age.

PRENTISS, Sargeant S., was a native of Portland, Maine, where he was born in 1810. He received an excellent classical eduеation, and at about eighteen years of age he went to Mississippi, where, in the vicinity of Natchez, he spent about two years as tutor in a private family, and in the pursuit of legal studies, under the instruction of General Felix Houston. P. was always remarkable, from boyhood, for fluency of language and ready wit; and his first speeeh to a jury, after being admitted to the bar, won for him the highest applause from judges, colleagues, and opponents. He made Vicksburg (then a small village) his residence, in 1830, and he soon became the acknowledged head of his profession in that region. His practice became very lucrative, and the payment of his fee, in land, for his successful management of a suit which involved the most valuable portion of Vicksburg, made him, in a short time, one of the wealthiest men in the State. P. entered the field of politics with great enthusiasm, and was a brilliant and successful stump orator; but at about the time when his fellow-citizens called him to service in the national counеils, he became embarrassed during the financial troubles of 1836, and removed to New Orleans to retrieve his fortune by professional labor. He first became known to the people of the United States, in general, when, in 1837, he appeared in the House of Representatives as the claimant of a disputed seat there. His speeeh in favor of his claim was listened to with the most profound attention, and it was admitted by all, that he had no superior in the country as an eloquent and logical parliamentary debater. His claim was rejected by the easting-vote of the Speaker, Mr. Polk, and he was sent back to the people. He at once canvassed the State, and was re-elected by an overwhelming vote. His services in the Hall of Representatives were brief, but brilliant in the extreme. Private engagements, and a distaste for political life, eaused him to refuse office, and with great industry he applied himself to his profession, in New Orleans. He died at Longwood, near Natchez, on the 1st of July, 1850, at forty years of age.

PRESCOTT, William, was born in Goshen, Massachusetts, in 1726. Of his early life we have no reliable record. He took quite an active part in the popular movements while the Revolution was ripening, and had command of a regiment of minute-men, in the spring of 1775. The events at Lexington and Concord called him to the field, and he was very active in assisting General Ward in the organization of the impromptu army that gathered around Boston, in May and June following. Confident in his military skill, General Ward selected Colonel P. to fortify and garrison Bunker's Hill, and on the evening of the 16th of June, 1775, he crossed Charlestown Neck, for that purpose, with a thousand men, and intrenching tools, after an impressive prayer in their behalf was offered up on the green at Cambridge, by President Langdon, of Harvard College. Breed's Hill being nearer Boston, P. proceeded to fortify that, and at early dawn the next morning, the British in the city and on the shipping in the harbor, were astonished and alarmed by the apparition of a strong redoubt, almost finished, in a position which commanded their most impressible points. In the action that ensued, the following day—the memorable 17th of June—P. was chief eommander. Putnam was on Bunker's Hill, urging forward reinforeements, and General Warren was in the redoubt, as volunteer. Though driven from the Charlestown peninsula, the gallant colonel wished to attack the conquerors the next day, but was overruled by prudent eounsellors. He continued under the command of Washington until after the battle at White Plains; and served as a volunteer under Gates, until the surrender of Burgoyne, in October, 1777. After the war, he represented his district in the State legislature, and was acting magistrate of Pepperell from 1786 until his death, on October 13, 1795, at sixty-nine years of age.

MEMORABLE AMERICAN EVENTS AND STATISTICS.

CHICAGO FIRE. On October 7, 1872, a destructive fire broke out in Chicago, causing the loss of one million of dollars. On the 8th succeeded the most disastrous conflagration as yet recorded in the annals of the country. The second fire commenced on the Sunday evening of the 8th, and continued to rage until the noon of the following day. The lives lost are estimated at 250, persons rendered homeless, 98,500, and buildings consumed, 17,500; while the value of property destroyed stands at the enormous total of one hundred and ninety-two millions of dollars. The fire burnt up the business and best built portion of the city. Two thousand acres were left covered with ruins. So completely did the fire do its work that in not more than a dozen cases were the chimneys or fire-walls of the great blocks, or any of the buildings, left standing.

CHINESE LABOR. In 1883 a law was passed excluding newly-immigrating Chinese laborers from the country, and requiring those already established to take out certificates, if they quitted the U. S., in order to prove their identity in the event of return.

CIVIL RIGHTS BILL. In 1875 the Civil Rights Bill passed Congress. It provided that all citizens, regardless of race, color, or previous condition of servitude, should have equal privileges at inns, theatres and schools, and on railroad, steamboat, and other transportation lines. This was to enforce the Fourteenth and Fifteenth Amendments to the Constitution, its projectors claimed. The law was provoked by discriminations, chiefly in the late slave States, against the freedmen in travelling and at places of amusement. Bitter opposition to the measure was offered by Southern Congressmen, principally on the ground that it was an invasion of State Rights not warranted by the Constitution. A few years later some portions of the Bill were found by the U. S. Supreme Court to be unconstitutional.

CIVIL SERVICE. In March, 1871, Congress passed an Appropriation Bill and, by a clause in it, the President was authorized to prescribe such rules and regulations for the admission of persons into the Civil Service of the United States, as would best promote its efficiency, and ascertain the fitness of each candidate in respect to age, health, character, knowledge, and ability for the service into which he might seek to enter.

CREDIT MOBILIER. This scandal came to light in 1873, Mr. James G. Blaine bringing forth the following facts in the House of Representatives. No private contractors could be engaged to build the Union Pacific Railroad which Congress chartered in 1862. A corporation was therefore formed called the Credit Mobilier, of which the stockholders were for the most part stockholders of the railroad company. This new organization agreed to build the road in consideration of certain land grants and government bonds issued originally to the railroad company to assist its construction. The capital stock of the Credit Mobilier was $2,500,000, but, by subsequent legislation, this was increased fifty per cent., the addition being taken by the holders of the original stock. The Credit Mobilier then went to work, and built the road. The profits derived from the contract were so great that in the winter of 1867-8 the stock was estimated to have a value of $380 or $400 per share of $100. It was not, however, placed on the general market. All sales were private, which precluded a knowledge of the character of the scheme. In June, 1868, a dividend of $60 a share was declared. It came to light that during the winter one Oakes Ames, a Congressman from Massachusetts, had approached various Congressmen and Senators with dulcet and whispered offers of Credit Mobilier stock at the low figure of $100 per share. Some of these, including Schuyler Colfax, then Speaker of the House, purchased the stock, a few paying cash, the bulk giving notes. They afterwards alleged that they saw no impropriety in the purchase, any more than in any other investment. Upon inquiry, it appeared that the Pacific Railroad and Credit Mobilier Companies would not ask for any further legislation from Congress, and so most of the purchasers, if troubled with conscientious scruples, concluded that they might honorably retain the stock. Some of them, however, becoming mistrustful, returned it to Mr. Ames and took up their notes. But, while the corporations did not intend to ask for positive legislation, they were threatened by adverse legislation, to nullify which they desired to sway as many members as possible. Some popular dissatisfaction at the high rates of transportation charged by the Union Pacific induced Mr. Washburne of Wisconsin to introduce a bill into Congress to provide for their reduction. This was known as the 'Washburne Movement,' and was anticipated. A hint as to the profits enjoyed by the Credit Mobilier, led to a rumor that a portion of the land grants to the Union Pacific would be cancelled. An investigating committee was named by Congress, which expelled Oakes Ames, and castigated other members of the House. This scandal became a factor in subsequent national politics.

DOLLAR, SILVER. In 1878 Congress passed a bill requiring the coinage of two millions of dollars in silver dollars of 412½ grains each, monthly. This was the culmination of a movement that had been in progress for three or four years. When the inflationists found themselves unable to get a law for unlimited paper money they began to agitate for silver money. The silver dollar had been out of circulation during the war; and in 1873, a law was passed making gold the exclusive currency standard. Owing, however, to the depreciation of silver, the amount of the metal which went into a dollar was now worth only about ninety cents in gold. Remonetization of silver was therefore opposed by the old hard money class as a blow at the public credit, and President Hayes vetoed the silver bill when it was first enacted; but Congress passed it in the promptest manner over Hayes's veto.

EAST RIVER BRIDGE. On May 24, 1883, the East River Bridge connecting New York with Brooklyn was opened for travel. The general plan of this structure included a massive stone tower 276 feet 9 inches on each shore, and perforated for the roadways by two tall narrow arches beginning 119 feet up from the water; four steel wire cables, 16 inches in diameter, securely fastened in a mass of masonry 930 feet back from the water edge on the New York side, stretching up over the top of the towers across the river to the other tower, and then down to an anchorage 930 feet away, in Brooklyn, and a series of stout steel bands, or 'suspenders,' each capable of holding up 100 tons, attached to the cables and hanging down to support the promenade of the bridge. The main span is 1595 feet 6 inches long; the two land spans each 930 feet; the masonry viaduct, or approach, on the Brooklyn side 971 feet, and the New York approach 1562, making a total of about 6,000 feet. The approaches are about 100 feet wide, but the bridge proper is only 85 feet. It is divided lengthwise into five passage ways, the outward for teams, the next two for cars propelled by cables, and the innermost for foot passengers. From the ends to the centre, the structure rises in a gentle curve, and the middle of the bridge is 135 feet above water in summer, and, owing to contraction from cold, 138 feet in winter. This enables most large ships to pass under without lowering their topmasts. The bridge was designed by John A. Roebling, of Trenton, N. J., builder of the first suspension bridge at Niagara.

ELECTORAL COMMISSION. The presidential election of 1876 was followed by an exceptional and alarming controversy. The Republicans had nominated for President, Rutherford B. Hayes of Ohio, who, the previous year, had defeated William Allen in a contest for gubernatorial honors, on a hard-money platform. William A. Wheeler of New York, who had been instrumental in adjusting the Louisiana troubles was chosen for Vice-President. The Democrats nominated Samuel J. Tilden, then Governor of New York, and Thomas A. Hendricks of Indiana. Their platform condemned the use of troops in the South, and favored a reduction of the tariff. The Greenback party named Peter Cooper of New York, and Samuel F. Cary of Ohio as its candidates. The other parties favored hard money. For several days after the election in November the result remained in great doubt. Four States were finally disputed. The Returning

Board in Louisiana gave the Hayes ticket a majority of about 4,000, but secured that result by throwing out the vote from several parishes on account of intimidation of voters. The Democrats claimed that these returns should also be counted, which would give Tilden the State. In South Carolinia the returns were canvassed by the Legislature. Two bodies claiming to be such were organized. One found a plurality of about 800 for the Republican ticket; the other a smaller one for the Democratic ticket. In Florida, a similar dispute arose, the majorities claimed by both sides being scarcely over one hundred. Finally, in Oregon, which gave an unquestioned Republican majority, one candidate for presidential elector on the winning ticket was said by his enemies to be ineligible on account of having been postmaster when nominated. Governor Grover then proposed to give certificates of election to his two Republican colleagues, but to a Democrat, Cronin, in his stead. This situation derived the greater importance from the fact that the Democrats had 184 electoral votes in the country unquestioned, while the utmost claims of the Republicans gave them only 185. The change, therefore, of a single vote, would elect Tilden. This condition of things raised party excitement to white heat. The Tilden party shouted 'fraud' and seemed to believe that their honestly won prize had been stolen, while the Hayes party claimed that their returning boards had acted legally and honestly, and that the Oregon Democrats were practising wicked and dangerous games. The complication was increased by the fact that one party controlled each house in Congress; and as the electoral vote must be counted at a joint session of the two, and double sets of returns would come from four States, a quarrel was sure to arise in Congress which threatened to end disastrously. Impetuous Democrats talked of marching an army of volunteers to instal Tilden as President at all hazards. Revolution and civil war seemed imminent. The electoral dispute was considered by Congress when it met in December, and, after a few weeks, a bill was passed constituting a special tribunal to decide the mooted points when the count commenced in February. This tribunal consisted of five Senators appointed by the Vice-President (three Republicans and two Democrats), five Representatives appointed by the speaker (three Democracts and two Republicans), and five Judges of the Supreme Court. The Electoral Commission decided that the Louisiana returning board had only exercised powers clearly accorded by the State law, and that Congress could not go behind the returns to inquire whether that board had performed its duty honestly or otherwise. South Carolina and Florida were similarily disposed of; and all three States were counted for Hayes. The ineligibility of Watts in Oregon was not recognized, and the manner in which his electoral vote was cast for Hayes was declared legal. The count, therefore, when completed, gave Hayes 185, and Tilden 184, but it was not completed until two days before the time of inauguration. Revised returns gave the three disputed Southern States to the Democrats on the State tickets, and restored to that party a 'solid South.'

FENIAN RAIDS INTO CANADA. Two expeditions were organized by the Fenians in 1866 for the invasion of Canada and New Brunswick. One numbering about 500 men, gathered in April at Eastport, Maine, with an intention of making a descent upon the island of Campobello, belonging to New Brunswick. After a delay of some days, a schooner arrived from Portland with 750 stand of arms. The British Consul at this port complained, and the arms were seized by the U. S. government. A British war steamer anchored off Campobello, and troops were summoned to prevent the invasion of the Province, and a detachment of U. S. troops was sent from Portland to Calais, at which point many of the Fenians had congregated. General Meade arrived on the 19th of April, and took command of the U. S. troops. A few days later, the Fenians lost heart, as their friends in New York did not send support, abandoned the raid, and disintegrated.

On May 19, the U. S. authorities at Rouse's Point on the Canadian frontier seized 1,200 stand of arms. On the 30th, the Fenians convened at Buffalo, and met in secret convention. At St. Albans on the same day the U. S. authorities seized 1,200 stand of arms. The military enthusiasm of Canada was now roused, and troops were moved upon all the threatened points. It was on the first day of June that a force of some 1,200 to 1,500 Fenians crossed the Niagara River at Buffalo, in Canal boats, and took possession of Fort Erie, an old work then unoccupied. On the 2d, there was a skirmish between some Fenians and Canadian volunteers, in which several of the latter were reported killed and a large number wounded. On the night of the same day, the Fenians being without supplies, artillery or reinforcements, attempted to retreat into the United States, but they were intercepted by a United States gunboat, and 700 were arrested. General Barry, then in command of the U. S. forces in that vicinity, accepted a parole from over 1,300 of the Fenians, who promised to abandon the enterprise. The officers were relieved by giving bail that they would appear when required for trial for an infraction of the neutrality laws. Fenians, however, continued to arrive from various parts of the country, but were ordered to return home by their commanders. In accord with this movement at Buffalo, Fenians were reported as assembling on the border in Vermont, and Malone, New York, and General Meade, in command of the U. S. troops, proceeded to Ogdensburg to commence operations for preventing the invasion. On the 7th of June, the Fenians, numbering over 1,000, crossed the frontier and took possession of St. Armand, which had been evacuated by the Canadians. On the same day one of the chief officers of the Fenian organization in the United States was arrested at St. Albans, Vt., and three at New York, and several other leaders at Buffalo. On the 9th, upon the advance of the Canadians at St. Armand, the Fenians retired and recrossed the frontier. General Meade arrested large numbers of the Fenians, accepted their parole, and provided them with means of transportation, for all who required it, to their homes.

FRIDAY, BLACK. The events which have caused Friday, the 24th day of September, 1869, to be designated 'Black Friday,' stand out luridly in the annals of the financial centre of this great country. For some little time previous to this date, a feeling prevailed that speculating in gold, which had been extensively engaged in throughout the war, was rapidly drawing to a close, and that the country was in the near future to resume specie payments. In the spring of this year gold fell to 131, at which price a clique of speculators in New York purchased several millions, and then, inducing a number of newspapers to magnify the probability that difficulties would arise from the Alabama Claims, a European war, the Cuban insurrection, and various other troubles, they forced up the price to 145, and made an immense pile. Down again came the price to 131, and the belief gained foothold that it would drop to 120. It was at this crisis that a conspiracy was formed among several speculators to control an immense amount of gold and send up the price. The financial policy of the government requiring the payment of duties in gold continuously created an imperative and legitimate demand for it. This clique operated so 'smartly' that the price by Wednesday the 22d of September was pushed up to 141. Stocks, always sympathizing with a marked change in the value of specie, on that day greatly fluctuated in price, amidst great excitement on the Stock Exchange, causing more surprise than the advance in gold. New York Central fell 22 per cent. in a few minutes, Hudson River 13 points, and other stocks instantly fell into line, placing dealers in bitter straits. Brokers called on their customers to increase their margins, which the day had wiped out. The money market became very tight, and high rates were paid so that balances could be carried over until the next day. When the dealings of Thursday morning opened it was at once evident that the conspirators had the grip, for gold continued to go up. The margins which had been increased with great difficulty and in many instances at considerable sacrifices the night before were again swept away, and there was a new call for their increase. This was beyond the power of all but the very strongest operators. All the small and medium speculators failed, or settled their obligations on the best terms they could. The wealthy dealers stood back to back and bade defiance to the clique. This was a day of the wildest excitement, of rushing, and of alternating hope and fear, such as had rarely, if ever, been witnessed, even during the war. The day closed with gold at 144.

On the morning of the never-to-be-forgotten 24th, every passage leading to the Gold Room was a solid mass of humanity, in a condition of excitement bordering upon insanity. At the opening of the Board the price of gold was 150—an advance of 6 per cent. on that of the highest quotation of the day before. It now became well and accurately known that the conspirators themselves held in gold and contracts for delivery something like a hundred and twenty millions, while all the current gold in New York could scarcely reach the sum of twenty-one millions. The Government alone could cut the Gordian knot, 'break the corner' by the sale of gold in the sub-treasury; but the deaf ear which had been turned to frantic appeals to Washington, if it did not confirm the boast of the conspirators that

members of the Government was in league with them, at least destroyed all hope of relief from that quarter. As the clock struck eleven the price was 155; at half past eleven it was 160, and then sprung up to 162, and then leaped to 164. In the whirl of the maddest excitement, when every human being engaged in operating was at white heat, and when the price was vibrating at the highest points, a breathless messenger arrived in the Gold Room with this 'glad tidings of great joy,' that the Government would sell gold, and almost ere he had delivered his message, the price crashed down to 135. The power of the conspirators was shivered, and one of the most daring of plots defeated. The great crisis was now at an end, but so large had been the dealings that the Gold Exchange Bank, which was the agent to settle the clearings, had not yet been able to foot up, and settle the transactions of the previous day, so there yet remained dismal doubt and uncertainty, and the shadow of disaster continued to darken Wall Street and its surroundings. The calamity to the business community which the conspirators had inflicted, was now keenly felt, and so great was the indignation against the unscrupulous clique, that its members were compelled to seek safety in seclusion. Efforts the most persistent were made to implicate the President in their transactions, and Congress appointed a Committee to investigate the charges, but they proved to be absolutely void of foundation.

GARFIELD, Assassination of. President Garfield was assassinated July 2, 1881, by Charles J. Guiteau, who shot him in the back at the railway-station in Washington, just as he was leaving town for Elberon, to see his invalid wife. He had intended to proceed thence to Williams College. The wound did not prove immediately fatal, and part of the time during the next few weeks there was a prospect of the President's recovery. The political situation added fuel to the popular excitement. Roscoe Conkling, Senator from New York, felt wronged by the appointment by Garfield a few weeks previously of Judge Robertson to the New York Custom House. Conkling and his colleague, Platt, had resigned their seats in the Senate, and were now candidates for re-election, hoping by this movement to secure a verdict from their own State condemning the act of the President; and Vice-President Arthur was at Albany giving yeoman's aid to Conkling, when the dastardly deed was committed. Guiteau had said, "I want to see Arthur become President." There were many foolish people who could not for a time set aside the idea that Garfield had been a victim of Conkling's malevolence; and that Arthur, if he became President, would work a revolution in the patronage and policy of the Government in the interest of Conkling. For two months and a half the country was kept in profound suspense by Garfield's condition. The malarial atmosphere around the White House proving hurtful to the sufferer, he was removed to Elberon on Sept. 6, where he died Sept. 19. Since Lincoln's death there had been no such demonstration of grief. The body was taken to Washington, exposed to view in the capitol, and finally removed for burial to Cleveland, with an imposing military and civil escort. Vice President Arthur took the oath of office as President, immediately after Garfield's death. Guiteau was arrested on the spot and was arraigned in Washington in November, the trial lasting ten weeks. Guiteau in his own behalf testified that he had been inspired by God to "remove Garfield" in the interests of the peace of the country. His plea was insanity. The jury convicted him January 25, 1882, and he was hanged June 30.

GREELY EXPEDITION. On the 22d of June, 1884, the survivors of the Greely party were rescued at Fort Conger, Lady Franklin Bay, in the Arctic regions. A special relief expedition was sent out by the U. S. government, which happily succeeded in effecting the rescue. The history of the enterprise is this. In the summer of 1881 a party of soldiers, commanded by Lieutenant A. W. Greely, was sent to this point by the Signal Service of the United States (of which Greely is now the chief) to be one of about a dozen at various circumpolar stations, established by several countries, for scientific observation during the next year or two. All of the other expeditions bore good fruit, and returned without loss of life. This enterprise contemplated an expedition to Lady Franklin Bay in the summer of 1883, to fetch the Greely party back, or to deposit provisions near enough to his station to be readily found on his retreat southward. The relief expedition proper—the 'Neptune' had already deposited provisions at Cape Sabine—comprised two vessels, the steam-whaler 'Proteus,' and the U. S. gunboat 'Yantic.' The 'Proteus' was ripped by the ice and sunk, and the 'Yantic' was left in the rear at Upernavik. A new expedition was fitted out by the Navy Department, consisting of the steam-whalers 'Thetis' and 'Bear,' while the British government contributed as a gift the Arctic exploring vessel 'Alert.' The expedition sailed in May. On June 22d the crew of the 'Bear' discovered papers at Brevoort Island locating Greely's camp, and announcing that the party were on the brink of starvation. The launch of the 'Bear' succeeded in finding the party before evening. Only seven men, including Greely, were found alive, and two of them died soon afterwards. Eighteen others were already dead from starvation, most of them having expired within a few days of the arrival of succor.

IMMIGRATION into the United States from 1820 to 1886 Fiscal Year ending June 30.

Year.	*Total Alien Pass'grs.*	*Year.*	*Total Alien Pass'grs.*	*Year.*	*Total Immigrants.*	*Year.*	*Total Immigrants.*
1820	8,385	1837	79,340	1854	427,833	1871	321,350
1821	9,127	1838	38,914	1855	200,877	1872	404,806
1822	6,911	1839	68,069	1856	195,857	1873	489,803
1823	6,354	1840	84,066	1857	246,945	1874	313,339
1824	7,912	1841	80,289	1858	119,501	1875	227,498
1825	10,199	1842	104,565	1859	118,616	1876	169,986
1826	10,837	1843	52,496	1860	150,237	1877	141,857
1827	18,875	1844	78,615	1861	89,724	1878	138,469
1828	27,382	1845	114,371	1862	89,007	1879	177,826
1829	22,520	1846	154,416	1863	174,524	1880	457,257
1830	23,322	1847	234,968	1864	193,195	1881	669,431
1831	22,633	1848	226,527	1865	247,453	1882	788,992
1832	60,482	1849	297,024	1866	167,757	1883	603,322
1833	58,640	1850	369,980	1867	298,967	1884	518,592
1834	65,365	1851	379,466	1868	282,189	1885	395,346
1834	45,374	1852	371,603	1869	352,768	1886	334,203
1836	76,242	1853	368,645	1870	387,203		
					Total		13,448,644

Prior to the year 1820, no official records of the arrival of alien passengers were kept. It is estimated, however, that the total number arrived in the United States from the foundation of the Government to the year 1820, was 250,000. It has been estimated that prior to the year 1856 about 98 per cent. of the total aliens arrived were immigrants.

The nationality of immigrants to the United States in the year ending June 30, 1886, was as follows:—German, 84,403; Irish, 49,619; English, 50,803; Scotch, 12,126; Swedish, 27,751; Italian, 21,315; Norwegian, 12,359; Danish, 6,225; Swiss, 4,805; French, 3,318; European not classified, 55,404; all others, 5,668. Of the whole number of immigrants arrived at the above named period, 266,370 came through the customs district of New York, 25,046 through Boston, and 20,822 through Philadelphia.

The records at Castle Garden New York for the year ending December 31, 1886, show that 300,918 immigrants landed at the port of New York during that period, being 19,748 more than in 1885. Early in the year there was a falling off, but in June an increase began which was afterward maintained. The figures for each month were:—January, 7,299; February, 7,776; March, 20,023; April, 36,298; May, 41,370; June, 35,950; July, 24,434; August, 25,267; September, 30,186; October, 30,919; November, 24,670; December, 16,735.

LIBERTY, STATUE OF, Enlightening the World.—The statue of 'Liberty Enlightening the World,' by the sculptor, Auguste Bartholdi, presented by the people of the Republic of France to the people of the United States, was placed on Bedloe's Island, in the harbor of New York, in 1886, and the inauguration ceremonies were celebrated October 28th, in the presence of a million people.

The conception of the colossal figure originated in the mind of Edward Laboulaye, the illustrious French publicist and friend of American institutions, and was suggested by him to M. Bartholdi, in whose hands the statue grew into being. The first steps toward its construction were taken in 1874, when the Franco-American Union was established, a banquet was given in Paris, and an appeal made to the people of France, headed by the following statement:

'The monument of Independence will be executed in common by the two peoples associated in this fraternal work, as they were of old in establishing independence. In this way we declare by an imperishable memorial the friendship that the blood spilled by our fathers sealed between the two nations. It is a treaty of friendship which should be signed by all hearts which feel the love of their country,

'E. Laboulaye.'

M. Bartholdi began his work by making a small model Statue of Liberty, followed by an enlarged model, which was

enlarged four times. The latter was then divided into sections and again enlarged four times. The subsequent work involved an enormous mass of details. The moulds only were cast, the statue itself being composed of copper sheets beaten out to fit the requirements of the moulds. The moulding began in 1875. In 1876 the gigantic hand was completed and sent over to the Centennial Exhibition in Philadelphia. It was afterward exhibited in Madison Square, New York, and then returned to France. In 1877 Congress passed an act giving the statue a site either on Governor's or Bedloe's Island, leaving the choice to be made by General W. T. Sherman. He confirmed Bartholdi's selection of Bedloe's Island. An American committee was chosen, with William M. Evarts as its chairman. The head of the statue was executed and placed on view at the Paris exposition in 1878. The entire statue was combined in 1880, and mounted in Paris in October, 1881. It was formally presented to the United States in Paris, on July 4, 1884, M. de Lesseps making the presentation speech, which was responded to by the United States Minister, Mr. L. P. Morton. In April, 1885, the statue was taken apart and shipped in 210 cases on board the French man-of-war 'Isere,' which arrived in June, and the pieces were landed and stored on Bedloe's Island. The cost of the work before leaving France was about $250,000, mostly contributed by the French people in small sums.

In the meantime the American Committee was engaged in raising, by public subscription and state and national appropriations, the sum necessary to provide the pedestal for the statue. An appropriation of $50,000 by the New York Legislature having been vetoed by Governor Cleveland on the ground of unconstitutionality, an appropriation by Congress of $100,000 having failed by accident, and the appeal of the committee to the public for individual subscriptions meeting with a slow response, the New York *World* took up the work, started a subscription, and in four months from April, 1885, raised over $100,000, contributed by more than 120,000 patriotic American citizens. This secured the completion of the pedestal. The erection of the statue and putting on the finishing touches, under the direction of General Charles P. Stone, as chief engineer, occupied the summer of 1886. The first rivet was driven July 12th and the last October 28th.

The inauguration ceremonies, October 28, 1886, were attended by the President of the United States, members of the cabinet, the Governor of New York, and the governors of other states, members of the diplomatic corps, and many other distinguished guests, and by a deputation from France composed of M. Bartholdi, Count Ferdinand de Lesseps, Admiral Jones, and General Pelissier, representing the French Senate; M. Spuller and M. Desmons, representing the French Chamber of Deputies; M. Deschamps, Vice-President of the Municipal Council of Paris; M. Napoleon Ney, and the representatives of the French Ministers of war, marine, commerce, and public instruction; of the Paris Chamber of Commerce; and of the French press. A great procession, in which the military, firemen, Grand Army of the Republic, French societies, and other organized bodies, took part, marched through the principal streets of New York, after passing the President and the French guests in review at Madison Square; and there was a naval parade in the harbor. The exercises on Liberty Island consisted of an address by Count de Lesseps on behalf of the Franco-American Union, the presentation address by Senator Evarts, the speech of acceptance by President Cleveland, an address by the French plenipotentiary, M. Lefaivre, and a commemorative oration by Chauncey M. Depew, with a prayer by Rev. Dr. R. S. Storrs, and the benediction by Bishop Henry C. Potter. Two bronze tablets were placed on the sides of the central arch on the seaward face of the base of the pedestal inscribed as follows:—

This pedestal was built by voluntary contributions from the people of the United States of America.

Constructive and Executive Committee: William M. Evarts, Chairman; Richard Butler, Secretary; Henry E. Spalding, Treasurer; Joseph W. Drexel, V. Mumford Moore, Parke Godwin, Frederick A. Potts, James W. Pinchot.

Richard M. Hunt, Architect.
General Charles P. Stone, Engineer-in-Chief.
David H. King, Jr., Builder.
Completed A.D., 1886.

A gift from the people of the Republic of France to the people of the United States.

This Statue of Liberty Enlightening the World commemorates the alliance of the Two Nations in achieving the Independence of the United States of America, and attests their abiding friendship.

Inaugurated October 28th, 1886.
Auguste Bartholdi, Sculptor.

The following are the dimensions of the great work:—

	Feet	*Inches*
Height from base to torch	151	1
Foundation of pedestal to torch	305	6
Heel to top of head	111	6
Length of hand	16	5
Index finger	8	0
Circumference at second joints	7	6
Size of finger nail		13×10
Head from chin to cranium	17	3
Head thickness from ear to ear	10	0
Distance across the eye	2	6
Length of nose	4	6
Right arm length	42	0
Right arm greatest thickness	12	0
Thickness of waist	35	0
Width of mouth	3	0
Tablet length	13	7
Tablet width	13	7
Tablet thickness	2	0
Dimensions of Pedestal:		
Height of pedestal	89	0
Square sides at base, each	62	0
Square sides at top, each	40	0
Grecian columes base	72	8
Dimensions of the Foundations:		
Height of foundation	65	0
Square sides at bottom	91	0
Square sides at top	66	7

The statue weighs 450,000 pounds or 225 tons. The bronze alone weighs 200,000 pounds. Forty persons can stand comfortably in the head, and the torch will hold twelve people.

The total number of steps in the winding stairway which leads from the base of the faundation to the top of the torch is 403. From the ground to the top of the pedestal there are 195 steps. The number of steps in the statue, from the pedestal to the head, is 154, and the ladder leading up through the extended right arm to the torch has 54 rounds.

The electric light in the inside of the torch lamp aggregates 50,000 candle power, and at the base of the statue 30,000 candle power, being 80,000 candle power in all. The entire electrical plant is the gift of President Goff, of the American System.

The entire cost of the work from beginning to end is estimated at $700,000.

The Statue of Liberty is the tallest statue in the world. Compared with celebrated monuments and buildings, its rank will be found in the following enumeration:—Washington Monument, 555 feet; City Hall, Philadelphia, 535 feet; Cathedral of Cologne, 511 feet; Cathedral at Strasburg, 468 feet; Great Pyramid, 450 feet; St. Peters at Rome, 448 feet; Cathedral at Milan, 360 feet; *Liberty*, 305 feet; Brooklyn Bridge Towers, 287 feet; Trinity Steeple, New York, 284 feet; Monument, London, 240 feet; Bunker Hill Monument, 221 feet; Arc de Triomphe, Paris, 162 feet; Colossus of Rhodes, 105 feet; Obelisk, New York, 68 feet.

APPENDIX.

A SYNOPSIS OF THE PRINCIPAL EVENTS ALL OVER THE WORLD IN 1885.

January 1.—The New Year opened with the crash and unendurable horror of earthquake in Spain.—In "dusky Egypt" the "lone sentinel," General Gordon, was reported as holding his own against the Mahdi and desperate odds.

January 2.—An explosion of dynamite scared cockney London.—France despatched fresh re-enforcements to the seat of war in China with considerable pomp and circumstance.

January 3.—Mr. Gladstone was reported very ill.—Sunny Spain experienced another shock of earthquake.—In Russia the old grudge against the Hebrews broke out, and in many of the cities the "chosen people" were dispersed by the military for demanding the release of their co-religionists.—The promoters of the Exhibition of New Orleans, unable to make "the thing pay," solicited an additional appropriation, the expenses being $250,000 in excess of what the managers expected.

January 5.—The G. O. M. was bulletined as better.—The House of Representatives refused to abolish the taxes on tobacco and distilled spirits.

January 6.—The earthquake in Spain was felt still more severely. Thousands of people were rendered homeless. Large subscriptions in aid of the sufferers were collected.—President-elect Cleveland resigned the Governorship of New York.

January 7.—Spain was still throbbing with earthquake, the panic in the provinces on the increase.—General Grant distinctly and absolutely declined the financial aid offered by his friends.

January 8.—In Germany the Reichstag re-assembled and Bismarck with considerable spirit defended his policy.—It was reported that 1865 manufacturing and mining enterprises were established in the South in the year 1884, with an aggregate capital of $100,000,000. A mass meeting was held in New Orleans in aid of the Exhibition.

January 9.—A telegram from "England's only General," Wolseley, announced that he would reach Khartoum on the 24th of January.—In the Reichstag, Bismarck met with violent and stormy opposition.

January 10.—A hurricane of dense destruction passed over the west and south of England, bearing havoc and disaster.—The King of Spain with his Cabinet started to visit the scenes of the earthquake—an act that rendered him exceedingly popular.—General and Mrs. Grant wrote to Mr. William H. Vanderbilt, declining to allow him to purchase and present them with the General's "war relics."

January 12.—The wreckage on the British coast consequent upon violent storms was immense.

January 13.—Rome was threatened with serious damage by an overflow of the Yellow Tiber.

January 14.—The water of the Tiber receded.—The Bill to place General Grant on the retired list of the army passed the Senate: yeas 49; nays 9.

January 16.—The Annual Report of the Department of Agriculture showed the production of corn during 1884 as 1,895,000,000 bushels, wheat 513,000,000 bushels, and oats 583,000,000 bushels.

January 18.—The House of Representatives refused to consider the bill to place General Grant on the retired list of the army.

January 20.—John Bright published a remarkable letter discussing "the situation" in Great Britain.

January 21.—A desperate battle was reported to have been fought on the 16th between the troops of the Mahdi and the British under General Stewart, near Metemmeh, the former being defeated.—A large number of people were overwhelmed and destroyed in Italy by snow avalanches.—General Sheridan issued orders to the U. S. troops to remove the "Oklahoma settlers" from the Indian territory.

January 22.—The Governor of Texas reported extensive depredations by Mexicans on the frontier.

January 23.—The "Liberty Bell" started from Philadelphia on its journey to New Orleans.

January 24.—London was flung into frenzied excitement by three dynamite explosions occurring simultaneously in the Crypt, Westminster Hall, the Stranger's Gallery of the House of Commons, and in the Tower. [The damage done to Westminster Hall was great, showing that a large quantity of explosive matter had been placed inside the great ornamental gates leading to the crypt. The explosion in the House of Commons was even more destructive. The western extremity of the building was completely wrecked. The lobby and post-office were demolished, the force of the attack being so great that a man three hundred yards from the scene was knocked down. In the interior of the House of Commons several seats, including that of Mr. Gladstone, were overturned and broken. The explosion in the Tower of London was on the second floor of the White Tower. Three floors were entirely wrecked, and the explosion damaged many hundred stands of arms that were in the part of the building employed as an arsenal.]

January 26.—Edmund Yates, novelist, and proprietor of *The World*, was sent to prison for libel against "a lady of quality" in London society.—News was received from General Stewart and his command in the Soudan announcing desperate battles on the 16th and 19th.—A resolution offered by Mr. Bayard deprecating the dynamite outrages in England passed the Senate.—The Oklahoma invaders surrendered.—The Senate refused to ratify the Nicaragua treaty: yeas 32; nays 23.

January 30.—Considerable excitement was caused in England and France by the report that the commander of the Mahdi's troops was an ex-Communist named Pain, who escaped from the penal settlement at New Caledonia.

February 1.—Lord O'Hagan, ex-Lord Chancellor of Ireland—the first Roman Catholic chancellor since the Reformation—died, aged 72. He was one of the most eloquent men of the century.—The military rolls in the several states showed an aggregation of 6,580,503 men.

February 2.—A desperate engagement took place between the British troops and the Arabs.—The President informed the House of Representatives of the offer of Mrs. Grant to give the government, in trust, all the various mementoes of General Grant's career.

February 4.—The fall of Khartoum was announced, and the rumor that Gordon was killed or a prisoner. The wildest excitement prevailed in England. The English cabinet met and ordered the most vigorous measures to rescue Gordon, if alive; if dead, to punish the Arabs, and re-establish British prestige in the Soudan. —Russia and England advanced a step in the negotiations relative to the advance of the former on Afghanistan.—Telephonic communication between New York and Chicago was successfully established.

February 7.—Popular feeling against the English government for its Egyptian policy became intensified.—The Jews in Tangiers reported brutal outrages inflicted upon them by the Moors.

February 9.—England sent re-enforcements to Egypt.—The French Commander in Tonquin reported the destruction of five forts.

February 11.—The reports of General Gordon's death were confirmed. [Charles George Gordon ("Chinese Gordon") was born in 1833, left the Royal Engineers as first-lieutenant in 1854, served in the Crimean war, and was wounded at Sebastopol. He was engaged in settling the Russian and Turkish frontiers in Asia; and he served in the expedition against Pekin. Taking service under the emperor of China, he was appointed to the command of the "Ever Victorious Army," and succeeded in suppressing the Tai-Ping rebellion. By his energy, and the terror of his name, he restored order to various towns and districts; and relieved some of the richest and most fertile parts of China from the hands of brigands. He was a man of great courage, and his utter contempt of danger made him, in the eyes of the heathen, a being from whom they fled in terror, or owned his sway with reverential awe.]—Turkish newspapers were officially ordered not to publish any news from the Soudan.—The Bill conferring suffrage on women passed one branch of the Legislature by a vote of 29 to 18.—His Eminence, Cardinal McCabe, who succeeded Cardinal Paul Cullen, died after a severe and prolonged illness. He was a ripe scholar, and a severe churchman. In politics, if he professed any, he was a Whig, and was always on intimate terms with Dublin Castle.

February 12.—The French advance on Langson, Tonquin, reported three days' hard fighting.

February 13.—The English Government was charged with suppressing General Gordon's diary.—The literary world was exercised over the sale of some unpublished letters of Lord and Lady Byron.

February 14.—Egypt, on account of "no funds," was compelled to release her military prisoners.—A snow-slide buried the greater part of the town of Alta in Utah.

February 16.—A fight occurred between French and German Socialists in the streets of Paris at a funeral, the latter having refused to lower the German flag.—France concluded a treaty with Burmah.—A large crowd of unemployed working-men marched through London, causing considerable excitement.—Maj.-Gen. Sir Herbert Stewart was killed in action in the Soudan, aged 41.—The Mardi-Gras festivities at New Orleans were witnessed by over 80,000 people.—The Hocking Valley strike of eight months' duration ended.—The first of the bills proposing the retirement of General Grant failed to pass the House of Representatives.

February 17.—The study of Latin and Greek was declared not essential to admission to Harvard. The severest frost known for several years visited the States, bays and rivers heretofore free of ice being frozen over.

February 19.—The British troops in the Soudan commenced their retreat. Parliament met, and Mr. Gladstone vigorously defended and justified the policy of his administration in Egypt. The Roman Catholic Bishop of Shrewsby in a pastoral letter denounced dynamiters.

February 22.—The great obelisk, in honor of George Washington, was dedicated. [The cost of the completed monument will aggregate $1,500,000. The shaft is 555 feet high, and the entire height, including the foundations, 592 feet. The base of the obelisk is 55 feet 1½ inches square. At 500 feet above the ground it has four sides, each of which is 35 feet wide. Its area at this point is that of a comfortable six-room house, each room of which might be 12x16. It would take more than 125 yards of carpet to cover its floor. This square forms the base of the pyramidal top, which runs from it 55 feet until it terminates in its metallic point. This point is constructed of the largest piece of aluminum ever made. It is a pyramid 9 inches high, and weighs exactly one hundred ounces, being one-third as light as it would be if it were made of copper. Aluminum does not corrode, and it makes one of the best conductors of lightning. The monument is only veneered with marble, but as it is over two feet thick, it is substantial. It is 30 feet higher than any other work of man. The stones of which the monument is constructed are great blocks, in some cases 9 feet long, 2 feet thick, and 3 and more feet wide. There are more than 18,000 of them. They are of white marble, and weigh several tons each. One hundred and eighty-one "memorial stones" have from first to last been contributed for use in the monument, but only 83 were set in that portion of the shaft that was built prior to 1856. Many of the others were entirely unworthy of a place, and were rejected by the commission. Among those sent was one from the Pope, several from foreign Governments, and one from each of the States and Territories. The ceremonies attending the dedication of the monument were of the most imposing character. The procession embraced over 6,000 men, and made an unusually fine display.]

February 23.—Switzerland rejected a naturalization treaty with the United States.

February 24.—The Prince and Princess of Wales decided to visit Ireland, to the horror of the Cockney Press.—The Senate passed the Bill authorizing the President to negotiate for the purchase of the Indian rights in the Oklahoma lands.

February 25.—Switzerland decided to expel from her territory over 1,000 anarchists who sought shelter therein.—Mr. Cleveland, President-elect, urged the Democratic members of Congress to vote in favor of the suspension of silver coinage. The seal fisheries of Alaska were reported to yield to the United States Government $300,000 annually.

February 26.—The Congo Conference, under the presidency of Bismarck, held its first sitting.—The English Army estimates for the year were submitted at $89,000,000.—In the House of Representatives the clause in the Sundry Civil Appropriation Bill giving the President discretionary power in the matter of the suspension of silver coinage, was rejected.

February 27.—The motion to censure the English Government-policy in regard to Egypt was defeated in the House of Commons by the narrow majority of 14; the Parnellites voting in favor of censure.—The Secretary for War officially declared in the House of Commons that the Government would not abandon the Soudan till Khartoum be taken, and the Mahdi crushed.—The Woman's Christian Temperance Union of Trenton, N. J., dedicated its new building, costing $32,000. The House of Representatives appropriated $300,000 for the New Orleans Exposition.

March 2.—The 700th Anniversary of the Convention of the Temple Church was celebrated in London.—The Pope reached his seventy-fifth year.—Severe shocks of earthquake terrified Spain.

March 3.—Tumultuous meetings of Anarchists were held in Paris.—The New South Wales contingent left Sydney for the Soudan; the first occasion of Australian troops sharing in the defence of the British Empire.—President Arthur received, according to usage, the resignations of the members of his Cabinet. Washington was literally crammed with visitors to the inaugural ceremonies.

March 4.—Grover Cleveland, ex-Governor of New York, was inaugurated President of the United States, the inaugural address being delivered and oath administered in front of the Capitol. General Grant publicly expressed his gratification at the passage of the Bill by Congress, placing him on the retired list.

March 5.—A contractor nailed up the Parliament buildings in Quebec, and refused to allow the Legislators admittance till his unpaid claim was discharged.—President Cleveland nominated his cabinet, and held his first public reception.

March 7.—Queen Victoria invested $5,000,000 in real estate, in London.—The President's Cabinet took the oath of office.

March 9.—War was declared between Guatemala and Nicara-

gua, on account of an attempt of the president of the former to form an union of all Central American States.

March 11.—Immense excitement was caused in England over the prospects of a war with Russia, owing to the evasion of the latter of Britain's ultimatum, and the departure of Muscovite troops for Afghanistan.—Mr. Parnell urged Ireland to observe a respectful neutrality during the approaching visit of the Prince and Princess of Wales.—The British government granted $100,000 to the family of General Gordon.—The introduction of machinery for the manufacture of cigars led to serious riots in Madrid, Spain.

March 12.—Mexico declared against Barrios' proposed forced consolidation of the Central American States, and President Diaz threatened to send troops to the frontier.—The Swiss government commenced the arrest of Socialists who refused to leave Swiss territory.—Sir Curtis Miranda Lampson, Bt., well known in connection with the first Atlantic Cable, died aged 74.

March 13.—Mr. Gladstone announced in the House of Commons, that an agreement had been made between Russia and England as to peace.

March 14.—The illness of General Grant became the subject of extensive description in the public papers.

March 15.—Telephone tickets at half a franc were issued in Paris.

March 16.—The commander of the French in China demanded 10,000 men as reinforcement.—Coal was discovered in Mexico.—The largest solar eclipse since 1869 took place.

March 18.—The British government guaranteed a loan of $45,000,000 to pay off the Egyptian debt.—The ambassador from France, in China, was instructed to negotiate with China for peace.

March 19.—Woman suffrage legislation was defeated in both the New York and Connecticut Legislatures.

March 20.—The British forces encountered severe defeat near Suakim. Cork decided to ignore the visit of the Prince and Princess of Wales.

March 21.—The Humane Society of Pittsburg, O., sued the Pennsylvania Railroad for cruelty to animals in transportation.

March 22.—The Arabs were badly beaten in a battle near Suakim. Reconnoitring at Suakim by means of a balloon took place; the first ascent made in active service in the British Army.

March 23.—A number of Spanish army officers were arrested, charged with organizing a conspiracy to overthrow the monarchy.—A revolt of half-breeds, with Riel at their head, was reported from the Northwest Territory, Canada. [Louis Riel, a half-breed educated in Lower Canada, became a public character in 1869, when Manitoba was formed into a Province, and a Governor sent from Canada to rule it. Riel headed the opposition, and formed a Provisional Government, demanding a guarantee for the rights of his race. He held out for ten months, but on the approach of a force under Garnet Wolseley his forces disbanded, and he fled to the United States. The Dominion of Canada, however, accorded Manitoba representation in Parliament, and promised guarantees which have never been fully carried out. Nothing was done for the Saskatchewan half-breeds, and Riel again raised the standard of revolt, and was joined by half-breeds, Crees and Blackfeet.]

March 24.—The Rhode Island House of Representatives passed a resolution favoring an amendment to the Constitution allowing women suffrage.

March 26.—A message was read from the Queen in the House of Commons to the effect that the Reserve Forces and Militia Reserves were to be called out. This caused intense enthusiasm.—The French were defeated by the Chinese in an attack on Dong-Dong.—Lake Erie was crossed on the ice.

March 27.—The Secretary of War announced the intention of the Government to clear Oklahoma of all intruders, whether settlers or ranchmen.

March 28.—A Papal allocution was issued denouncing all diplomats who attended the laying of the corner-stone of a monument to Victor Emanuel.—Langson, in Cochin-China, was evacuated by the French.—The sculling match for the championship of the world and a stake of $5,000, took place at Sydney, New South Wales, between William Beach, of Illawarra, and Edward Hanlan, of Toronto, Canada, and was won by the former.

March 30.—The French Chamber of Deputies refused to vote the Government $40,000,000 on account of military operations in China, and the Ferry Cabinet fell.

March 31.—The half-breed insurgents in the Northwest Territory, Canada, captured the town of Battleford.

April 1.—Revolutionists burned Aspinwall, the principal city of Panama, leaving thousands of people homeless and shelterless.—Bismarck celebrated his seventieth birthday.—Battleford, Canada, was pillaged and burned by the half-breed insurgents.—General Grant was reported as dying.

April 3.—General Graham with the British troops occupied Tamai.—The United States Government despatched a force of 800 marines and war vessels to the Isthmus of Panama to protect the property of Americans, and open up communication across the Isthmus. Gold discoveries in North Carolina were reported.

April 5.—A new French Cabinet was formed.—Preparations for war with Russia progressed in England, as Russia's answer to England's demand was considered as "slimily evasive."

April 6.—Peace was concluded between France and China.

April 7.—The new French Ministry defined its policy to the Chamber of Deputies, and the latter voted $30,000,000 for operations in Tonquin. The Prince and Princess of Wales with their eldest son started for Ireland.

April 8.—The "Castle hacks" received the Prince and Princess of Wales with all honor, the citizens holding aloof. An official proclamation against the Mahdi was issued at Constantinople.

April 9.—The most frantic excitement was caused in England by the news of a battle fought between the Russian troops and Afghans near Penjdeh on the Afghan frontier. War with Russia was considered inevitable, and the Government naval and dockyards were worked at the highest pressure.—The report that Barrios was killed in an engagement in Central America was confirmed.

April 10.—Fourteen whites were killed by Indians at Frog Lake, Winnipeg.

April 11.—England, on her mettle, demanded that Russia disavow the act of her commander on the Afghan frontier and recall him. The war feeling was at its height.—General Grant was reported as much worse.

April 13.—Turkey announced her disinclination to enter into an alliance with either England or Russia.—At the Mallow Junction, Ireland, a riot occurred upon the arrival of the Prince and Princess of Wales, the people desiring "none of them," and clamoring for "Justice to Ireland" and singing "God save Ireland."—The United States Supreme Court decided that a wife's estate is not liable for the debts contracted by her husband, while pretending to act as trustee for her, unless she intended her estate to be so bound.

April 14.—Peace was proclaimed in Central America.

April 15.—A riot occurred in Cork on the visit of the Prince and Princess of Wales, the rioters being fired on by the police. Rotten eggs and decomposed cabbages were freely flung at the Royal party, who were hooted and groaned as they passed through the city.

April 18.—Primrose day was celebrated in England, so-called as being the anniversary of Lord Beaconsfield's death, the primrose being his favorite flower.

April 20.—Six hundred colored people left South Carolina for Arkansas.

April 21.—Sir Peter Lumsden's despatch in reply to the British Government's inquiry as to the correctness of the Russian accounts of the Penjdeh affair was published, and it contradicted in many particulars the Russian General Komaroff's despatch. The British Government asked Parliament for a "credit" of $55,000,000 for the Army and Navy.—Mr. Keiley, Minister to Italy, resigned. An attempt was made to blow up the University of Chicago.

April 22.—The Reserves came out strong in England, the call to arms being enthusiastically responded to.—A terrific volcanic eruption took place on the Island of Java.—The United States troops in Panama were fired upon and a proclamation directed against them. Ice 20 inches in thickness and snow drifts 10 feet high were reported in the State of New York.

April 23.—A dynamite explosion in the Admiralty Office, London, again scared the Cockneys, and the papers "went" for the United States. In Belfast the Orange section, descendants of Cromwell's Ironsides, received the Prince and Princess of Wales with the most frantic loyalty. At Stratford-on-Avon the 321st birthday of Shakespeare was jubilantly celebrated, the crowd of visitors being numerous. The Austrian Government seized upon five Vienna papers for printing objectionable political matter.—Destructive forest fires ravaged Eastern Pennsylvania and New Jersey.

April 24.—United States troops took possession of Panama, and arrested Aizpuru, commander of the rebels.

April 25.—A battle was fought between the Canadian troops and Riel's half-breeds.—Emma, Queen Dowager of Hawaii, widow of King Kamehameha, died.

April 27.—The British House of Commons, after a powerful address from the G. O. M., without a division, voted $55,000,000 for the war with Russia.

April 28.—A fleet of mackerel schooners arrived at New York with 12,000,000 fish caught off the Virginia Capes within twenty-four hours.

April 29.—The rebels at Panama surrendered.—The Police Commissioners of Cincinnatti decided to close the theatres on Sundays. The new Chicago Board of Trade opened its palatial building, which cost $2,000,000.

April 30.—Mr. Keiley, whose appointment as Minister to Italy was objected to on account of his personal opinion in regard to the Catholicity and morality of the late king, Victor Emanuel, was appointed Minister to Austria.

May 1.—Brinley Richards, the musical composer, died aged 67.

May 2.—The Exposition at Antwerp was opened with considerable flourish of trumpets.—A threatened "strike" riot in Joliet, Ill., was nipped in the bud by the interposition of the soldiery. The railway war in cut rates enabled a traveler to proceed from New York to the Pacific for $43.00.

May 4.—The World's Exhibition of Inventions, or the "Inventories," was opened in London.—General Grant resumed work on his book. The Patent-office reported that for the month of April 3,159 applications for patents were sent in.

May 5.—The Mexicans celebrated the defeat of the French, in 1862, with great *furore*, the Capital being a scene of the brightest festivity.—A treaty was concluded by the United States Government, and the Columbian Government at Bogotá, providing a joint protectorate over the Isthmus.

May 6.—The Columbian Government hanged two rebels who were prominent in the insurrection.—Cable cars were introduced into Philadelphia streets.

May 7.—James Russell Lowell unveiled a bust of Coleridge in Westminster Abbey, and delivered an address.

May 9.—Another battle was fought between the Canadian troops and the half-breeds, in which the latter were routed by General Middleton.

May 13.—A riot occurred in Trafalgar Square, London, between the police and the mob which had gathered to protest against the proposed increase of tax on spirits and beer.

May 14.—The House of Commons voted the Princess Beatrice, the youngest and only unmarried daughter of Queen Victoria, an annuity of $30.000 on the occasion of her marriage with a pauper German princeling.

May 15.—Queen Victoria was presented with the first complete copy of the "Revised Bible."—Louis Riel, the half-breed instigator of the Canadian Rebellion, was captured.

May 16.—The Revised Edition of the Bible was issued to the newspapers.

May 19.—The rebels in Columbia attacked the city of Carthagena, but were repulsed with heavy loss.—Mr. Lowell took official leave of the Queen, and Mr. Phelps "kissed hands" as the new American Minister.

May 21.—The Presbyterian General Council opened in Cincinnatti.

May 22.—Victor Hugo, French author, poet and dramatist, died aged 83. [He was the youngest of three sons of General Hugo, who served with distinction through Napoleon's campaigns in Italy and Spain. Madame Hugo and her children followed the General into both countries. Thus their early years were spent amid strange sights and scenes, following the fortunes of war. The first volume of Victor Hugo's "Odes and Ballads" appeared in 1822, and his tales, "Hans of Iceland" and "Bug-Jargal," were written about this time. In 1826 he published a second volume of "Odes and Ballads," which exhibited a change in his political and literary opinions, and in 1827 he composed his drama, "Cromwell." In 1829 he published his "Last Days of a Condemned Criminal." Shortly after the Revolution of July 1830, his "Marion de Lorme," which had been suppressed by the censorship under the Restoration, was brought out with success. "Le Roi s'amuse" was performed at the Théâtre Francais in January, 1832. After the *coup d'état* of 1851, Victor Hugo refused the amnesty offered by Napoleon III., rejected with scorn the triumph of Imperialism, and went into a voluntary exile for nineteen years afterward at Guernsey. His prose works during this period included "Les Misérables," "Les Travailleurs de la Mer," "L'Homme qui Rit," and "Quatre-vingt Treize"; his poems, "Napoléon le petit," "Les Châtiments," "La Légende des Siècles," "Chansons des Rues et des Bois," and "Les Contemplations." On the fall of the Empire he hastened back to his native country, and was returned to the National Assembly at Bordeaux. He then sought refuge in the seclusion of the little town of Vianden, in Luxemburg, where he composed "L'Année Terrible." Returning to Paris in July, 1871, he pleaded earnestly for the lives of Rossel, Ferré, and the other Communists. M. Victor Hugo has given an account of this period of his career in "Actes et Paroles, 1870–71–72," published in 1872. Collections of his lyrics, which were published from time to time, bore the titles: "Les Rayons et les Ombres," "Les Voix Intérienres," "Les Feuilles d'Antomne," "Chants du Crépuscule," etc. Victor Hugo's literary works brought him a moderate fortune, and his latter years were spent in a pleasant house on the outskirts of Paris, in an avenue named in his honor.]

May 27.—The Supreme Court of Mexico decided that foreigners may hold property in the Republic.—The Mikado of Japan conferred honorary titles on four American citizens, for services rendered as teachers in the University of Tokio.—A Philadelphia woman was convicted of being a "common scold," and sentenced to four months' imprisonment.

May 28.—The President and Cabinet refused to encourage the re-opening of the New Orleans Exhibition in the fall.

May 30.—The Apache Indians committed atrocities in Arizona. Great excitement was caused by the discovery of a gold mine in Josephine County, Oregon.

June 1.—The funeral of Victor Hugo took place in Paris. He was interred in the Pantheon. The cortegè and ceremonial was one of the most imposing ever witnessed in "glittering Lutetia."

June 2.—A terrible earthquake occurred in Cashmere, India.—The mayor of Chicago issued a proclamation against gamblers and gambling in that city, which caused a sensation.

June 4.—The British House of Commons was greatly exercised over the question of diplomatic relations with the Vatican, and the Government announced that it was not their intention to establish same in a regular way.—A motion in the French Chambers impeaching M. Ferry was defeated.—A cyclone in Aden, Arabia, committed fearful havoc.—In Arizona and New Mexico the hostile Indians were on the war path.

June 5.—Sir Julius Benedict. Kt., musical composer, died, aged 81.—Ferdinand Ward, "the Napoleon of finance," was indicted for fraud.

June 6.—Cashmere was again desolated by an earthquake.

June 7.—There was a great demonstration in Hyde Park, London, to protest against an increase in the beer and spirit duties.

June 8.—Mr. Gladstone was defeated in the House of Commons on the proposition to increase the tax on wine and spirits. The excitement in England was at fever heat.—The treaty of peace between France and China was signed.—The newspapers published the first extracts from General Grant's memoirs.

June 9.—The Gladstone Ministry resolved upon resignation, to the utter dismay of the Liberals, and the intense satisfaction of the Conservatives and Parnellites.

June 10.—A fire at Aux Cayes, Hayti, destroyed $2,000,000 worth of property, and rendered over one thousand families homeless.—The supporters of Prince Napoleon issued an election Manifesto, declaring war against "Republican Anarchy."

June 11.—Queen Victoria summoned the Marquis of Salisbury to Balmoral with a view to commanding him to take office and form a Ministry.

June 12.—The Marquis of Salisbury consented to form a Ministry; this after considerable hesitation. The town of Grodno, Russia, was destroyed by fire.

June 15.—The Shah of Persia started a school and a newspaper.—Prince Frederick Charles of Prussia, "The Red Prince," died aged 57. [Prince Frederick Charles of Prussia, better known as "The Red Prince," was the son of Prince Frederick Charles, who was a brother of the present Emperor of Germany. He was born March 20, 1828. He married, November 29, 1854, the Princess Marie, daughter of Leopold Frederick, Duke of Anhalt. His children: 1. Princess Marie, born September 14. 1855. married, August 24, 1878, Prince Henry of the Netherlands. 2. Princess Elizabeth, born February 8, 1857, married, February 18, 1878, the Hereditary Duke of Oldenburg. 3. Princess Louise, born July 25, 1860, married, March 13, 1879, the Duke of Connaught; and 4. Prince Joachim, born May 14, 1865.]

June 16 —Cholera appeared in Spain. Its malignity spreading terror over the Peninsula.—Another shock of earthquake was experienced at Cashmere, and 2,000 people were reported as killed.

June 17.—The New British Cabinet was announced, and Lord Randolph Churchill being given a portfolio, created at once satisfaction and surprise.—The Bartholdi Statue of "Liberty Enlightening the World" arrived at New York.

June 18.—A Cabinet crisis in Italy led to the resignation of the Ministry.—A shock of earthquake was severely felt at York, England.—The increase of cholera in Spain was most serious.

June 19.—The Statue of "Liberty Enlightening the World" was formally received in New York, [It is estimated that, of the $390,000 that will have been expended before the statue is finally placed in position, the pedestal alone will have cost $250,000, the interior bracings and structure $25,000, and the placing it in position, $25,000. This will make total cost of statue, pedestal and erection about $650,000, or over half a million. The pedestal is a truncated cone, with galleries on each side supported by Ionic columns. The top of the torch will then be 305 feet 11 inches above low water, 21 feet higher than Trinity Church spire, and 23 feet higher than the towers of the Brooklyn Bridge. Some approximate idea of the size of the statue may be gained when it is stated that the forefinger is nearly 7 feet long, and is over 4 feet in circumference at the second joint. The nail measures 9 by 6 inches, the head is 16 feet high, and the eye is nearly 2 feet wide. Three feet and over is the length of the nose; forty persons can find room inside the head, and twelve in the torch held by the hand.]

June 20.—A shock of earthquake was felt in Switzerland.—The Spanish Ministry tendered their resignation in consequence of the King's determination to visit the cholera-stricken districts.

June 23.—The Salisbury Ministry formally entered office, the Marquis having received the seals from the Queen.

June 24.—The Russian Government forbade newspapers from making any reference to its action in Afghan affairs.—The decree of the Mexican Government regarding payment of duties and railway subsidies caused a financial crisis.—The second case of whipping for wife-beating took place in Maryland.

June 25.—The ravage of disease among the French soldiers at Tonquin was reported as appalling.—A severe shock of earthquake was felt in Inverness-shire, Scotland.

June 26.—The financial embarrassment of the Mexican Government was officially reported.

June 27.—The Rev. Mr. Spurgeon published a pamphlet denouncing immorality in English high life.—The death-rate from cholera in Spain was enormously increased.—Three hundred natives of the Republic of Nicaragua fell in battle.

June 30.—The Nationalist Parliament party issued an address advising Irish electors to vote for Conservatives for Parliament with a view to the promotion of Irish interests.

July 1.—The English Cabinet decided to abandon coercion in Ireland.—Ice and snow appeared in Southwestern Virginia.

July 2.—500 Mormon converts arrived in New York.

July 3.—400 policemen guarded the cars and property of the Chicago Street Railway from the strikers.

July 4.—The Province of Murcia, Spain, was reported as depopulated by cholera.

July 5.—Cholera appeared in Toulon and Marseilles, France.—The *Pall Mall Gazette*, London, published revolting and sensational details in regard to the licentiousness of London.

July 8.—Feverish excitement prevailed in Mexico in consequence of the Government's financial troubles, and several arrests were made.—General Grant received a visit from a deputation of Mexican editors journeying in the United States.

July 9.—The University College of Wales was burned at a loss of $200,000.

July 10.—The French Chamber of Deputies made an appropriation of $800,000 to be expended in educating every seventh child born in French families, where such aid might be needed.—The President ordered General Sheridan to go in person to the scene of the Indian troubles in the Indian territory.

July 11.—Great damage was done in Southern Hungary by floods.

July 13.—The New Orleans Exposition property was sold at auction for $175,000.

July 15.—The grounds around and about the Falls of Niagara were formally opened as a public park.

July 23.—The Princess Beatrice was married at Whippingham Church, Isle of Wight, England, to Prince Henry of Battenberg, a penniless German princeling.—Ulysses S. Grant, the conqueror of the American Rebellion, ended his career at the age of sixty-three, at Mount McGregor, New York, and his character now stands for the judgment of history. [Ulysses S. Grant was born at Point Pleasant, Clermont County, Ohio, April 27. 1822; graduated at the military academy of West Point in 1843, and served under General Taylor in the war with Mexico, 1846, up to the capture of Monterey. His regiment was then transferred to the expedition under General Scott, and he took part in every action from Vera Cruz to Mexico, and was brevetted first lieutenant and captain for meritorious conduct at Molino del Rey and Chapultepec. In 1852, he served in Oregon; but, in 1854. resigned his commission, and settled at St. Louis, Missouri, whence, in 1859, he moved to Galena, Illinois, and engaged in the leather trade. At the breaking out of the rebellion he returned to the army and served as colonel, rapidly advancing to the chief command of the United States Army. He was twice elected President, and one of the most memorable events of his administration was the settlement of the Alabama question in 1871.]

July 24.—The President issued a proclamation declaring void the Cheyenne and Arapahoe Indian territory leases to cattlemen, and requiring the latter to remove within forty days.

July 28.—Sir Moses Montefiore, the illustrious Hebrew philanthropist, died at his home in Ramsgate, England. He had reached the patriarchal age of one hundred years. [The Montefiores were originally from Spain. Driven from that country they took refuge in Italy, where they amassed wealth. After Manasseh-ben-Israel's intercession with Cromwell for the admission of Jews to England, they took up their residence in that country. Moses Montefiore, the son of Joseph Elias and Rachel Montefiore, was born in Leghorn, Italy, October 24th, 1784, during a visit of his parents to that place. At an early age he entered commercial life in London, becoming first a clerk, and afterward a stockbroker. In 1824 the

death of his father left him in possession of a considerable fortune, and a year later he retired from the Stock Exchange. Early in life his heart had been touched by the miserable condition of his people, the Jews, abroad, and he had long nurtured plans for redressing it. Sir Moses Montefiore was elected Sheriff of London in 1837, and soon after was knighted by the young Queen who then came to the British throne; and the honors he received from royalty in many lands indicate that he possessed a charm of character which won the hearts of all classes. In his munificent benefactions he knew no race distinctions, and it was his gift of $1,000 which started the fund of $110,000 for the relief of the Christians on Mount Lebanon a quarter of a century ago.]

July 30.—The half-breed Riel was put on trial.—Maude S. trotted a mile in a half second less than ever before, doing it in 2:08¼.

July 31.—The Pope created a batch of Cardinals.

August 1.—Riel was found guilty and sentenced to be hanged on September 18.

August 4.—A religious service in memory of General Grant was held in Westminster Abbey.

August 6.—The Emperor's of Germany and Austria met at Gastein.

August 11.—The Spanish Government received information of a plot to assassinate King Alfonso.—A re-union of Federal and Confederate soldiers took place on the field of Gettysburg.

August 14.—The British Parliament was prorogued. The Crimes' Act in Ireland expired.

August 20.—The occupation of the Caroline Islands by Germans caused much excitement in Spain.

August 22.—China contracted with an English firm to construct 100 miles of railroad, giving Pekin direct communication with the sea.—The new Cunard Steamship Etruria made the fastest ocean voyage yet recorded, six days, five hours, and twenty-one minutes.

August 23.—One thousand eight hundred and nineteen deaths in one day from cholera, were reported from Spain—the highest record.

August 25.—The Emperors of Russia and Austria met at Kremsier.

August 29.—The peasants of South Germany were thrown into consternation by the sudden and inexplicable departure of the rooks, that for centuries had made their abode there.

August 31.—An official announcement was made that of 223,546 persons attacked by cholera in Spain, 82,619 had died from the epidemic.

September 1.—A modified commercial treaty was agreed upon by the United States Minister and the Spanish Government.

September 7.—The new and patriotic Archbishop of Dublin, Dr. Walsh, was installed. His Grace is a very prodigy of learning, and is a young man. The Whigs were in favor of an Archbishop of the McCabe type, but the Parnellites prevailed at Rome and "elected their man."

September 8.—The deaths from cholera in Spain were reported as being rapidly on the decrease.

September 10.—The highest tide of the year was experienced on the British coast.—The Society of the Army of the Tennessee held a great meeting at Chicago.

September 13.—Small-pox broke out in Montreal, Canada, 48 deaths being reported.

September 14.—Riel was respited.—After four abortive attempts the first International Yacht Match took place off New York, the American yacht Puritan beating the English yacht Genesta.

September 15.—Jumbo, the famous elephant, was killed by a freight train at St. Thomas, Ontario.

September 17.—A wondrous hail storm took place near Granite Falls, Minn., the stones being ten inches in thickness.

September 18.—A revolution took place in Eastern Roumelia. The Governor-General was placed under arrest and allegiance was sworn to Prince Alexander of Bulgaria.

September 20.—A monster Socialistic meeting was held in London, England, and several of the speakers were arrested.

September 22.—Three hundred lives were lost by a cyclone which swept over the Bay of Bengal.

September 23.—Bismarck accepted Spain's apology for an insult to the German Embassy at Madrid.—A fearful crush opposite the hotel in Stockholm, where Madame Nilsson, the prima donna, was stopping, resulted in nineteen persons being killed and fifty injured.—United States war vessels arrived at New York with silver to the amount of $10,400,000 on board.

September 28.—The deaths reported from small-pox for a week at Montreal numbered 325, and an attempt to enforce compulsory vaccination produced a riot, the rioters making an assault on the Board of Health.

September 29.—The Militia was called out to suppress the mob in Montreal.

September 30.—Great and destructive floods were reported from India and from Switzerland.

October 1.—The daily vaccination at Montreal was reported at 3,000.—The first female law student entered Yale College.—The system of sixpenny (10 cent) telegrams came into operation in Great Britain. The Earl of Shaftesbury died, aged 84. [Anthony Ashley Cooper, K.G.D.C.L., 7th Earl of Shaftesbury, was born on the 29th of April, 1801, of a family which for three hundred years has claimed kindred with the greatest in England. His mother was a daughter of the Duke of Marlborough. Under his then title of Lord Ashley he was sent to Harrow and then to Oxford. At the age of twenty-five he entered Parliament as member for Woodstock, and afterwards represented Dorchester and Bath. In 1851 his father died and he took his seat in the House of Lords. In 1828 he was connected with the Board of Control, in 1834 one of the Lords of the Admiralty, and an Excise Commissioner from 1841 to 47. He married, in 1830, Lady Emily, eldest daughter of Earl Cowper, who died in 1872. Lord Shaftesbury's whole term of service in the two chambers was fifty-six years. He leaves four sons and two daughters. His life has been one of vast usefulness, and his name long honored by the most virtuous and intellectual people of the civilized world.]

October 3.—A conference was held in Constantinople on the Roumelian question.—A great demonstration took place in Manchester to celebrate the passing of the Manchester Ship Canal Bill. This canal will connect Manchester with Liverpool.

October 6.—Another riot occurred at Montreal.

October 7.—The Abysinian army, marching to the relief of Kassala, in the Soudan, encountered Osman Digma and defeated him, killing 3,000 of his dervishes.

October 8.—A great fire occurred in the city of London, causing a loss of $15,000,000.—The Patent Office reported that during the fiscal year ended June 30th, 35,688 patents were applied for.

October 9.—Shocks of earthquake startled Virginia.

October 10.—"Hell Gate Rock," New York Harbor, covering nine acres, was exploded with 285,000 lbs. of dynamite and rack-a-rock. [After the destruction of Hallett's Reef a few years since, work was commenced on Flood Rock, which was the great remaining obstacle to navigation. The rock was honeycombed with cartridges, and the explosion was entirely satisfactory to Gen. Newton, the engineer. Scientific observations were made as to the effects of the concussion, and as far away as Massachusetts the shock was felt and the exact time recorded. The clearing away of the débris (now being done) will make a channel 26 feet deep and 1200 feet wide.]—Three shocks of earthquake were felt in Virginia.—His Eminence, Cardinal McCloskey, Cardinal Archbishop of New York, died aged 75. [Cardinal John McCloskey was born in Brooklyn on March 20, 1810. At the age of seven he was sent to Mount St. Mary's College, at Emmetsburg, Md., where he supplemented his classical education by a course of theology at the seminary of that place. He was ordained a priest in 1834. Two years later he went to Rome and spent two years at the convent of St. Andreás della Vallée. While there he became intimate with Cardinal Wiseman, then rector of the English College, and Cardinal Cullen, rector of the Irish College. Upon returning to New York he was appointed assistant pastor at St. Patrick's Cathedral; in 1838 he was appointed assistant pastor of St. John's, and in 1841 he was nomi-

nated by Archbishop Hughes president of Fordham College, much against the wishes of his parishioners; but he returned in a year to St. John's, after skilfully commencing the organization of the new college. On the 10th of March, 1844, Father McCloskey was consecrated titular bishop of Atière and coadjutor to the Bishop of New York. In 1847 the diocese of New York was divided, and on the 21st of May of the same year Bishop McCloskey was translated to the see of Albany, and made its first bishop. Albany at that time contained only three churches. During the years that Bishop McCloskey spent there he accomplished much for the cause of religion, churches were built, and institutions organized. But the Bishop's greatest achievement was the erection of the imposing Cathedral, the corner-stone of which was laid in 1848 by Archbishop Hughes. In 1851 Bishop McCloskey visited Rome. In 1864, when Archbishop Hughes died, Bishop McCloskey was appointed his successor. His departure from Albany occasioned gloom and sorrow there, where he was much beloved. He did for New York what he had accomplished for Albany. Churches and institutions sprang up like magic under his fostering and beneficent care. To him the Catholics of New York are indebted for the Westchester Protectory, a Foundling Asylum in 68th Street, a Deaf and Dumb Association at Fordham, and Homes for destitute children and aged people. He established various religious communities composed of Dominicans, Franciscans, Capuchins, and the Little Sisters of the Poor. He also devoted himself untiringly to bring to a successful completion Archbishop Hughes' conception of the present stately Cathedral of St. Patrick on Fifth Avenue. March 15, 1875, was a memorable day not only in Archbishop McCloskey's career, but also in the history of the Roman Catholic Church in America, for on that day he was appointed a Cardinal by the Pope. Archbishop McCloskey received the news of his elevation to this high dignity with the modesty and humility which had always formed a striking part in his character. The investure took place on April 27, 1875, in Old St. Patrick's in Mott Street. The scene at this ceremony was marked by a religious pomp and magnificence never before witnessed in this country. A short time afterwards Cardinal McCloskey went to Rome, where he was received with great distinction by the Pope. After the completion of the new Cathedral, a marble residence was erected on the grounds, and there the Cardinal has passed his declining years in seclusion, seldom mixing in social life, except by an occasional summer trip to Newport, R. I. On the 12th of January, 1884, the fiftieth anniversary of his elevation to the priesthood was celebrated at the Cathedral with impressive ceremonies. From that time till his death his health failed gradually, when his useful life was brought to a close, and he peacefully expired in the presence of many of the sorrowing clergy. He was a man to compel attention even in a multitude, not through any mere physical endowment, but by the quiet gravity of his demeanor, and the ascetic though singularly benign cast of his features. The mold of his face was Irish, and his eyes were blue and piercing. During his long career in the Church he commanded the respect of non-Catholics by his blameless life, and firmly rooted himself in the affection of every Catholic heart. He is succeeded by the Most Rev. Michael Augustine Corrigan, Titular Bishop of Petra, who was appointed his coadjutor a few years since.]

October 12.—Reserves were called out in Greece, and Servia was at a war-fever heat.

October 13.—The body of Cardinal McCloskey lay in state at St. Patrick's Cathedral, and was visited by thousands.

October 15.—The reported death of Osman Digma was confirmed.

October 21.—An attempt to wreck street cars in St. Louis by dynamite was frustrated by discovery.

October 22.—The British Privy Council refused to reverse the sentence of death passed on Riel by the Canadian Court.—Prince Waldemar of Denmark was married, at the ancient Castle d'Eu, to Marie Amélie d'Orleans.

October 24.—A prairie-fire in Texas swept over 500,000 acres.

October 27.—A terrific storm devastated Labrador.

October 28.—The Great Eastern Steamship, that laid the first Atlantic cable, was sold for $130,000.

October 29.—An attempt was made by one Corsi to assassinate De Freycinet, French Minister of Foreign Affairs, while riding in his carriage in the streets of Paris.—General McClellan (Little Mac) died aged 58. [George B. McClellan was born at Philadelphia in December 1826. In his 16th year he was sent to the United States Military Academy at West Point, where he graduated with high honors in 1846, and joined the army as second lieutenant of engineers, to take an active part in the Mexican war, where he distinguished himself. In 1861 he was made commander-in-chief and reorganized the Army of the Potomac. In 1864 he was the Democratic candidate for President, but was defeated by Abraham Lincoln. In 1877 he was elected Governor of New Jersey. He has published several military papers.]

October 30.—Senator Stanford set aside $3,000,000 to endow an university at Palo Alto, Cal.

October 31.—Ferdinand Ward, the "Napoleon of Finance," was sentenced to hard labor in the Penitentiary for ten years, and taken to Sing Sing prison.

November 2.—The British forces marched against Burmah.—The remains of General McClellan were interred at Trenton, N. J.

November 3.—The monument erected at Tappan-on-Hudson to Major André by Cyrus W. Field was blown to pieces by dynamite.

November 4.—A determined crusade against the Chinese in Washington Territory and elsewhere on the Pacific coast was inaugurated.

November 7.—President Grévy refused to accept the resignation of the French Cabinet.

November 9.—The International Inventions Exhibition, London, was closed, the total number of visitors who attended was 3,760,581.

November 10.—War with Burmah was formally declared by Great Britain.—The New Orleans Exposition was re-opened.

November 11.—The Balkan Conference agreed that the basis of its deliberations should be a restoration of affairs that existed before the Roumelian Revolution.

November 13.—A great fire swept over Galveston, Texas, destroying fifty blocks, and causing damage to the extent of $3,000,000.—The business failures in the United States during the year ending October amounted to 9,627.

November 14.—The Ruler of Servia at the head of his troops marched into Bulgaria.

November 16.—Louis Riel, the Half-breed leader, was hanged for high treason at Regina, Northwest Territory.

November 17.—A battle of eighteen hours' duration was fought between the Servians and Bulgarians near Slineratz.—The British Parliament was dissolved.

November 20.—The town of Helena, Ark., was visited by a deluge of grasshoppers.

November 21.—A tornado swept over the Philippine Islands, causing immense destruction of life and property.

November 23.—The most exciting Parliamentary elections of modern times commenced in Great Britain.

November 24.—The Chamber of Deputies, France, recommended the evacuation of Tonquin and Madagascar.

November 25.—Alfonso XII., King of Spain, died aged 28. [Alfonso XII. was born Nov. 28, 1857. On Dec. 29, 1874, General Martinez Campos proclaimed him King of Spain in Valencia, and a few days later Alfonso, who had gone over to Paris in order to spend the *Jour de l'An* with his mother, left France for Spain, arriving at Madrid Jan. 14, 1875. He was most enthusiastically received. On Feb. 16, 1876, he departed from Madrid to take command of the troops operating against the Carlists, and on the 20th of the following month he returned in triumph to the capital at the head of 25,000 men, having subdued the Carlist insurrection. In 1878 he married his cousin, the Princess Mercedes, who died June 26th of the same year. King Alfonso married secondly, in 1879, Maria Christina, who bore him two daughters. His life was attempted on Dec. 30, 1879.]—Thomas A. Hendricks, Vice-President of the United States, died aged 66. [Thomas Andrews Hendricks, born in Ohio, Sept. 7, 1819; removed, when a child, with his father, to Shelby Co., Ind.; graduated from South Hanover College in 1841; and was admitted to the bar in 1843. He engaged actively in politics, and soon became one of the leaders of the Democratic Party in Indiana. He was a member of Congress, 1851–55; U. S. Senator, 1863–69; and in 1872 was elected governor of Indiana. In 1876 he was the Democratic candidate for Vice-President, with

Samuel J. Tilden for President, but was defeated. In 1884 he was again nominated for the same position, with Grover Cleveland for President, and was elected. Mr. Hendricks has for years been recognized as one of the ablest and most influential men of his party.]

November 26.—The Servians sent a flag of truce to the Bulgarians, which the latter refused to accept unless their country was evacuated.

November 27.—The Bulgarians were repulsed by the Servians at the battle of Widdin.—Mr. Gladstone was returned as member for Midlothian, Scotland.

November 28.—Mr. Jay Gould announced his intention of retiring from business as a speculator.

December 1.—The British troops occupied Mandalay, the capital of Burmah.—A battle was fought at Lima, Peru, the war continuing.—A convention of Knights of Labor was held at San Francisco to arrange a systematic anti-Chinese agitation.—Vice-President Hendricks was interred.

December 3.—King Thebaw of Burmah offered to abdicate if his life was spared.

December 4.—The British defeated a force of 4,000 Arabs in the Soudan.

December 7.—Hard fighting between the Servians and Bulgarians was reported.—Senator John Sherman was elected president *pro tem.* of the Senate.

December 8.—The Queen Regent of Spain announced her intention of pardoning all political offenders.—William H. Vanderbilt dropped dead, aged 64. [The great millionaire William H. Vanderbilt was born at New Brunswick, N. J., May 8, 1821, the Commodore, his father, being at that time engaged in a steamboat enterprise which required his residence in New Jersey. The young Vanderbilt spent his early years, a roystering gamin, playing about the Vanderbilt homestead on Staten Island. He got such schooling as the Island afforded, and at twelve years was placed in the Columbia College Grammar School, under Dr. Anthon, and for six years got a good academic training there. He was then placed by his father as a clerk in the banking house of Drew, Robinson & Co., of Wall street, then one of the largest firms operating in the market. Two years of clerking broke down his health, and to fend off the chronic dyspepsia which threatened, the physicians ordered an out-door life. The father purchased a seventy-five acre farm on Staten Island and set his son, just of age, upon it. He had already married a Miss Kissam, daughter of a New York clergyman, and the young couple were living very comfortably on a $16 weekly salary. The farm-life was hard—the farm practically a stony desert. He soon felt the need of capital. He knew he could use it to advantage, but he did not dare to ask for a loan from the already abundant store of his father. A friend asked the favor of a $5,000 loan on behalf of the young man, only to meet a flat refusal from the Commodore. This led to a mortgage of $6,000 being placed on the farm. William made of farming a success. His farm grew to one of 350 acres, and he found profit and pleasure in the raising of fine stock, and got that close knowledge of horseflesh which was one of the passions of his life. The Staten Island Railroad was suggested, and Wm. H. Vanderbilt became, with his uncle Jacob, largely instrumental in starting this venture, and in 1856 the road was built, skirting the eastern shore from Vanderbilt's Landing. It was a great public convenience, and when it went into bankruptcy Mr. Vanderbilt became receiver. In two years he had settled all the debts, had put the road on a paying basis and established a regular ferry to New York. He had become fully identified with his father's growing enterprises, and in every way began to prepare himself to succeed the Commodore. He became in 1865 Vice-President of the New York and Hudson River road, and upon the consolidation with the Central in the following year he was made Vice-President of the united company. He had already been made Vice-President of the Harlem road, and from that time on father and son worked together to build up the greatest railroad property in America. With the close of the will contest Wm. H. Vanderbilt found himself in undisputed possession of the great railroad properties which had been built up by his father, and he pushed them with vigor in every direction. The railroad system which came under his control, as it had been in fact before the Commodore's death, included not only the New York Central and the Harlem, but the Lake Shore and Michigan Central, and they became a virtual entity as the "Vanderbilt system." Subsequently he went into telegraph stock and had a vast interest in the Western Union Company, while in the Union Pacific his holdings were very large. In his enterprises he used an army of men as agents and executive officers, but his advisory board consisted of James H. Rutter. E. D. Worcester and Chauncey M. Depew, with his son Cornelius in later years. While he was a hard worker he was also a generous liver and his former home at Fortieth street was one of the most luxurious on Fifth Avenue. His summers were spent at the old Pavilion Hotel at Sharon Springs and at the United States Hotel at Saratoga. He was accustomed in later years to take summer flits to Europe, and his last run over was a round trip on one of the White Star steamers, running up from Queenstown to Killarney while the steamer was running to Liverpool, and embarking again on its return to Queenstown. He often said that he found the ocean steamers good enough yachts for him when urged to allow his love for out-door life to lead him into yachting. In his family relations Mr. Vanderbilt has been very happy. He has had nine children, of whom eight survive him, four sons—Wm. K., Cornelius, Frederick and George—and four daughters, all of them married.]

December 10.—The King of Burmah was sent to Madras.

December 11.—It was announced that the British Government would send a new expedition to the Soudan.—France denied the report of an alliance with Burmah.

December 12.—The bi-centennial of printing in America's Middle Colonies was celebrated at Philadelphia. A plot organized for the assassination of some of San Francisco's most prominent citizens was exposed.

December 17.—Mr. Gladstone declared himself favorable to a "certain measure" of Home Rule.

December 23.—Greece complained that the great powers make her no reparation for injuries sustained.—Capitalists from Berlin decided to send delegates to China with a view to negotiating with the Government in the matter of establishing a railway system throughout the empire.

December 24.—The purchase of 800,000 barrels of oil in Oil City by a single speculator, nearly paralyzed the oil trade.

December 27.—The "Lady Stitching Union" of Lynn, Mass., composed of 3,000 women, demanded an increase of wages, and their demands were complied with.

December 28.—Consequent upon a fierce contest M. Grévy was re-elected President of the French Republic.

December 30.—The British troops after a desperate fight defeated the Arab troops in the Soudan. Monsieur Pasteur's method of treating hydrophobia was taken up by the incorporation of the American Institute of Hydrophobia.

December 31.—The year 1885 died uneventfully, and went to its rest as quietly as the sun sets.

APPENDIX.

A SYNOPSIS OF THE PRINCIPAL EVENTS ALL OVER THE WORLD FROM JANUARY TO JUNE, 1886.

January 1.—Hon. David B. Hill inaugurated Governor of the State of New York. Southern rabbis meet at New Orleans. 35,696 deaths, 30,038 births, and 11,716 marriages in New York City during 1885. 7,070 of the brides and 6,323 of the bridegrooms of foreign birth. Two women and three men married for a fourth time, thirty-four women and ninety-six men were married for a third time, while 1,242 of the brides and 1,590 of the bridegrooms had had a single previous experience in matrimony. The total loss by fires in New York during the year $3,800,000, and the police in the same time made 74,373 arrests, 54,883 being those of men. During the same period 5,627 dwellings and twenty-one churches built in Philadelphia: loss from fires $1,586,972.75.—Telegraphic despatches announce a treaty between France and Madagascar. After a year and a half of warfare, a treaty has been made, under which France virtually abandons all her pretensions to a protectorate, and acknowledges the ruler of the Hovas as sovereign of the whole island.—In Peru, as the result of the triumph of the revolutionists, a Council of State is formed, with Dr. Antonio Arenas as president, and a full cabinet, and, pending the election of a president and other officials under the Constitution of 1860, the country becomes quiet, with a prospect of a final restoration of an orderly and stable administration.—The Rt. Hon. T. D. Sullivan, author of "The Wearing of the Green," installed Lord Mayor of Dublin.—Burmah annexed to the British Indian Empire.—The creditors of the King of Bavaria sue his majesty.—The German army counts 161 regiments of regular infantry, 20 battalions of light infantry, 93 regiments of cavalry, 37 regiments of artillery with 341 batteries of six guns, and 19 battalions of pioneers, making a total for the regular army of 1,263,746 men. The garrison troops and Landsturm amount to 809,847 men.

January 2.—China proposes to incur a debt of $175,000,000 to build railways and increase her armament.

January 3.—Kaiser William's jubilee celebration of his accession to the throne of Prussia.—Crisis in the French cabinet on the vote on the Tonquin credit. Disappointed at the meagreness of the government's majority on that occasion, Premier Brisson tenders to President Grévy his resignation, together with that of the whole Cabinet.

January 4.—First performance of the American Opera Company a success. The Enoch Pratt Free Library at Baltimore formally opened. [The sum of $1,145,833 contributed by Mr. Pratt for the library and its uses: 20,000 names of readers already entered on the list. Enoch Pratt a member of the firm of Pratt & James, iron merchants. He rose from a poor boy to a millionaire, and he has still some millions besides his big gift to Baltimore.]—M. de Freycinet forms a new cabinet. A photograph of a section of the sky, taken at the Paris Observatory, some five degrees square, shows three thousand stars on a ten-inch square plate. This would indicate that there are twenty million stars up to the fourteenth magnitude, inclusive.—The application of automatic brakes to freight trains greatly exercises railway men.—Despatches announce that the British troops in Egypt have won a decisive victory over the rebels, who have for some time menaced the garrison at Kosheh, midway between El Obeid and Cairo. The successor of the Mahdi now holds the Nile Valley and surrounding country from Kosheh to Khartoum, and southward, and since the fall of Khartoum he has been moving cautiously northward with the avowed intention of invading Egypt.—Rumors rife to the effect that Servian troops have violated the armistice by attacking a Bulgarian frontier village, not confirmed; another, stating that Russia and Austria are secretly arming.—The inhabitants of the island of Crete petition the powers to liberate the island from Turkish domination.

January 5.—President Cleveland writes to ask that he may be allowed to assist in the erection of the proposed monument to the late Vice-President Hendricks.—Mr. Gladstone declines an invitation to visit America.—Gounod composes a mass in honor of Joan of Arc.

January 6.—Judge Powers, of the United States court, decides that citizenship must be refused to all persons who are not prepared to make oath that they regard the laws of the United States as supreme. This decision prevents the naturalization of Mormons who hold to polygamy, and makes it impossible for them to vote or act on juries. Mr. Pendleton, U. S. Minister, induces the German government to rescind its order for the expulsion of Americans from the island of Foehr.—King Humbert burns the letters of Victor Emmanuel to the Countess Miraflori.—Labor troubles in the north of England.

January 7.—The work of widening the Suez Canal delayed owing to the refusal of the Egyptian government to sanction a modification of the treaty.—The total cost of the military expeditions to Suakin, Egypt, according to an official statement issued in England, $17,727,415.—The Pope urges the Spanish bishops not to engage in politics.—The Princess of Wales seriously ill.—A massacre of Christians at Annam.

January 8.—A blizzard in the Northwest. Ice carnival at St. Paul, Minn., begun. Opening date of the American exhibition in London changed to May 2, 1887. A record of the railroad-building of the year 1885, shows the total length of main lines laid in the United States 3,113 miles, about 700 miles less than in 1884, and less than in any year since 1878, when the total was but 2,687 miles. The building permits issued in Chicago during the year 1885, represent a value of $19,062,570, and cover the construction of 342 flats, 2,413 dwellings and 38 factories, besides stores, offices, barns, etc. Permits were issued for the construction of 106 buildings to cost over $50,000, and two to cost $500,000 each.—The telegraph system of the British Islands, under control of the Post Office, amounts to 156,000 miles, and employs 17,000 instruments. The standard rate is twelve words for a sixpence, address included. Press messages alone now average a million words a day. Great storm on the north coast of Great Britain. The Loyalist Union resolves to establish branches of the Union throughout Ireland. Emperor William decorates Cardinal Jacobini for his services in connection with the settlement of the Carolines.—The war fever subsides in Greece.

January 9.—The Cherokees protest against the settlement of their lands by white people, and denounce the proposed scheme as one of spoliation. The great strike of the coal-

miners in the Monongahela Valley, initiated on the 3d of March, 1885, ends, the men going to work at the rate of wages offered from the first by the employers. The orange crop in Florida destroyed by frost.—It is rumored that the half-breeds of the northwest propose avenging the late Louis Riel.—The Queen announces her intention of opening Parliament in person.—The Anglo-Spanish protocol concerning the Caroline Islands signed.—The Marquis of Salisbury proposes a scheme to buy out the Irish landlords.—The return of Prince Alexander to Sofia, his capital, at the head of a part of his victorious army, marked by a popular ovation. Russia insists that Turkey fulfil the article in the Berlin Treaty providing for religious reforms in Armenia. The partisans of Senor Zorilla, in Spain, urge a revolution against the Government. A revolutionary conspiracy discovered at Ciudad Real.—The annexation of Burmah to the British Empire formally proclaimed. England cedes to China part of Upper Burmah in order to make the Chinese and Indian frontiers contiguous.

January 10.—Greece makes overtures to Montenegro for the formation of an alliance both offensive and defensive against the Porte.—Conferences for the purpose of reforming the Egyptian Government commenced.—Freycinet makes up a Cabinet of conciliation. General Boulanger takes portfolio for war. [General George Ernest Boulanger, the new War Minister of the De Freycinet Cabinet, is one of the youngest and most remarkable of the general officers of the French Army. Born in 1837, he entered Saint-Cyr in 1855, and left it on the 1st of October, 1856, with the grade of sous-lieutenant of infantry. Decorated after Magenta, he served in China as lieutenant, and received a very serious wound, which has never been well cured. He was promoted to a captaincy in 1862, and became chief of battalion (major) in 1870, and lieutenant-colonel on the 9th of November in the same year. Wounded at the head of his regiment at the first affair at Campigny, he assisted none the less at the second battle on the 2d of December. He was made a colonel, and received the rosette of the Legion of Honor, which, on the 24th of June, 1871, was changed into the badge of a commander. In May, 1880, when but little over forty-three years of age, he was made a brigadier-general. General Boulanger was chief of the French military mission to the United States on the occasion of the Yorktown Centennial celebration in October, 1881. Later he was appointed commander of the French division of occupation in Tunis.] Charles de Lesseps and a party of engineers start from France for Panama.—A departure in the history of the Catholic Church in Spain marked by the manifesto issued by the Spanish Bishops, wherein they take a bold step in the direction of the severance of their religion from politics.—Mr. Gladstone promises the Liberal members of Parliament an immediate frank statement of his proposition for the settlement of the Irish question. Mr. Parnell maintains a masterly reticence, with his small but well-organized force in readiness to take strategical advantage of the situation as developed by the Queen's speech and Lord Salisbury's reply.

January 11.—Dakota asks to be admitted to the Union as a State. A city ordnance passed at San Francisco making it a misdemeanor with heavy penalty to hold sand-lot meetings.—The king of Bavaria's probable morganatic marriage announced to the young and beautiful widow of a Nurenburg carriage maker.—The quiet in the Balkans, under the armistice, unbroken, save for a statement to the effect that Servia is assuming an attitude of presumption towards her conquerors.

January 12.—The Senate promptly passes Mr. Edmund's Bill for winding up the affairs of the Church of Latter-day Saints. The Act annuls all Territorial laws designed to bolster the Mormon iniquity, including that which permits women to vote; and declares all marriages between persons within, and not including, the fourth degree of consanguinity, to be incestuous. The Presidental Succession Bill passed by the Senate.—The British Parliament opened.—The Powers summon Servia, Bulgaria, and Greece, to disarm.—France proposes to hold a great exhibition in 1889.

January 13.—Dr. Daniel G. Brinton announced as laureate of the Société Américaine de France for 1885. The first American thus honored. President Grévy signs a decree granting amnesty to persons convicted of political offences since 1870.—The Japanese Government sends Vassar College a pair of bronze vases handsomely ornamented with inlaid decorations in gold and silver, in appreciation of the education given to two Japanese girls.—A party of travelers go from San Francisco to London within fourteen days—the quickest time on record.—The agitation in favor of a bimetallic standard of currency in Germany attains great proportions. Two hundred petitions from farmers' and peasants' unions demanding the restoration of silver, presented to the Reichstag.—The Australian harvest over. Ninety thousand tons of wheat available for export.—A severe engagement takes place between a body of Russian troops and a body of Persian troops.—Russia asks the Vatican to reopen the negotiations for closer relationship.

January 14.—The Emperor William opens the Prussian Diet.

January 15.—The bill regulating the Presidential succession passes the House.

January 16.—Thirteen Mormon workmen meet instant death at a mine at Evanstown, Wyoming.—The London Chamber of Commerce petitions the Indian Office to facilitate the establishment of railroad communication between Burmah and China. The British Government approves the proposal to appoint a special committee of the House of Commons to consider means for the improvement of the Mail service between Canada and the United States.

January 17.—The Pope complains of the conduct of the government of France towards the Church.—The Greeks clamor for extension of territory or for war.—Arrests of persons suspected of complicity in the late abortive revolutionist demonstration at Carthagena continue in various parts of Spain.

January 18.—Germany seizes the Islands of Samoa, about half way between San Francisco and Australia. The islands, which are eight in number, have a constitutional form of government, and contain an aggregate of 35,000 inhabitants.

January 19.—New York begins to grow uneasy in regard to the Broadway surface road franchise. The workingmen assemble in council at Albany.—Prince Napoleon undergoes a surgical operation for the removal of a tumor on the cheek. The French Government creates traveling juries. In the organic law of the Institut it is to select yearly ten citizens to travel abroad and collect information useful to science, commerce, and agriculture. These scientific travelers will not be appointed by the Academy of Sciences or the whole Institut, but by a special administrative commission, on the basis of a competitive examination.—The Bavarian Secretary of State presents a memorial to the King, stating that the ministry will endeavor to regulate his Majesty's finances, on the condition that it be empowered to control his future expenditures.

January 20.—The migration of negroes from North and South Carolina to Arkansas attracts attention.—Proposed in France to tax all foreign residents in that republic eighteen francs per annum. It is announced that less than one-third of the earth and *débris* that cover the ruins of Pompeii has been removed to date. The Carlists decide to abandon for the present their preparations for a rising in Spain. Rumors are rife that Russia is preparing for war. The Prince of Wales opens the new Mersey tunnel at Liverpool. A Bengal native Regiment sent to reinforce the British troops at Mandalay.—Herr Kopp, Roman Catholic bishop of Fulda, appointed a member of the Upper House of the Prussian Landtag by the Emperor William.

January 21.—Queen Victoria opens Parliament in person. Her Majesty's speech considered very unsatisfactory by the Parnellites. The British troops successful in a skirmish at Burmah.—It is rumored that a revolutionary expedition against Spain is being prepared in France. The French flag hoisted over Sumatra, one of the Sunda Islands, hitherto under Dutch protection.

January 22.—Thirty-nine men entombed alive in the bottom of a shaft at Wheeling, West Virginia. Mr. and Mrs. Sloane propose to build and endow a maternity hospital in New York City.—Moukhtar Pasha proposes that the Turko-Egyptian army be organized for the protection of Egypt instead of the English army now in the country.—The Government of the Congo State asks Mr. Henry M. Stanley to renew his engagement with that State.—Prince Bismarck receives the

decoration of the Order of Christ. The badge worth $3,000. The first Protestant who has been thus honored.—The New Mexico Government enlisting Texas rangers to fight the Apaches.

January 23.—The police authorities in London take extraordinary precautions against dynamite. John Magee, who pleaded guilty to attempting to procure money from the Prince of Wales by threatening letters, sentenced to seven years' penal servitude. Farmers in Wales demand a permanent reduction of twenty-five per cent. in rents, fixity of tenure, and compensation for making improvements on their holdings.—M. de Lesseps remains a fortnight at Panama. Declares that his task there is a far easier one than was the construction of the Suez Canal, and says that the Panama Canal will be completed by the end of 1888.

January 24.—An immense flood in Los Angelos, Cal.—England informs Greece that she is prepared to send a fleet to prevent that power from attacking Turkey by sea.—A serious deficiency reported in the Italian Budget, attributed to cholera and the expenses attending the expedition to Massowah.

January 25.—The cholera appears at Trieste.—The Governor of Senegal telegraphs that he has completely defeated the False Prophet and driven him into the Niger country.—Greece completes her preparations for war and seeks a plausible pretext for a conflict.

January 26.—Thomas A. Edison invents a device for telegraphing to and from moving trains. It is not by means of induction from a wire running near the cars, but the message is made to jump from the tin roof of the cars to one of the ordinary wires strung on poles twenty-five to sixty feet away, whence it goes to its destination, and the message and the answer jump back across the chasm in the same way. The Pennsylvania Railroad Company organizes a relief department. The plan contemplates the establishment of a fund, through monthly contributions of members, for the support of employés in case of accident or death, and the assistance of their families, in sums ranging from $250 to $2,500 in case of death.—The Salisbury Government goes down with sensational suddenness; the immediate occasion of its overthrow being, not the Irish problem proper, but a lateral issue which did not involve the question of Imperial unity at all. The hazardous experiment having been tried of making a Cabinet question of Mr. Collings's agricultural amendment to the Queen's address, the Tories were defeated by an Irish-Liberal combination which gave the decisive vote of 329 in favor of the proposition to 250 against it.—The Greek fleet weighs anchor and goes out to sea.—Serious floods prevail in the south of France.—It is rumored that the Duke of Braganza, heir to the throne of Portugal, will marry the eldest daughter of the Comte de Paris.

January 27.—A bill introduced in the Senate provides that Indians shall be eligible to appointment as postmaster, mail agent, postal clerk, deputy collector of internal revenue, deputy marshal, Indian agent, or Indian inspector, or to any other office relating to the conduct of Indian affairs or to the government of any Indian tribe or nation. Mrs. Grant receives her first check from the publishers of General Grant's memoirs for $250,000—probably the largest sum ever paid at one time for literary work. The next largest check may have been that paid to Macaulay—a hundred and fifty thousand copies of his wonderful history having sold within four weeks. The Pan Electric Telephone Company scandal brought to light.—The British Conservative Ministry resign office. Mr. Parnell spoken of as Chief Secretary for Ireland. The British Mediterranean fleet ordered to rendezvous at Suda Bay, Crete.—The Turks and Bulgarians fraternize.—A great strike of iron workers takes place in France. Troops called to quell the disturbance and several rioters killed.

January 28.—Capt. Crawford, U. S. A., fired upon by Mexicans in Sonora and killed.—Prince Bismarck in the Prussian Landtag urges the expulsion of the Poles from Germany, proposing to buy out all the real estate owned by Polish nobles in Prussian Poland at a cost of $75,000,000.—A skirmish between Greeks and Turks takes place at Lasora, on the frontier of Epyrus.—M. de Lesseps leaves Paris for Panama, saying, "I will be back in 60 days, I cannot die before opening the canal."

January 29.—The admission of Dakota as a State under debate.—Mr. Gladstone summoned by the Queen to form a cabinet. The commander of the English Mediterranean Squadron instructed to employ force against the Greeks whenever they attack the Turks.—Police authorities raid a house in St. Petersburg and arrest 23 Nihilists.

January 30.—Enormous rascality developed in the theft of land in Utah.—Copyright question before a committee at Washington. Two ocean steamers the "Servia" and "Nordland" collide on the Hudson. The alumni of Vassar College impeach its sectarian government. Representatives of the New England fisheries appear before the Senate Committee on Foreign Relations to argue against any new negotiations for the settlement of the fishery question. They claim to have all the rights they want in the privilege of fishing beyond the three-mile limit accorded by the Convention of 1818. Beyond that they only ask the protection afforded by the duty on fish which is revived by the abrogation of the Treaty of Washington.—A severe shock of earthquake experienced at Veley-Malaga, Spain.—The Mexican Government announces that it will immediately establish an agency in London for the registration and liquidation of Mexican Bonds.

January 31.—Chicago Anarchists issue a bloodthirsty circular.

February 1.—A successful test of the new invention by Thomas A. Edison for sending telegraphic messages from a car running at the rate of 25 miles an hour.—France gains great privileges in her treaty with Madagascar. General Boulanger leads an exciting debate in the Chamber of Deputies, Paris, on the necessity of crushing anti-republican intrigues.—Mr. Gladstone, at Osborne, receives the command of the Queen to form a cabinet.—An Italian version of a collection of poems written by Pope Leo XIII. published in Paris by the Abbé Brunelle.—The Vatican accepts Prussia's *modus vivendi* regarding the education of clergymen, subject to some minor modifications.

February 2.—Bills before the House Committee on Public Lands provide for the restoration to the public domain of 100,000,000 acres of land which have not been actually earned by the railroads to which they were given by Congress within the time specified in the law.—Engineers survey the proposed railway route from Winnipeg to Hundson's Bay and report that the line will be entirely practical, and not likely to cost over $8,000,000.—Mr. Gladstone's daughter marries. The lads on the British reformatory ship "Clarence" mutiny.—The Polish policy of Prince Bismarck produces great excitement throughout Germany and Austria.

February 3.—The New York surface car drivers go on strike. Terrific explosion of blasting powder at the new aqueduct, New York.—A snow storm in Mexico. Snow four inches deep near the capital—the first in thirty years.—An officer and five men attached to the Austrian war-ship "Donau" lost in the North River, New York.—Mr. Gladstone officially announces his cabinet. The Dacoits defeated by the British in Burmah with heavy loss.—Great strike of French weavers. The agreement between France and Germany regarding their respective possessions on the west coast of Africa and in the South Sea settled by the Reichstag.—A revolution in Spain feared.—His holiness the Pope has a slight attack of syncope.

February 4.—Florida land-swindles shown up by the public press. Mr. George L. Lorillard, of New York city, dies at Nice, France. [Mr. Lorillard was widely known in this country as a yachtsman, a turfman, and a patron of all outdoor sports.] A war of cable-rates threatened.—The principal landlords in Wales combine to resist the Farmer's League for a reduction of 25 per cent. in farm rents. The Earl of Aberdeen appointed Lord Lieutenant of Ireland. Mr. John Morley Chief Secretary.—Italy will accept Spain as arbiter between the United States of Colombia and Italy over the arrest of an Italian subject.—The Servian government orders all merchants and manufacturers under forty years of age to join the active army of Servia.—The Porte supports the demands of Bulgaria for a war indemnity from Servia.

February 5.—It is considered inopportune by the Extreme Left in the Chamber of Deputies to bring forward a measure for the expulsion of the Orleans Princes.

February 6.—The inquiry into the Broadway surface road robbery begins.—Representatives of Turkey and Bulgaria sign the agreement relative to the Bulgarian union. The treaty confirms Prince Alexander's appointment as permanent Governor, provides for mutual help to repel foreign invasion, and gives Turkey control over certain Mussulman villages in Roumelia.—A revolution fermenting in Turkish Armenia.—The striking factory operatives at Saint Quentin, France, erect barricades and seem desirous of coming in conflict with the military.

February 7.—The Northwestern States visited by another blizzard. At St. Paul the thermometer registers 36° below zero, in Northern Michigan 40° below.—Excavations made by the English at Tel-el-Kebir, in Egypt, bring to light the remains of a city and traces of the bricks without straw with which the Israelites were obliged to build during their bondage in Egypt.—The commerce committee of the French Chamber of Deputies resolves to ask the government to continue to prohibit the importation of American pork.—Several deaths of cholera reported at Terifa, Spain.—Greece informs the Porte that she has no intention to attack Turkey.

February 9.—Major-General Winfield Scott Hancock died, aged 62. [Born in Montgomery Co., Pa., Feb. 14, 1824; graduated from West Point in 1844. He served in the Mexican war, and was present at San Antonio, Cherubusco, Contreras, Molino del Rey, and the capture of the city of Mexico. For gallantry at Cherubusco and Contreras he was promoted. In 1861 he was made brigadier-general of volunteers, and was from that time until the termination of the war connected with the Army of the Potomac. He rendered gallant and valuable services at the siege of Yorktown and the battles of Golding's Farm, Garnett's Hill, Savage's Station, White Oak Swamp, Crampton's Pass, South Mountain, and Antietam; and in 1862 he was made major-general U.S. Volunteers. He commanded a division at Fredericksburg and Chancellorsville, and rendered gallant service at Gettysburg, where he was severely wounded at the very moment of victory. Here he commanded the left centre, and repulsed the final and grand assault of Lee on the third day of battle. Recovering from his wound, he was present at the Wilderness, Spottsylvania, and the assault upon Petersburg. He also commanded the Union forces at Deep Bottom and Ream's Station. Held the post of commander of the Eastern division of the U.S. army, headquarters at Governor's Island, till his death. In 1880 he was nominated for the presidency by the Democratic party, but was defeated.] Over 1,000 private Pension Bills already introduced in the House. The Commissioner of Pensions estimates that it will take $52,000,000 to meet the claims for pensions on account of the Mexican War. Serious trouble by strikers in the Pennsylvania coke regions. An ice-blockade on the Long Island Sound.—A socialist riot in London; houses wrecked and shops pillaged.—The art treasures of the late King of Portugal announced for sale in Paris.

February 10.—Archbishop Gibbons of Baltimore receives the announcement that a Cardinal's hat will be conferred upon him. General Hancock interred at Norristown, Pa. Ex-Governor Horatio Seymour failing rapidly.—The Right Hon. Mr. Forster, for some time Chief Secretary for Ireland, reported dying. The English government intends to prosecute the more violent of the Socialist speakers. Mr. Parnell carries the Galway election. London greatly scared over a report of the rising of Socialists. A meeting of Englishmen and Scotchmen in favor of Irish Home Rule held in London, Lord Ashburnam presiding.—The strike of factory operatives at St. Quentin ended.—The site of the Roman arena in Paris reveals indications of the use of water to flood the arena for the purpose of water sports and sham naval battles. Fragments of seats, with the names of their holders engraved on them, found, and a woman's head in stone, with a fillet of bay-leaves about it.—Herr Halbherr, explorer of the Island of Crete for Italy, finds in the inscriptions first seen on the foundations of a mill at Gortyna, Crete, the lost laws of Minos.

February 11.—Mr. Garland surrenders his Pan Electric stock. The Chinese on the Pacific coast subjected to an organized boycott, carried on with systematized vigor. The House of Representatives passes the Bill increasing pension of widows and dependent survivors of Union soldiers from $8 to $12 a month.—The emperor of China formally invites the Pope to open direct relations between the Holy See and the Chinese Empire by the establishment of a Papal Embassy at Pekin.—A mob riot in Leicester, England. The police overpowered. Mr. Gladstone is reported as preparing a bill providing for the expropriation of land in Ireland by means of State funds. The Marquis of Lorne accepts the position of Honorary Commissioner for Canada at the coming Colonial exhibition.—Captain Saraw found guilty of having furnished plans and information regarding German fortifications and armaments to the French military authorities.—King Milan summons the entire Servian army to enter the field fully equipped for war for a drill of six weeks.

February 12.—A fund inaugurated for General Hancock's widow. Great floods in New Jersey. Horatio Seymour dies, aged 75. [Born at Pompey, Onondaga Co., N. Y., May 31, 1810. He was admitted to the bar in 1832, and in 1841 was elected to the State Assembly as a Democrat. He was elected Governor of the State in 1853; but failed of re-election in 1855, on account of vetoing a prohibitory liquor law. He was re-elected in 1862. In 1868 he was nominated for the presidency, but was defeated, and thereafter did not take a very active part in politics.]—The French Chamber of Deputies vote that the crown jewels shall be sold to provide a fund for aged workmen. The jewels estimated to be worth $40,000,000. Some that are of historic interest will go to the Louvre collection. The gems of artistic and educational interest, valued at 13,000,000 francs, will be handed to the Museum and School of Mines. The imperial crown swords that belonged to Louis XVIII. and the Dauphin will be melted in order to prevent the possibility of their falling into the hands of showmen.—The abdication of the Queen of Spain rumored.

February 13.—Great floods reported all over the United States. Ex-President Arthur seriously ill. The United States Senate passes the Bill to open to settlement 11,000,000 acres of the Sioux reservation in Dakota. The reservation comprises 33,000 square miles, is four times as large as the State of Massachusetts, and "is as fine a country." The House Military Committee agrees to a Bill for the protection of the people of Arizona and New Mexico. It provides for raising one regiment of volunteer cavalry in each Territory for one year's service, to be composed of and officered by actual residents of the Territories named.—Dissensions in Mr. Gladstone's Cabinet rife.—The Irish Loyalists propose to arm in defense of the Union.—Germany mediates between Russia and Bulgaria.

February 14.—Two square miles of Boston, Mass., under water. Chicago Socialists endorse the London rioters. Ex-Governor Seymour interred.—Bismarck's Polish policy bitterly opposed.—Banquet to Mr. Morley, Chief Secretary for Ireland, in the Dublin Mansion House, boycotted.—Nine dynamiters arrested in Madrid, Spain.—Russia renews negotiations with England to induce her to join the International League for the extradition of political criminals.

February 15.—Mr. Gladstone announces that he will give precedence to home rule in Parliament.—France supports the demands of the Porte for the formation of a Turco-Egyptian army to replace the British troops in Egypt.—Bismarck practically repeals the May Laws in order to conciliate the Vatican.—It is decided by the English government to garrison Burmah with 16,000 troops.

February 16.—The postmasters national convention meets in Chicago.—A new war cloud in the Balkan peninsula appears in the horizon.—A series of stringent measures against the German residents of Russian Poland commenced.—Ex-Queen Isabella of Spain becomes reconciled to her husband Francois.—France informs England that she has instructed her minister at Cairo to support the demands of Moukhtar Pasha that the English evacuate Egypt, and that the British force there be replaced by a Turco-Egyptian army.—The Papal secretary of state sends a note to the Prussian minister to the Vatican accepting the principle of the new Prussian Religious Bill.—Bismarck sends a note to the Greek government insisting on the disarmament of Greece.

February 17.—The Southern strike extends; the governor of Louisiana appealed to for State troops. A Philadelphia syndicate offers to purchase a controlling interest in the Broadway surface railroad. Virginia's public debt to be adjusted by a commission of three. The Western Union Telegraph Company refuses to pay taxes.—Mr. Joseph Chamberlain, president of the local government board, quarrels with Mr. Gladstone on the Greek policy of the government.

Trial of the London Socialists commences. A mutiny on board the British naval training-ship "Arethusa."

February 18.—John B. Gough, the distinguished temperance advocate, dies in Philadelphia. [John B. Gough was born in Sandgate, Kent, England, of very poor parents, in 1817. He came to America when twelve years old, and it was not until 1842 that he began his work as a temperance advocate. In the interim he had worked as a bookbinder for $2.25 per week in New York; had sung and acted in low theatres there and in Boston; had seen his mother buried in the Potter's Field in New York, and had fallen into the depths of intemperance and degradation. He was induced to sign the pledge at a temperance meeting in Worcester, Mass., in 1842. He first spoke as a reformed drunkard. His speeches soon drew him large audiences, and he lectured successfully in Boston, New York, and Philadelphia. In 1853 he went to England, and again in 1857 and 1878, staying once three years and making 1,260 speeches in all. He has delivered nearly 10,000 addresses and traveled hundreds of thousands of miles in the cause of temperance, and spoken before more persons than any one man now living.] A World's fair for New York proposed. Mr. John Kelly (Boss) pronounced hopelessly ill. The war on the Trans-continental commences. A cut from 30 to 50 per cent. on the Union Pacific. The Chicago picture "Origin of the Book," by Raphael, proves to be a fraud. The consideration of the Fitz John Porter Bill resumed.—The Home Rule question postponed in the British Parliament until March 22. The Womans' Franchise Bill read a second time.—Von Moltke suffers gastritis.—Professor Nichol of the University of Glasgow arrested in Naples for carrying a sword-stick.—England will act in concert with the other powers in relation to the Greek fleet.—Prince Alexander arrives at Philippopolis as ruler of Eastern Roumelia.—The project of recruiting a Hungarian legion for service in the Servian army prohibited.

February 19.—Mr. Evarts in the Senate makes a strong plea for education in the South.—Sir Charles Dilke will not resign his seat in the House of Commons.—Servia negotiates with Turkey in favor of a union with Bosnia.—The Portuguese Ministry resigns.—Germany augments her torpedo armament in a greater ratio than either England or the United States.—The Crown Prince and Princess of Austria will visit England in the fall.

February 20.—The injustice of detaining debtors in Ludlow street jail exposed. Completion of the movement initiated by Miss Caldwell for building a Catholic University.—The Empress of Austria ordered to abandon her equestrian and sword exercises on account of ill health.—The Earl of Aberdeen, Lord Lieutenant of Ireland, makes his state entry into Dublin.—The French Government decides to hold a universal international exhibition in Paris in 1889.

February 21.—An immense fire at Wilmington, N. C. Pierre Lorillard sells off his magnificent stud of horses.—Ex-President Soto, of Honduras, refuses to be identified with the filibusters of the City of Mexico.—Food riots in Quebec by starving fishermen.—The English Socialists meet in Hyde Park, London, 50,000 strong.—It is reported that a plot exists to unite Spain and Portugal under the Duke of Braganza, and to overthrow the present Regency in Spain.—Thirty thousand persons apply to the London Mansion House for relief.—The Powers send a final note to Greece before blockading the Greek fleet in the bay of Salamis.

February 22.—Austria declares herself anxious for peace.—Nine hundred convicts in the central prison at Thouars revolt and master the guards; the troops succeed in suppressing them.—The German Ambassador recommends a German protectorate of the Marshal, Providence and Brown Islands.—The Balkan peace conference adjourns.—Lord Randolph Churchill works up a loyalist boom in the north of Ireland.—Archbishop Walsh, of Dublin, on the part of the Irish Bishops, endorses Mr. Gladstone.—Mr. Gladstone announces that the government does not intend to suppress the Irish National League. The police department of London to be re-organized.—The Berlin Mint turns out silver for Egypt.—Outbreak of smallpox at Buda-Pesth.—Greece anxious for hostilities.

February 23.—The Fire Insurance Convention takes place at St. Louis.—Greece formally submits.

February 24.—A special committee to investigate the Pan Electric. The House Committee on Commerce practically adopts the Ship Railway Bill of Captain Eads. The weather clerks hold a convention in Washington.—It is reported that the first outline of Mr. Gladstone's Irish proposals has been presented to the Cabinet, and that the Premier goes the whole length of restoring the Irish Parliament.

February 25.—An international movement in the interest of laboring-men proposed for Europe. A water famine in Vienna.

February 26.—A wind storm traveling at the rate of 84 miles an hour passes over New York, followed by a blizzard.—The screw makers of Birmingham on strike. A famine on the west coast of Ireland reported.

February 27.—The Municipality of Paris orders the name of the Deity to be expunged from children's books issued by the Metropolitan school committee. The treaty of peace between France and Madagascar ratified by the Chamber of Deputies.—Brazil borrows $30,000,000.

February 28.—An Anti-Poligamy Bill to be introduced into Congress.—The marriage of the Archduchess Maria of Tuscany to the Archduke Karl Stephan, brother of the Queen-Regent of Spain, is solemnized at Vienna.

March 1.—The President replies to the Senate touching his rights and powers.—Sir Alexander Stewart, ex-Premier of South Wales, visits the United States via San Francisco.—The wife of Minister Phelps specially received by the Queen at Windsor.—Forty laborers a day die on the Isthmus of Panama.

March 2.—The President recommends an appropriation to indemnify the Chinese for losses sustained at the Rocks Springs Massacre. A great car-driver's strike in New York.—Pope Leo celebrates the seventy-fifth anniversary of his birth and the eighth anniversary of his coronation.—An American bark looted on the Island of Madagascar.—The creditors of King Ludwig, of Bavaria, begin to make life a burden to the great spendthrift.

March 3.—General Terry succeeds the late General Hancock in the department of the Atlantic. The filibustering steamer "City of Mexico" captured.

March 4.—Archbishop Corrigan invested with the Palium at St. Patrick's Cathedral, New York. A great surface car strike in New York and Brooklyn.—The British Government telegraphs Lord Dufferin to definitely annex Burmah.—The French Chamber of Deputies reject a motion for the immediate expulsion of the French princes from France.

March 5.—Great strike on the Texan-Pacific railroad.—Mr. Labouchere moves the virtual abolition of the House of Lords. His motion rejected by a vote of 202 to 166.

March 6.—A million dollar fire in Akron, O. The Kentucky militia called out to suppress mining troubles in Kentucky.—Parnellites understood to be willing to agree with Mr. Gladstone.—Germany claims that boys are being inoculated in Alsace-Lorraine with the idea of revenge.—The Infanta Eulalia, sister of the late king of Spain, Alfonso, married in Madrid to Prince Antonio, son of the Duc de Montpensier, and brother of the Comtesse de Paris. Ex-Queen Isabella and her consort, Don Francisco, prove their reconciliation by jointly giving away their daughter. Mr. Henry M. Stanley seriously ill.

March 7.—The British foreign secretary consents to make room for a number of Turkish officers in the Egyptian army by displacing British officers.

March 8.—Ten thousand soft coal miners in the east quit work. Senator Miller, chairman of the committee on foreign relations, dies. The celebrated "Peach Blow" vase sells for $18,000 at the Morgan sale.—Mr. Gladstone confined to his room.

March 9.—A brilliant Mardigras at New Orleans.—Greece refuses to disarm in spite of the naval demonstration.

March 10.—The great strike continues at St. Louis.—Fatal railway collision between Monte Carlo and Mentone; twenty persons killed.

March 11.—A steamer blows up on the Mississippi. A savings bank at New Brunswick, New Jersey, wrecked. Freight begins to move again over the South Western lines. Princess Hellene de Ypsilante declared a bankrupt. —German to be studied in the Austrian-Hungarian army. —The Pope sends a special letter to Bismarck, thanking him for his eulogistic references to His Holiness at the recent German parliamentary dinner.

March 12.—The murderers Ford and Murphy, New Orleans, poison themselves in their cells. Bill passes the House for the pension to the widow of the late General Hancock.—The committee of the Reichstag practically reject Bismarck's Spirit Monopoly Bill.

March 13.—The question of Sunday theatrical performances at Cincinnati causes considerable agitation.—Mexico aroused to the demand of the United States for redress for the death of Captain Crawford.

March 14.—The Cunard S.S. "Oregon" run down by a schooner off the Long Island coast. Washington, D. C., spoken with over telephone-wire.

March 15.—Richard Bell, the English sculptor, found guilty of misdemeanor, for having obtained money under false pretences, and sentenced to a year's imprisonment with hard labor.

March 16.—Mrs. Bancroft, wife of the venerable historian, dies. Ex-President Arthur better. 28,000 miners quit work in the bituminous coal regions, Pennsylvania.—Mr. Joseph Chamberlain, President of the Local Government Board, and Mr. George Trevelyan, Secretary for Scotland, place their resignations in the hands of Mr. Gladstone.—The Reichstag totally rejects Bismarck's Spirit Monopoly Bill.

March 17.—St. Patrick's Day celebrated with the utmost eclat all over the United States.

March 18.—The perfected Franchise Bill carried through at Albany. Abigail Bates, who with her sister frightened away a British warship by sounding fife and drum in 1812, dies, aged 89. President Cleveland, 49 years of age. Great strike coming to an end.—The Czar objects to Prince Alexander being a life-governor of Roumelia.—Russian petroleum-fields on the west coast of the Caspian Sea developed.

March 19.—Alarming fires in the oil region.—The German newspapers discuss the prospect of a war of retaliation by France.

March 21.—The Railway Franchise Bill becomes a law of the State.

March 22.—Oil fields discovered in Upper Egypt.—Emperor William celebrates his 89th birthday in excellent health.

March 23.—State troops ordered to drill nightly at Kansas City, to be prepared for the strikers. The police of Chicago discover a dynamite arsenal.—The first steamer lighted by electricity passes through the Suez Canal.—M. de Lesseps arrives in Paris after his trip to Panama.

March 24.—Queen Victoria startled; a crank throws a petition into her carriage.—The Indian financial statement for 1885 shows a deficit of £386,440.

March 25.—Mr. Gladstone will detail his Irish plan on April 8. The Countess de Chambord dies.

March 27.—Secretary Manning struck with paralysis.

March 28.—Mr. Jay Gould agrees to the plan of arbitration in the strike question. Yellowstone Park to be leased to a new syndicate.—Prince Alexander about to make his army proclaim him King of United Bulgaria.—The Portuguese Government issues a decree authorizing the free exportation of gold and silver coins.

March 29.—A hitch in the negotiations for a peaceful settlement of the strike.—Mr. Parnell denies that he has been quasi-officially informed of the progress of Irish matters in the Cabinet.

March 30.—Jefferson Davis, ex-President of the Confederacy, names April 28th as the date of his lecture at Montgomery, Alabama, in aid of the monument for the Confederate dead. The body of Capt. Crawford recovered and embalmed. —Key West, Fla., swept by fire, loss $1,500,000.—Emperor William gives audience to Dr. Kopp, Roman Catholic bishop of Fulda.

March 31.—The great strike over.—The Bill enfranchising the police passes its second reading in the British House of Commons.

April 1.—Furious spring freshets in New England and the south.—The Czar of Russia and his Court start for the Crimea, the route guarded by one hundred thousand men.—Bismarck celebrates his seventy-first birthday.

April 2.—Many Southern towns under water.—A mass meeting in London protests against granting a Parliament to Ireland.—The German Reichstag decides in favor of prolonging the anti-Socialist law.

April 3.—Great floods in the West and South. A strikers riot at Fort Worth, Texas. The Western Union Telegraph Co. sued for $2,000,000. The House passes the Labor Arbitration bill.—The opposition to Home Rule increases in England.—A report that Bismarck decides to withdraw the concessions made to the Vatican.

April 4.—The Knights of Labor hold a conference at St. Louis. Rioting in Fort Worth continues.

April 5.—The floods in the South subside. Fort Worth patrolled by 400 Texan militia men. The House passes the Mexican pension bill for the survivors of the war of '47.—The Right Hon. William E. Forster (Buckshot) dies, aged 68. [Mr. Forster was Under Secretary for the Colonies from 1865 to 1868, in Lord Russell's administration; a member of the Privy Council in 1868, and of the Cabinet in 1870. He was prime mover in the passage of the Educational bill in 1870, and the Ballot bill in 1872. On Mr. Gladstone's retirement in 1875 Mr. Forster might have led the Liberal party, but declined through fear of proper support. When the Beaconsfield Parliament was prorogued in 1880 Mr. Forster returned to power as Chief Secretary for Ireland under Gladstone. Mr. Forster was undoubtedly a well-hated man, his nickname, "Buckshot" Forster, being bestowed upon him during the heat of the Irish troubles connected with the suppression of the Land League, Mr. Forster having advocated the substitution of buckshot cartridges for the usual ball cartridges used by the Irish constabulary.]—Ten thousand operatives on strike in Belgium.—The Reichstag adopts the treaty between Germany and Zanzibar.

April 6.—The Knights of Labor declare war on Jay Gould. A great fire at La Cross, Wisconsin.—The Abbe Liszt conducts his Oratorio of St. Elizabeth in London.—Cholera appears in the south of France.

April 7.—A mob riot in East St. Louis. Senator Logan's Army bill defeated. A terrible railway accident on the Fitchburg railroad, Massachusetts.

April 8.—Severe rioting in Laredo, Texas. Fire in the Philadelphia Academy of Fine Arts; 45 pictures destroyed.—Mr. Gladstone unfolds his scheme in the House of Commons: a severance of Parliament, but no repeal of the Union. Irish representatives no longer to sit in Westminster. Intense excitement in the House.

April 9.—An anti-railway mob fired into at East St. Louis.—Mr. Chamberlain opposes Mr. Gladstone's scheme for Home Rule.

April 11.—The militia supports the sheriff's authority in East St. Louis.—Lord Wolseley opposed to the Home Rule measure.—Grecian deputies clamor for war.

April 12.—Boston indorses Gladstone's scheme. Strikers go to work. Major-General Schofield assumes General Hancock's command.—Conservatives attack Mr. Gladstone's plans for Ireland.

April 13.—Rumor started of President Cleveland's engagement to Miss Frances Folsom.

April 14.—Rhode Island indorses Home Rule. John H. Noyes, founder of the Oneida community, dies.—Mr. Gladstone fights for time in order to rally his followers.

April 15.—The Porte notified by Russia, Germany, and Austria, that they are taking steps to make Greece disarm.

April 16.—The four sons of the late W. H. Vanderbilt endow a free dispensary. Free ports for American vessels in Canada demanded of Great Britain. Great strike of the Third Avenue surface railroad of New York.—Mr. Gladstone unfolds his Land Purchase Bill in the British House of Commons: £50,000,000 three per cent. stock issued at par to buy out the landlords; twenty years to be a normal purchase.

April 17.—An abnormal flood in the river St. Lawrence, great destruction of property.—Bismarck denies that he is an enemy of the Poles.—Lord Hartington is hostile to Gladstone's scheme.

April 19.—The Seventh Regiment visits Washington, D. C. Ex-President Arthur reported at death's door.

April 21.—Charles E. Loew, a prominent New York citizen, dies.—A conflict on the Greek frontier hourly expected.—The British defeated in Burmah.—A missing Chapter-house in Christ Church, Dublin, discovered.—The Duke of Sutherland with a large party visits New York.

April 22.—Riots at the sugar refineries at Greenpoint, L. I. The last stone laid of the Statue of Liberty's pedestal.—The judgment of the Court in the "Oregon" inquiry case is in favor of the owners and officers. A great Home Rule meeting in London.

April 23.—The Lake Shore strike over. The largest grain fleet ever afloat on the great lakes leaves Chicago.

April 24.—An attempt made to blow up London Bridge. Orange and Catholic roughs come into collision at Glasgow. It is believed that Greece will disarm.

April 26.—The Wabash, St. Louis and Pacific railroad sold.—Lord Hartington endeavors to create an independent party. The formation of a supreme and permanent commission for the settlement of fisheries disputes between Canada and the United States advocated in London.

April 27.—Jefferson Davis, ex-President of the Confederacy, visits Montgomery, Alabama.—Emperor William sends a jeweled cross to the Pope as a souvenir of German gratitude for the friendly offices rendered by His Holiness in arbitrating the dispute between Germany and Spain, over their respective claims to the Caroline Islands.

April 28.—Jefferson Davis's visit to Montgomery causes considerable excitement in the South.—Bee, a German pretender to the Danish throne, arrives in Spain.

April 29.—Jefferson Davis dedicates a monument to the Confederate dead.—A political crisis supposed to be imminent in Spain.

April 30.—Ironclads carry the day. Greece bows to the will of the Powers.—Large quantities of ice on the routes of ocean steamers.—Canada enforces her fishery laws and orders off four American fishing schooners at St. Andrews, in the bay of Fundy.

May 1.—Thirty thousand working men demand shorter hours of labor in New York. Jefferson Davis attends the unveiling of Senator Hill's statue at Atlanta, Ga. Bishop Robertson of the Episcopal Church dies at Philadelphia.

May 2.—Prussia issues orders to the police to interfere in all cases of strikes.

May 3.—End of the big strike at St. Louis. Rioting in Chicago. Six thousand strikers storm the McCormack Reaper Works. Anarchists incite them to violence. The Chatham Artillery celebrates its Centennial anniversary at Savannah, Ga.—Mr. Gladstone issues an address to Midlothian.

May 4.—Chicago anarchists fight the police with bombs. A mob of fiends dispersed by pistol volleys. A riot at Milwaukee suppressed. Herr Most and anarchists on trial at New York.

May 5.—Twenty-six men buried under a falling building at Minneapolis. Socialists shot down at a riot at Milwaukee by the militia. The police finally repress the bloody anarchists at Chicago.—Mr. Gladstone's policy endorsed by the National Liberal Federation.

May 6.—Arms and dynamite found in Chicago in the haunts of the Anarchists. The Governor of Wisconsin tames the Anarchists at Milwaukee.

May 7.—A mass-meeting at the Academy of Music, New York, endorses Gladstone's policy.—Henry Rochefort fights a duel in Paris.—The Lower House of the Prussian Landtag adopts the Ecclesiastical Bill in its entirety.

May 8.—It is rumored that Lord Wolseley threatens to head the Ulster men in case of rebellion.—Emperor William of Germany buys for 5,000 dollars the original manuscript of the "Watch on the Rhine."

May 9.—Third Avenue, New York, long strike still continues. Chicago again quiet.—Oliver Wendell Holmes receives an enthusiastic reception at Liverpool.

May 10.—Alderman Jaehne's trial commences.—England concludes a commercial treaty with Spain.

May 11.—A tornado in Kansas City, Mo. A tornado near Pittsburg, Pa. The hotelmen meet in convention at New York.—Belfast papers advertise for 20,000 Schneider rifles. The English press declares that Gladstone is riding for a fall. Queen Victoria arrives at Liverpool for the purpose of opening the Liverpool National Exhibition.

May 12.—Tornadoes visit Illinois and Indiana. Herr Most, the Anarchist, is sent to the Tombs.

May 13.—A lively debate in the House of Commons on Home Rule; more deserters; arming and drilling goes on in Armagh.—Serious forest fires rage in Mexico.—Notice served on Canada that damage for the detention of the schooner "Adams" will be demanded.

May 14.—The bomb-throwing anarchists of Chicago caught. Both Governments await official reports on the seizure of the "Adams."—A shock of earthquake felt in Scotland.

May 15.—Alderman Jaehne convicted. A sub-treasury to be established at Louisville, Ky.—Dr. Holmes receives the warmest reception ever extended to any American across the Atlantic.

May 16.—Nationalists and Orangemen have a free fight in Tyrone.

May 17.—The largest aerolite on record, 200 tons, found at Washington County, Pa.; its composition is chromium, nickel, albumin, copper, magnesium, and tin. The American schooner "Ella Doughty" captured by the Dominion authorities at Englishtown for buying bait at that port.—Queen Marie Christina presents an heir to the Spanish throne.

May 18.—Maxwell confesses to the killing and mutilation of Preller at St. Louis.—The Crown Prince of Portugal starts for the frontier to meet his betrothed, the Princess Amelie, daughter of the Comte de Paris.

May 19.—German traders massacred on the gold coast of West Africa.

May 20.—The wife of the U. S. Minister to Germany, Geo. H. Pendleton, accidentally killed in Central Park, N. Y. Miss Kate Stoneman admitted to practice as an attorney and counsellor-at-law, at the Empire bar, the first woman ever admitted to practice law in the State of New York. The President's bride-eleet losses her grandfather, Col. John B. Folsom. Alderman Jaehne sentenced to Sing Sing for a term of nine years and ten months.

May 21.—Secretary Bayard makes formal demand on Great Britain, to release fishing boats. Martin Irons threatened with hanging by a mob of angry strikers.

May 22.—Fears in Europe that Russia means to give trouble. —Don Carlos disputes the right of Alfonso XIII. to the Spanish throne.

May 23.—Serious fighting between Greeks and Turks along 15 miles of the Northeast frontier.—The fêtes in honor of the marriage of the Princess Marie Amelie d'Orleans, with the Duke of Braganza, hereditary Prince of Portugal, begin.—Von Ranke, the "Nestor" of German historians, dies.

May 24.—Portland officials seize a Nova Scotian schooner under American laws.

May 25.—Twenty thousand friends of Ireland attend a Home Rule meeting in Chicago.

May 26.—Eight anarchists indicted at Chicago.—The Lord Lieutenant of Ireland receives an enthusiastic reception at Cork.—The French Budget Committee decides by a vote of 12 to 9, to throw out the Public Worship estimate.

May 27.—Great explosion of dynamite on Tom's River, N. J. Congress adopts a Shipping Bill, arming the President with power to order tactics of commercial embargo.—The Great Liberal meeting called by Mr. Gladstone, takes place in London.—The French Government subjects its Expulsion bill to the Chamber of Deputies.

May 28.—The President's wedding is semi-officially announced for June 2. The Senate Commerce Committee recommends the Ship railway guarantee.—Important discovery of gold at Kimberley, Australia, is reported.—A new extradition treaty between England and America spoken of in the House of Commons.

May 29.—A great mass meeting held at New Orleans in favor of Home Rule.

May 30.—The President arrives in New York and meets his fiance.

May 31.—Decoration Day. General Grant's tomb on the Hudson the "Mecca" of Grand Army veterans.—The Colony of Victoria, Australia, joins the Copyright Convention.

June 1.—John Kelly, the great Tammany chieftain, dies. Mr. James G. Blaine makes a remarkable and brilliant speech on Home Rule.—England warned by Canada that the Dominion will resent dictation.

June 2.—President Grover Cleveland marries Miss Frances Folsom; a quiet wedding at the White House. Anarchist Most and his companions sent to prison.—Canada votes to strengthen her defences.

June 3.—The House passes the Oleomargarine Bill by 76 majority.

June 4.—Secretary Manning sends in his resignation.—Severe rioting in Belfast; 2,000 Orangemen attack 100 Catholic navvies.—The Marquis of Salisbury criticises the speech of Mr. Blaine.—The eruption of Mount Etna ceases.

June 5.—Imposing funeral of John Kelly at St. Patrick's Cathedral.

June 6.—A party of French railroad officials arrive in the United States for the purpose of inspecting American railways.

June 7.—Mr. Gladstone's Home Rule Bill defeated in the House of Commons by a majority of thirty votes.

June 8.—Mr. Gladstone's Cabinet votes unanimously to dissolve Parliament.

June 9.—Orange riots in Belfast; nine persons shot dead by the police, and many wounded. The Queen consents to the dissolution of Parliament; all parties prepare for a general election.

June 10.—Belfast under martial law. Lord Carnarvon, ex-Lord-Lieutenant of Ireland, admits having had an interview with Mr. Parnell, but denies that he compromised the Tory party in any way.—Violent earthquake at Talavera, New Zealand.—It is proposed to depose King Ludwig of Bavaria.

June 12.—Passaic, N. J., celebrates its bi-centennial.—The Bill providing for the expulsion of the French Princes introduced into the Senate.

June 14.—Prince Alexander opens the first Bulgarian-Roumelian assembly.—Queen Victoria offers the Comte de Paris the use of Claremont; the Comte declines with thanks.—King Ludwig of Bavaria commits suicide in Lake Starnberg; his medical attendant, Dr. Gudden, drowned with him.

June 15.—Mrs. Cleveland installed in the White House.—The Belfast Jury returns a verdict of willful murder against the police.

June 16.—The dead King of Bavaria lies in state.—2,500 Belgian miners on strike.—Nova Scotia votes for secession.

June 17.—Oliver Wendell Holmes receives an Honorary Degree from Cambridge University. A statue of Daniel Webster unveiled at Concord, N. H.

June 19.—Archibald Forbes, the famous war correspondent, married at Washington, D. C., to Miss Meiggs, daughter of the Quartermaster-General of the U. S. Army.—King Ludwig is royally interred. The Bavarian people deeply grieved at his loss. Bells to ring for six weeks throughout Bavaria as an act of mourning.

June 22.—The whole village of Potterville, N. J., poisoned by ice cream.—The French Senate passes the decree of exile on the French Princes.

June 23.—The French Princes receive an order to leave France.—Parnell telegraphs that an important delegation will attend the Chicago Convention.

June 24.—John Bright proclaims himself an enemy to Home Rule.—The Comte de Paris arrives in England as the Marquis of Harcourt.

June 25.—Serious strike on the Chicago end of the Lake Shore railway.—The Queen dissolves Parliament with this significant sentence: "In order to ascertain the sense of my people on the important proposal to establish a legislative body in Ireland for the management of Irish as distinguished from imperial affairs," which causes intense excitement.

June 26.—Ex-Vice-President David Davis dies at his home in Bloomington: President Lincoln's friend, Supreme Bench Justice, Senator, and "absolutely incorruptible."—The Rev. Henry Ward Beecher receives an enthusiastic welcome in England.

June 28.—Mr. Gladstone and the Rev. Mr. Beecher, two "grand old men," meet in Liverpool.

June 30.—Mexican bondholders meet in London, and denounce the Mexican Government for its dishonest treatment of its creditors. An explosion of sewer-gas in the House of Commons leads to a dynamite scare.—The Prussian Diet agrees to a motion extending the liberties of the Evangelical Church.

INDEX

OF MATTERS NOT HAVING SPECIAL ARTICLES.

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ABBREVIATIONS: *r.*, river; *l.*, lake; *Supp.*, Supplement; *mt.*, mountain; *i.*, island; *c.*, cape.

Aa, *Ems*.
Aabenrade Firod, *Slesvig*.
Aach, *Aa*.
Aachen, *Aix-le-Chapelle*.
Aahmes, *Egypt*.
Aar, *Nassau*.
Aarau, *Aargau*.
Aatb, *Ath*.
Aatholm, *Laaland*.
Ababde, *Nubia*.
Abaca, *Plantain*.
Abaco, *Bahamas*.
Abai, *Abyssinia, Nile*.
Abana, *Barrada, Syria*.
Abang, *Guiana, British*.
Abatembu, *Tembu*.
Abbasides, *Abbas, Calif*.
Abbate, *Abbé*.
Abba Yared (*mt.*), *Africa*.
Abbey Craig, *Clackmannansh*.
Abbot of Unreason, *Fools, Feast of*.
Abbotsford Club, *Roxb. Club*.
Abdallah, *Wahabis*.
Abd-el-aziz, *Spain*.
Abdelmoumen, *Almohades*.
Abdera, *Adra*.
Abderrahman, *Ommiades*.
Abd-ul-Aziz, *Ot. Emp*.
Abd-ul-Aziz, *Wahabis*.
Abd-ul-Hamid, *Ot. Emp*.
Abd-ul-Medjid, *Ot. Emp*.
Abdulmelek, *Ommiades*.
Abecedarian Hymns, *Acrostic*.
Abel, *Algebra*.
Abella, *Avella*.
Aberbrothwick, *Arbroath*.
Aberche (*r.*), *Tagus*.
Aberconway, *Conway*.
Abercorn, Lords of, *Hamilton Family*.
Aberdare, *Cardiff, Merthyr-Tydvil*.
Aberdeen, Earls of, *Gordon Family*.
Aberffraw, *Anglesey*.
Abergele, *Denbighshire*.
Aberhonddu, *Brecon*.
Abertawy, *Swansea*.
Abingdon (*i.*), *Galapagos Is*.
Abjuration of the realm, *Sanctuary*.
Abolitionists, *Republican*.
Abomasus, *Ruminantia*.
Abomey, *Dahomey*.
Aboo Arish, *Yemen*.
Aboyne, *Dee*.
Aboyne, Earls of, *Gordon Family*.
Abroma, *Byttneriaceæ*,
Absalon, *Axe*.
Absinthe, *Liqueur*.
Abstraction, *Generalization*.
Abu, *Elephantiné*.
Abu (*mt.*), *India*.
Abubekr ibn Tofail, *Arabian Lang. & Lit*.
Abu-Hannes, *Ibis*.
Abu Jafar, *Calif*.
Abul-Abbas, *Calif*.
Abul-Ala, *Arab. Lang. & Lit*.
Abul-Aswad-al-Duli, *Arab. Lang. & Lit*.
Abu'l Faraj, *Anthology*.
Abul-Hassan-Ali, *Arab. Lang. & Lit*.
Abul-Kasem, *Arab. Lang. & Lit. Distillation*.
Abuna, *Abyssinia*.
Abury, *Avebury*.
Abu Saïd, *Karmathians*.
Abu Tahir, *Karmathians, Persian Lang. & Lit*.
Abyla, *Ceuta*.
Abyssinia, *Theodore*.
Acacia, false or thorn, *Robinia*.
Acacia formosa, *Sabicu*.
Acacia, German, *Sloe*.
Academy, Royal, *Painting*.
Acadia, *Annapolis*.
Acanthopis, *Adder, Viperidæ*.
Acanthosoma, *Bug*.
Accent (in verse), *Rhythm*.
Acceptor, *Bill of Ex*.
Accipenser, *Sturgeon*.
Accipiter *Sparrow-hawk*.
Accommodation bill, *Bill of Exchange*.
Acepbalocyst, *Hydatid*.
Acerina, *Ruffe*.
Acetone, *Synthesis*.
Acetum cantharidis, *Vesicants*.
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Acheron, *Albunia*.
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Acherusia Palus, *Fusaro*.
Acheus, *Sloth*.
Achievement, *Hatchment*.
Achinduin Castle, *Lismore*.
Achlamydeous, *Apetalous Flower*.
Achlya, *Algæ*.
Achmet I., II., III *Ot. Emp*.
Achmet (vizier), *Ot. Em*.
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Achradina, *Syracuse*.
Achray (*l.*), *Katrine* (*l.*).
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Acid tartrate, *Tartaric Acid*.
Acidulated drops, *Tartaric Acid*.
Acidulous waters, *Carbonated Waters*.
Acne, *Whelk*.
Acne rosacea, *Rosacea*.
Aconeagua, *Andes*.
Aconcagua, *San Felipe de Aconcagua*.
Acoono Coono, *Calabar*.
Acquia, *Potomac*.
Acra, *Jerusalem*.
Acrita, *Zoology*.
Acroceraunian promontory, *Albania*.
Acromion, *Scapula*.
Actinæ, *Anemone, Sea*.
Actinocrinites, *Silurian Rocks*.
Actinophrys, *Rhizopoda*.
Actitis, *Sandpiper*.
Acuyori wood, *Icica*.
Adamantine spar, *Corundum*.
Adam de la Hale, *Opera*.
Adampore *Allahabad*.
Adams (*mt*), *Washington* (*ter.*)
Adams (*mt.*), *White Mts*.
Adanara (*i.*), *Solar Is., Timor*.
Adassi, *Black Sea*.
Addax, *Antelope*.
Adder, *Viper*.
Adder (*r.*), *Tweed*.
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Addorsed, *Indorsed*.
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Aderbaijan, *Azerbijan*
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Adi, *Navarre*.
Adiabené, *Assyria*.
Adighé, *Circassians*.
Adipose fin, *Salmonidæ*.
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Admiralty, *Board of Admiral*.
Adosse, *Abaissé*.
Adowa, *Abyssinia*.
Adoxa, *Aralia*.
Adpar, *Cardiganshire*.
Adranum, *Aderno*.
Adranum, battle of, *Timoleon*.
Adrogation, *Adoption*.
Adulteration of food, *Food and Drink*.
Adur (*r.*), *Sussex*.
Adventure, *Joint Trade*.
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Æetes, *Argonauts*.
Ægida, *Capo d'Istria*.
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Ælia Capitolina, *Jews*.
Æmilian Provinces, *Emilian Provinces*.
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Æolipile, *Steam-engine*.
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Affronte, *Abaissé*.
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Aga Mohammed, *Persia*.
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Agasias, *Sculpture*.
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Agbatana, *Ecbatana*.
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Ageladas, *Sculpture*.
Age of Bronze, Iron, &c. *Bronze* (*Age of*).
Age of Reason, *Paine*.
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Agincourt, *Azincourt*.
Aglabites, *Barbary*.
Aglar, *Aquileja*.
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Agnomen, *Name*.
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Agri, *Basilicata*.
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Agri Decumates, *Alemanni*.
Agrostis, *Bent Grass*.
Aguan, *Honduras*.
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Aguara fox, *Cerdocyon*.
Aguare, *Carlos, San*.
Ague-cake, *Spleen*.
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Aidan, *Scotland*.
Aiguebellette (*l.*), *Savoy*.
Aiguillon, Bay of, *Vendée, La*.
Aiguisse. *Abaissé*.
Aigun, *Sakhalin*.
Aile, *Abaissé*.
Ailurus fulgens, *Panda*.
Aime, *Dartmoor*.
Ain-esh-Shems, *Bethshemesh*.
Aiou, *Cook Is*.
Air, *Sanitary Science*.
Air-cells, *Respiration*.
Aird, *Ard*.
Aire (*r.*), *Yorkshire*.
Air martyrs, *Pillar Saints*.
Aitoa, *Casuarina*.
Aix, *Aa*.
Aixanes, *Axum*.
Aizoon, *Tetragoniaceæ*.
Ajuga, *Bugle*.
Akabab, Gulf of, *Edom, Red Sea*.
Akâlis, *Sikhs*.
Akals, *Druses*.
Akaroa, *New Zealand*.
Akenium, *Achenium*.
Akepbaloi, *Monophysites*.
Akbmim, *Ekhmim*.
Akhrida, *Albania*.
Akinesia, *Paralysis*.
Akkad, *Assyria*.
Aktistetoi, *Monophysites*.
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Akshidide, *Egypt*.
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Al Ajb, *Mohammedanism*.
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Alamo, massacre of the, *San Antonio*.
Alan, *Stewart Family*.
Ala-nor, *Hwang-ho*.
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Alba Julia, *Akjermann*.
Albaniæ Pylæ, *Derbend*.
Alban Lake, *Albano*.
Albanus (*mt.*), *Albano*.
Albany, dukes of, *Stewart Family*.
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Albemarle (*i.*), *Galapagos Islands, Roanoke*.
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Alberti, *Engraving*.
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Alcahest, *Alchemy*.
Alcaic verse, *Alcæus*.
Alcamenes, *Sculpture*.
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Alcazarquebir, battle of, *Sebastianistas*.
Alckmer, Hinreck van, *Reynard the Fox*.
Alcmeon, *Anatomy*.
Alcobolometer, *Areometer*.
Alcorno Bark, *Malpighiaceæ*.
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Alcyone, *Pleiades*.
Aleyonella, *Alcyonium*.
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Avignon berries, *Buckthorne.*
Avlona, *Albania, Berat.*
Avon (*r.*), *Dartmoor.*
Avon (*r.*), *Linlithgow.*
Avon (*r.*), *Nova Scotia.*
Avoset, *Avocet.*
Award, *Arbitration.*
Awe, *Argyleshire.*
Awkward Squad, *Squad.*
Ay, *Motuccus.*
Ayapana, *Eupatorium.*
Ayasaluk, *Ephesus.*
Aycotta, *Cranganore.*
Aylmer (*l.*), *Great Slave L.*
Ayscough, Sir G., *Ruyter.*
Ayton, *Berwickshire.*
Ayubite dynasty, *Saladin.*
Azarole, *Cratægus.*
Azazil, *Mohammedanism.*
Azim's Fort, *Azimghur.*
Azimuthal condensing light, *Light-house.*
Azio, *Actium.*
Azoguê, *Andes.*
Azote, *Chemistry.*
Azraël, *Mohammedanism.*
Aztecs, *Mexico.*
Azuline, *Dye-stuffs.*
Azur Stone, *Lapis Lazuli.*
Azyms, *Unleavened Bread.*
Azzeddin, *Arab. Lang. & Lit.*
Baalzebub, *Philistines.*
Baasher (*r.*), *Algoa Bay.*
Baastaards, *Griquas.*
Baba, *Mohammedan Sects.*
Babahan, *Fars.*
Babahoyo, *Guayaquil.*
Babee, *Bawbee.*
Babegan, *Persia.*
Babi, *Sumatra.*
Babine (*l.*), *Columbia, British.*
Babul, *Acacia.*
Babur. *Baber.*
Babwyan (*i.*), *Philippine Is.*
Bacchantes, *Bucchus.*
Bacchiglione (*r.*) *Austria, Vizenza.*
Baccbus-wine, *Naxos.*
Bachelor's buttons, *Ranunculus.*
Bachilo (*r.*), *Mugdala.*
'Backing the field', *Horseracing.*
Backplate, *Breastplate.*
Backstays, *Rigging.*
Backwater, *Water-power.*
'Backwaters,' *Ghauts.*
Bacon beetle. *Clavicornes.*
Baconiana, *Ana.*
Bacs Canal, *Zombor.*
Bactra, *Bactria.*
Baden, *Germany.*
Badenoch, Lords of, *Gordon Family.*
Bael, *Aurantiaceæ.*
Bael, *Bhel.*
Bætica, *Andalusia, Spain.*
Baffa, *Bassa.*
Bagenalstown, *Carlow.*
Baggit, *Salmon.*
Bagheria, *Bagaria.*
Baghistan, *Behislun.*
Bagirmi, *Begharmi.*
Bagnol, *Muscalel.*
Bagradas (*r.*), *Tunis.*
Bahia, *Cotton.*
Bahour, *Pondicherry.*
Bahr-el-Abiad, *Nile.*
Bahr-el-Asirad, *Abyssinia, Nile.*
Bahr-el-Azrek, *Nile.*
Bahr-el-Gazal, *Nile.*
Bahr-el-Merj (*l.*), *Damascus.*
Bahr-Jusuf, *Mœris (l.).*
Bahr Loot, *Dead Sea.*
Baiern, *Bavaria.*
Bailie, *Bailiff.*
Bailments, *Contract.*
Bails, *Cricket.*
Bain. *Telegraph.*
Bainbridge, *Down.*
Baiocco, *Bajocco.*
Bairam, *Beiram.*
Baise (*r.*), *Garonne, Gers.*
Bait-fishing. *Angling.*
Bajada de Santa Fe, *Entre Rios.*
Bajan, *Bejan.*
Bajazet I., II., *Ottoman Empire.*
Bajjerkeit, *Pangolin.*
Bajra, *Ajmeer.*
Bakar, *Buccari.*
Baker (*mt.*), *Washington (ter.).*
Bakhtegan (*l*), *Fars, Persia.*
Baki, *Turk. Lang. & Lit.*
Bakwains, *Beljuans.*
Bal, *Bally.*
Balla beds, *Caradoc Sandstone.*
Balachiam, *Cochin-China.*
Balais, *Balay.*
Balan, *Transylvania.*
Balance-sheet, *Book-keeping.*
Balaninus, *Weevil*
Balanites Egyptiaca, *Amyrideæ.*
Balanophora and Balanopboraceæ, *Rhizanthese.*
Balas ruby, *Spinel.*
Balasore, *Cuttack.*
Balassa-Gyarmat, *Gyarmat-Balassa.*
Balbriggan, *Dublin.*
Balcarres and Crawford, Earl of, *Lindsay Family.*
Balcony of Puglia, *Minervino.*
Bald Buzzard, *Osprey.*
Baldjik, *Baltschik.*
Baldur, *Balder.*
Baldwin I., II., *Byzantine Empire.*
Baleen, *Whale.*
Balgay Hill, *Dundee.*
Balira (*r.*), *Andorra.*
Balkash (*l.*), *Semipalatinsk.*
Ballamgarb, *Bulubgurh.*
Ballater, *Dee.*
Ballinderry (*r.*), *Cookstown, Tyrone.*
Ballista, *Balista.*
Ballon d'Alsace, *Vosges Mts.*
Ballon de Guebwiller, *Vosges Mts.*
Ballota nigra, *Horehound.*
Bally, *Bali.*
Ballymahon, *Longford.*
Ballymote, Book of, *Irish Lang.*
Baloum tree, *Pestacia.*
Balquidder, *Perthshire.*
Balsam apple, *Momordica.*
Balsamo, Giuseppe, *Cagliostro.*
Baltic cod, *Dorse.*
Baltinglass, *Wicklow.*
Balveny, *Banffshire.*
Balverda, *Balsward.*
Bamboroughshire, *Shire.*
Bammia, *Hibiscus.*
Banana (*is.*), *Sierra Leone.*
Banca, *Sumatra.*
Banchory-Ternan, *Dee.*
Banda, *Bundelcund.*
Bandaleer, *Bandoleer.*
Bauded sea-snake, *Hydridae.*
Ban de la Roche, *Oberlin.*
Banderillas, *Bull-fight.*
Bandiat, *Charente.*
Bandikai, *Hibiscus.*
Bangor, U. S., *Penobscot.*
Banian, *Banyan.*
Banjer (*r.*), *Banjermassin.*
Banjoewangi, *Java.*
Banjouvangy, *Banyuwangy.*
Bank-notes, *Greenbacks.*
Bank's Strait, *Melville.*
Bann (*r.*), *Antrim, Coleraine, Neagh (l.).*
Bann, Upper (*r.*), *Down.*
Bannatyne Club, *Roxb. Club.*
Bannocks, *Bread.*
Banquette, *Covered Way.*
Banshee, *Benshie.*
Banting, *Obesity.*
Banza, *Congo, San Salvador.*
Baphia, *Camwood.*
Bara, *Kordofan.*
Barabras, *Nubia.*
Barada (*r.*), *Syria.*
Bara-Isa, *Niger.*
Baramula, *Cashmere.*
Baramula Pass, *Jhelum.*
Barante, *French Lang.*
Baratry, *Barratry.*
Baratynski, *Russian Lang. & Lit.*
Barb, *Horse.*
Barbadoes Nuts, *Physic Nut.*
Barbarea, *Rocket.*
Barbarette, *Ruatan.*
Barberry root, *Dye-stuffs.*
Barbet, *Poodle.*
Barbezieux, *Charente.*
Barcelona, *Cumana*
Barcelona nuts, *Hazel.*
Bardits, *Bard.*
Bardon Hill, *Leicestershire,*
Bardsey Isle, *Cardigan Bay.*
Barebones Parliament, *Rump Parliament.*
Bargander, *Barnacle Goose.*
Bar-gemel, *Barr.*
Bargusin, *Baikal.*
Bariatinsky, *Shamyl.*
Barisan (*mts.*), *Sumatra.*
Barium, *Bari.*
Bark, *Barque.*
Barkhusen, Hermann, *Reynard the For.*
Barking marmot, *Prairie Dog.*
Barking squirrel, *Prairie Dog.*
Bark-speeler, *Creeper.*
Barlaam, *Heyschasts.*
Barle, *Exe.*
Bar-le-duc, *Meuse.*
Barley midge, *Cecidomyia.*
Barmouth Bay, *Merioneth.*
Barnaul, *Altai Mts.*
Barnburner, *Republican.*
Barnes, Thomas, *Times, The.*
Barnet, battle of, *Richard III.*
Barouche, *Coach.*
Barr, *Bar.*
Barracks, *War Services.*
Barraconda, *Gambia.*
Barraconda, *Sphyrænidae.*
Barrada, *Damascus.*
Barrancas, *Mexico.*
Barras, *Directory.*
Barrasters, *Barristers.*
Barretry, *Barratry.*
Barrington Isle, *Galapagos Is.*
Barrow, *Kildare, Queens County.*
Barrow (*i.*), *Barrow-in-Furness.*
Barrulet, *Barr.*
Bars, *Barsch.*
Bars Khotan, *Baras Khotun.*
Bar-sur-Ornain, *Bar-le-Duc.*
Bart, Jean, *Barth.*
Barton beds, *Bagshot Beds.*
Barwon (*r.*), *Victoria.*
Barygaza, *Baroach.*
Basento (*r.*), *Basiento.*
Bashee (*i.*), *Philippine Is.*
Bashee (*r.*), *Tembu.*
Bashkirs, *Turks.*
Basic waters, *Salts.*
Basilia, *Basel.*
Basilius I., II., *Byzant. Emp.*
Basle, *Basel.*
Basoche, *Bazoche.*
Basrah, *Bassora.*
Bass, *Base.*
Bass, *Bast.*
Bass, *Don.*
Bassadore, *Basidoh.*
Basseiu, *Pegu,*
Basselin, Olivier, *Vaudeville.*
Bassenthwaite Water, *Cumbrian Mts.*
Basses-Alpes, *Alpes, Basses.*
Basseterre, *Christopher's, St.*
Bassic acid, *Stearic Acid.*
Bassorin, *Mucilage.*
Bastan, *Navarre.*
Bastard, *Parent and child.*
Bastard cedar, *Chittagong wood.*
Bastard croup, *Thymus Gland.*
Bastard guava, *Eugenia.*
Bastei (*mt.*), *Saxony.*
Basto, *Quadrille.*
Batabano, *Cuba.*
Bataf, *Moldavia.*
Batanæa, *Bashan.*
Batanen (*i.*), *Philippine Is.*
Batanta, *Papua.*
Batham, *Exe.*
Bathang, *Tibet.*
Bath-metal, *Alloy.*
Bathy, *Samos.*
Batjan, *Moluccas.*
Batley, *Dewsbury.*
Batoom, or Batoum, *Batum.*
Battery, Bunsen's, &c., *Galvanism.*
Battiferri, Laura, *Ammanate.*
Battle of the Spurs, *Guinegate.*
Battock (*mt.*), *Kincardineshire.*
Batû (*i.*), *Sumatra.*
Batua root, *Cissampelos.*
Batû Khan, *Russia.*
Batz, *Bas.*
Baucis, *Philemon.*
Baudrick, *Baldrick.*
Bauge, *Maine-et-Loire.*
Bauge, subterraneau lakes of, *Savoy.*
Bauld Cape, *Newfoundland.*
Baulk, *Billiards.*
Baume-les-Dames, *Doubs.*
Bautzen, *Lusatia.*
Bavaria, *Germany.*
Bay, *Floors.*
Bayad, *Egypt.*
Bayard of India, *Outram.*
Bayard of the French army, *Oudinot.*
Bayberry, *Candleberry.*
Bayern, *Bavaria.*
Bayezeed, *Bayazid.*
Bay-laurel, *Cherry-laurel.*
Bay of All Saints, *Bahia.*
Bay of Islands, *N. Zealand.*
Bayonet exercise, *Fencing.*
Bay rum, *Spirit.*
Bay-stall, *Bay-window.*
Bazaar, *Bazar.*
Beachy Head, battle of, *Tourville*
Beacons, *Lighting of Beacons, &c.*
Bead tree, *Meliaceae.*
Beaked whale, *Bottlehead.*
Bealtainn, *Beltein.*
Bear (*i.*), *Bantry Bay, Cork.*
Bearberry, *Arbutus.*
Beard, use of, *Hair.*
Bearded griffin, or vulture, *Lammergeier.*
Beardie, *Loach.*
Bear's paw, *Clam.*
Beas, *Chenab.*
Beatification, *Saints.*
Beaufins, *Apple.*
Beaulieu, *Bewdley.*
Beauly, *Inverness-shire.*
Beaumaris Shark, *Porbeagle.*
Beaune, *Côte d' Or.*
Beaupreau, *Maine-et-Loire.*
Beauvoir, *Visor.*
Beaver rats, *Hydromys.*
Becard, *Salmon.*
Bec d'Oic, *Dolphin.*
Bechena. *Dellys.*
Bechuanas, *Beljuans.*
Becque. *Beaked.*
Becuna, *Sphyraenidae.*
Bedan-ambran, *Argyleshire.*
Bede, *Bead.*
Bede, *Beda.*
Bedehouse, *Boad.*
Bedesman, *Bead.*
Bedford, Dukes of, *Russell, House of.*
Beebeeru, *Bebeeru, Green-heart.*
Bee-bread, *Bee.*
Beech-drops, *Cancer Root.*
Beechmast, *Beech.*
Beef-wood, *Casuarina.*
Beekaneer. *Bikanir.*
Beemah, *Calburga.*
Beer, *Ale, Barley.*
Beet coffee, *Beet-rool Sugar.*
Beet-spirit, *Beet-root Sugar.*
Befort, *Belfort.*
'Beggars, The,' *Gueux.*
Beggars of the Sea, *William Prince of Orange.*
Begging Hermits, *Augustines.*
Beghards, *Beguines.*
Beglerbeg, *Beg.*
Bego (*r.*), *Theiss.*
Beguttæ. *Beguines.*
Behar, *Bahar.*
Behbehan, *Fars.*
Behring's Island, *Behring Strait.*
Beigerland, *Beyerland.*
Beikos, *Begkos.*
Bei-kul, *Baikal.*
Beiltine, *Beltein.*
Beirut *Beyrout.*
Beit-al-Harâm, *Beit.*
Beit-el-Maa, *Daphné.*
Beith, *Ayrshire.*
Beit-laham, *Belhlehem.*
Beitool, *Baitool.*
Beit Ullah, *Mecca.*
Beja, *Alemtejo.*
Bel, *Ball.*
Beleeru *Greenheart.*
Belem, *Para.*
Belfast, U. S. *Penobscot.*
Belfast (*l.*), *Down.*
Belize, *Balize.*
Bell, Melville, *Shorthand.*
Bellac, *Vienne, Haute.*
Bellagio, *Como (l.).*
Bell animalcules, or Bell-flower animalcules, *Vorticellidae.*
Bellano (*l.*), *Como (l.),*
Bellary, *Balaghat.*
Bellay, J. du, *Ronsard.*
Bell-bird, *Honey-eaters.*
Bellenz. *Bellinzona.*
Bellevue, *Iowa.*
Belino, *Bandit.*
Bellotto, Bernardo, *Canaletto.*
Bellows, *Blowing-machines.*
Belluno, Duke of, *Victor.*
Bel-lush, *Assyria.*
Belly (*r.*), *Saskatchewan.*
Bellyache *Colic.*
Bel-merodach. *Assyria.*
Belper, *Derbyshire.*
Belsazar, *Belshazzar.*
Beltane, *Beltein.*
Beltidum, *Rosary.*
Belturbet, *Cavan.*
Belu, *Amhersl.*
Beluchis, *Sinde.*
Belud-el-Jerid, *Barbary, Tunis.*
Beluga, *Dolphin.*
Beluka (*mt.*), *Altai Mts.*
Belus, *Baal, Dido.*
Ben-a-Main, *Banffshire.*
Benarty, *Kinross-shire.*
Ben-avenna, *Daventry.*
Benclach or Bencleugh, *Clackmannanshire.*
Ben Creach, *Argyleshire.*
Ben Cruachan, *Grampians.*
Bender, *Gombroon.*
Benedetto Odescalchi, *Innocent XI.*
Benedict XIII., Pope, *Schism, Western.*
Benet College, *Corpus Christi.*
Bengal Fire, Red, *Strontium.*
Bengal Hemp, *Sunn.*
Bengal Light, *Pyrotechny.*
Bengbazi, *Tripoli.*
Bengies, *India.*
Beni. *Bolivia.*
Beni, *Madeira.*
Beni-Hassan, *Necropolis.*
Ben Ima, *Argyleshire.*
Benjamin tree, *Benzoin.*
Ben-jemma, *Malta.*
Ben Klibert, *Sutherland.*
Ben Lomond, *Tasmania.*
Ben Lui, *Tay.*
Ben More, *Grampians.*
Ben More in Asynt, *Sutherland*
Benmore Head, *Fair Head.*
Ben-na-buird, *Aberdeenshire.*
Benne, *Niger.*
Bennear, *Cantire.*
Bennington, *Vermont.*
Ben Rinnes, *Banffshire.*
Bensart (*l.*), *Tunis.*
Ben Starvic, *Etive.*
Bentang, *Eriodendron.*
Ben Voirlich, *Dumbartonshire*
Ben Wyvis, *Ross & Cromarty*
Ben-y-Gloe, *Glenlill.*
Benzerta, *Bizerta.*
Benzine, *Benzole.*

Benzoin odoriferum, *Allspice.*
Benzoyle, *Benzile.*
Berat, *Albania.*
Beraun, *Moldau.*
Berbera, *Somali Land.*
Berberin, *Dye-stuffs.*
Berbers, *Barbary.*
Berchemia, *Supple Jack.*
Bere, *Barley, Bear.*
Berengaria, *Richard I.*
Beresina (*r.*), *Dnieper, Vilno.*
Bereydah, *Wahabis.*
Berezina (*r.*), *Beresina.*
Berezov, *Beresoff.*
Bergamah, *Pergamus.*
Bergeronette, *Wagtail.*
Berghen, *Mons.*
Berg-mehl, *Animalcule.*
Berg-Zabern, *Zabern.*
Berkeley's, theory of vision, *Vision.*
Berlin Decree, *Continental System, Orders in Council.*
Berlin-work, *Embroidery.*
Bermudez, Geronimo, *Spanish Lang. & Lit.*
Berna, *Berni.*
Bernard, Richard, *Sabbath.*
Bernadin Pass, *Alps.*
Berne, *Bern.*
Bernese Oberland, *Bern.*
Bernesga, *Leon.*
Bernhard, St., *Abelard.*
Bernia, *Berni.*
Bernicle, *Barnacle.*
Bernstorff, *Christian VII.*
Beroo. *Biru.*
Berothai, *Beyrout.*
Berou (*r.*), *Borneo.*
Berre, l'Etang de, *Rhône.*
Berri, *Berry.*
Berry-bearing alder, *Buckthorn.*
Berthelot, *Satire.*
Bertrand de Born, *Troubadour.*
Berubium, *Duncansby Head.*
Bervie, *Kincardineshire.*
Bervies, *Haddock.*
Berytus, *Beyrout, Phœnicia.*
Bes, *Saugor.*
Besanty Cross, *Besants.*
Bessi, *Servia.*
Bessus, *Alexander the Great.*
Bestushev, *Rus. Lang. & Lit.*
Betanzos, *Coruña.*
Bethel, *Bethel.*
Betel-nut palm, *Areca.*
Bethesda, *Caernarvonshire.*
Bethlehemite Order, *Cross, Order of.*
Bethune, Cardinal, *Beaton.*
Bethune, *Pas-de-Calais.*
Betik, *Betick.*
Betle, *Betel.*
Betony, *Stachys.*
Betula, *Birch.*
Betulineæ, *Betulaceae.*
Betwa (*r.*), *Jumna.*
Beukels, *Beukelzoon.*
Bey, *Beg.*
Bey-Keme (*r.*), *Yenisei.*
Beypore, *Bepur.*
Bezant, *Roundle.*
Bezant argent, *Plate.*
Bezantée, *Bezants.*
Beziers, *Albigenses.*
Bezoar-stones, *Coprolites.*
Bhabhur, *Cotton Grass.*
Bhadri (*r.*), *Bellur.*
Bhagecrette (*r.*), *Bhadrinath.*
Bhaghircti (*r.*), *Ganges.*
Bhagruttee (*r.*), *Burhampore.*
Bhagrutti (*r.*), *Ganges.*
Bhagni, *Bagul.*
Bhamo (*r.*), *Irrawadi.*
Bhampura, *Bampura.*
Bharuch, *Baroach.*
Bhats, *India.*
Bhavani, *Umâ.*
Bheel, *India.*
Bhel, *Bael.*
Bhewannee, *Bhowan.*
Bhilsa, *Bilsa.*
Bhovani-Kudar, *Bhavani-Kudar.*
Bhugeisur, *Allahabad.*
Bia (*r.*), *Ob.*
Biafo glacier, *Tibet.*
Bialogrod, *Akjermann.*
Bialy, *Bialystok.*
Bianson (*r.*), *Var.*
Bibawan, *Atlas Mt.*
Bible Christians, *Methodists.*
Bible Communists, *Perfectionists.*
Biborate of soda, *Borax.*
Bibracte, *Autun.*
Biceps muscle, *Hand.*
Bichacz, *Bihach.*
Bichir, *Polypterus.*
Bicker, *Beaker.*
Bidonze, *Pyrénees Basses.*
Biela (*r.*), *Bohemia.*
Bielaga, *Sturgeon.*
Bielaia (*r.*), *Timur, Ufa.*
Bieloe, *Novgorod.*
Bielstein, *Bielshöhle.*
Bièvre, *Seine.*
Bighorn, *Argali, Sheep.*
Big Laurel, *Magnolia.*
Bignolles, *Alpes, Basses.*
Big Sandy River, *Tennessee.*
Big Vermilion (*r.*), *Wabash.*
Biji, *Bhuji.*
Bijuga (*i.*), *Bissagos.*
Bikshu, *Buddhism.*
Bila, *Bilin.*
Bilbilis, *Calatayud.*
Bilharzia, *Trematoda.*
Biling, *Reformation.*
Bilious Fever, *Typus and Typhoid fevers.*
Bill-book, *Book-keeping.*
Bill of Pains and Penalties, *Bill of Attainder.*
Bill of Portland, *Portland Is.*
Bille, *Denmark.*
Billows Falls, *Vermont.*
Bills (in parlt.), *Parliament.*
Bimah, *Kistna.*
Bimo, *Sumbawa.*
Bindloes (*i.*), *Galapagos Is.*
Bingerloch, *Bingen.*
Bingol-su, *Aras.*
Binnen, Bay of, *Amboyna.*
Binny, *Barbel.*
Binue, *Benue.*
Bipinnate, *Leaves.*
Birbboom, *Beerbhoom.*
Birch-oil, *Birch.*
Birch-tar, *Birch.*
Bird (*i.*), *America.*
Bird (*i.*), *Chaos Islands.*
Bird-mite, *Epizoa.*
Bireli-jik, *Bir.*
Biren, *Biron.*
Bir-es-seba, *Beersheba.*
Biretum, *Vestments.*
Birgus, *Purse-crab.*
Biribi, *Rouge-et-noir.*
Birkenfeld, *Oldenburg.*
Birket-el-Kerun, *Moeris, L.*
Birket-el-Mariult, *Mareotis.*
Birlaw, *Byrlaw.*
Birs Nimrud, *Pyramid.*
Birth, *Berth.*
Bisanagar, *Bisulnuggur.*
Biscoe's Range, *Graham's Land.*
Biscuit root, *Quamash.*
Biserta (*l.*), *Tunis.*
Bishari, *Africa, Nubia.*
Bishop-Wearmouth, *Sunderland.*
Bishop-weed, *Gout-weed.*
Bissayas, *Philippine Islands.*
Bisulphide of carbon, *Sulphur.*
Bisutun, *Behistun.*
Biswamintri, *Baroda.*
Biternate, *Leaves.*
Bitlis (*r.*), *Tigris.*
Bitolia, *Monastir.*
Bito-tree, *Hajilij.*
Bittacle, *Binnacle.*
Bitter apple, *Colocynth.*
Bitter cucumber, *Colocynth.*
Bitter (*l.*), *Suez, Suez.*
Bitter liquid, *Bittern.*
Bitter of senna, *Cathartine.*
Bitter waters, *Mineral Waters.*
Bjeelbog, *Slaves.*
Black (*i.*), *Ross and Cromarty.*
Black (*i.*), *Polynesia.*
Black (*mt.*), *Montenegro.*
Black (*r.*), *Jamaica.*
Black (*r.*), *Mississippi.*
Black (*r.*), *Niger.*
Blackadder (*r.*), *Berwickshire.*
Black-ash, *Soda.*
Blackbine, *Buckwheat.*
Blackbird, Moor, *Ring Ouzel.*
Black Country, *West Bromwich.*
Black cumin, *Cockle.*
Black Down, *Mendip Hills.*
Black draught, *Magnesium, Senna.*
Black-eyed pea, *Dolichos.*
Blackfish, *Tautog.*
Black gram, *Kidney-bean.*
Black goose, *Brent Goose.*
Black grouse. *Blackcock.*
Black Hawk War, *U. S.*
Black helmet, *Cameo.*
Black lark, *Dumfriesshire.*
Black leg, *Black Quarter.*
Black locust, *Honey Locust Tree.*
Black oak, *Quercitron.*
Black orang, *Chimpanzee.*
Black Russia, *Lithuania,*
Black saltwort, *Glaux.*
Black Saturday, *Perth, Five Articles of.*
Black-shouldered hawk, *Elanet.*
Black spald, *Black Quarter.*
Black squitch, *Bent Grass.*
Blackstairs (*mt.*), *Wexford.*
Blackstone (*r.*), *Woonsocket.*
Black tang. *Wrack.*
Black Town, *Bombay.*
Black varnish tree, *Melanorhœa.*
Black vomit, *Yellow Fever.*
Black vulture, *Carrion Crow.*
Blackwater, *Essex.*
Blackwater, *Overyssel.*
Black whale, *Caaing Whale.*
Blackwood, *Rosewood.*
Blad-el-Djerid, *Algeria.*
Bladenoch (*r.*), *Wigtown.*
Blair-Drummond, *Bog.*
Blanch Town, *South Australia.*
Blankenstein, *Blankenburg.*
Blanquette, *Sprat.*
Blanquilla, *Antilles.*
Blantyre, Lord, *Stewart Family.*
Blasquets, *Kerry.*
Blastema, *Cells.*
Blau (*r.*), *Ulm.*
Blauw, *Blaeu.*
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Faradization, *Tabes Dorsalis.*
Farcy, *Equinia.*
Fardingale, *Crinoline.*
Fario, *Salmon.*
Faro, *Benué.*
Faro, Capo del, *Sicily.*
Farsistan, *Fars.*
Fasa, *Fesa.*
Fasting-tide, *Shrove-tide.*
Fast-mass, *Shrove-tide.*
Fat glands, *Skin.*
Fauna, arctic, tropical, &c., *Geographical Distribution of Animals.*
Faunus and Fauna, *Roman Religion, Ancient.*
Faustrecht, *Golden Bull.*
Faustus, Bishop of Riez, *Semipelagianism.*
Faverge, Valley of, *Savoy.*
Fawn, *Fallow Deer.*
Fayence, *Foience.*
Feale (*r.*), *Shannon.*
Fear, *Emotion.*
Fearne, *Farne Isles.*
Featherfoil, *Hottonia.*
Feathering, *Oar.*
Fecht, *Colmar.*
Federalists, *Republican, U. S.*
Federsee, *Würtemberg.*
Feeders, *Mining.*
Feejee, *Fiji Islands.*
Feldberg, *Black Forest.*
Fellows, *University.*
Felsina, *Bologna.*
Feme Sole, *Feme Coverte.*
Fens, *Middle Level.*
Fen Town, *Finsbury.*
Feodor, *Romanoff, House of.*
Feral races, *Wolf.*
Fer de Moulin, *Millrind.*
Ferdinand III. of Castile, *Spain.*
Ferghal, *Ireland.*
Fergus, *Scotland.*
Fergus (*r.*), *Shannon.*
Ferid Eddin Attar, *Persian Lang. & Lit.*
Ferishtah, *Persian Lang. & Lit.*
Ferment, *Wine.*
Fern Isles, *Farne Isles.*
Fernandina, *Cuba.*
Fernand Vas (*r.*), *Ogobai.*
Ferney, *Voltaire.*
Ferolia Guianensis, *Satin-wood.*
Ferrari, Ludovico, *Algebra.*
Ferreo. Scipio, *Algebra.*
Ferruchi, *Persian Lang. & Lit.*
Ferrum tarturatum, *Tartaric Acid.*
Fersala. *Pharsalus.*
Fertile Isle, *Christopher's, St.*
Ferula, *Ammoniacum.*
Fervenca, *Braganza.*
Feugh, *Dee.*
Fever, relapsing, *Relapsing Fever.*
Fever, remittent, *Remittent Fever.*
Fever, rheumatic, *Rheumatism.*
Fever, scarlet, *Scarlatina.*
Fever-bush, *Benzoin.*
Feysul, *Wahabis.*
Fez, *Morocco.*
Fibre-plating, *Goldlace.*
Fibro-muscular tissue, *Vascular Tissue.*
Fibrous tumor, *Womb, Diseases, &c., of.*
Fibula, *Foot.*
Fichtelgebirge, *Main.*
Fidaris, *Ætolia.*
Field-glass, *Opera-glass.*
Field-rush, *Luzula.*
Fier (*r.*), *Savoy.*
Fife, Earls of, *Stewart Family.*
Fifer, *War Services.*
Fighine, *Figline.*
Figues-caques, *Date Plum.*
Figure, *Syllogism.*
Filament, *Stamen.*
Filaria hominis bronchialis, *Strongylus.*
Filaria piscium, *Spiroptera.*
Filature, *Silk & Silkworm.*
File, *Label.*
File-fish, *Balistes.*
Filfila marble, *Philippeville.*
Filfila, *Malta.*
Fillets, *Mint.*
Filmore, *Utah.*
Fine, *Repeat.*
Fines and Recoveries, *Fine of Land, Records, Public.*
Fin-fish, *Rorqual.*
Fingerling, *Salmon.*
Finiguerra, *Engraving.*
Finlay (*r.*), *Columbia, British.*
Finnan haddocks, *Haddock.*
Finow Canal, *Germany.*
Finsterberg (*mt.*), *Thuringerwald.*
Fiorentino, *Italy.*
Fire-backed pheasant, *Macartney Cock.*
Fire-balls, *Aërolites.*
Fire-draught, *Warming & Ventilation.*
Fire-flaire, *Sting Ray.*
Fireweed, *Senecio.*
Fire-worship, *Sun & Fire Worship.*
First-fruits (in law), *Annates.*
Firth of Lorn, *Colonsay.*
Fish-culture, *Pisiculture.*
Fisherrow, *Musselburgh.*
Fishes, showers of, *Showers of Fishes.*
Fishguard Bay, *Pembrokeshire.*
Fishing eagle or hawk, *Osprey.*
Fish-ladders, *Solmon.*
Fish-maws, *Mungo-fish.*
Fish-platc, *Railways.*
Fish salamander, *Botrachia.*
Fish-skin disease, *Ichthyosis.*
Fish-stairs, *Salmon.*
Fissiparous multiplication, *Reproduction.*
Fissure of the anus, *Anus.*
Fistola lachrymalis, *Lachrymal Organs.*
Fitch, *Polecat.*
Fitch, *Steam-navigation.*
Fittri (*l.*), *Sudan.*
Fit-weed, *Erymgo.*
Fitz-alan, *Stewart Family.*
Fitzroy (*r.*), *Queensland.*
Fiumara, *Fiume.*
Fiumicino (*r.*), *Rubicon.*
Five-day fever, *Relapsing Fever.*
Five fingers, *Star-fish.*
Flaccus Albinus, *Alcuin.*
Flag, *War-Services.*
Flagellum, *Runner.*
Flagstadöe, *Lofoden.*
Flail, *Thrashing.*
Flammingo, Dionisio, *Calvuert.*
Flan of Monasterboice, *Irish Lang. & Lit.*
Flanques, *Flanches.*
Flap operation, *Amputation.*
Flashed glass, *Gluss.*
Fleabane, *Conyza,*
Fleawort, *Plantagineae.*
Flèche, *Fortification.*
Fleetwood, *War Services.*
Flemingites, *Sigillaria.*
Flies, artificial, *Angling.*
Flinders (*r.*), *Queensland, Australian Explorations.*
Flint (*r.*), *Tennessee.*
Flittermouse, *Bat.*
Flix-weed, *Hedge-Mustard.*
Floating gardens, *Floating Islands*
Floating mattress, *Water-bed.*
Floating sweet meadow grass, *Manna Grass.*
Florac, *Lozère.*
Flores, *Azores.*
Florets, *Flower.*
Floripendio, *Thorn-apple.*
Flos Adonis, *Adonis.*
Floscularia, *Rotatoria.*
Flotation, *Hydrostatics.*
Flote fescue, *Manna Grass.*
Flower City, *Springfield.*
Flowering fern, *Osmunda.*
Flowering rush, *Butomus.*
Flowers of arsenic, *Arsenious Acid.*
Flowers of sulphur, *Sulphur.*
Flowk-wort, *Hydrocotyle.*
Fluke. *Flounder.*
Flush, *Cribbage.*
Flushing, *Long Island.*
Flutemouth, *Fistularidae.*
Fly agaric, *Amanita.*
Fly-fishing, *Angling.*
Flying fox, *Flying Lemur.*
Flying oppossum, *Flying Phalanger.*
Fœniculum Capense, *Umbelliferae.*
Foggie, *Humble Bee.*
Fogo, *Cape Verd Islands.*
Foktshany, *Suvorof.*
Folio, *Book.*
Folkland, *Saxony.*
Follicle, *Glands.*
Follicle, *Legume.*
Folquet de Marseille, *Troubadour.*
Fonka, Cape, *Cos.*
Fontaine, *Algebra.*
Fontainebleau, *Renaissance.*
Fontargente (*mt.*), *Ariège.*
Foo, *Heen.*
Food, *San. Science.*
Foramen magnum, *Spinal Cord.*
Forbes, Lough, *Shannon.*
Forecastle, *Fore.*
Forefang, *Forfang.*
Forest Courts, *Forest Laws.*
Forest Ridge, *Sussex.*
Forest wool, *Pine.*
Form, *Type.*
Formartin, *Aberdeenshire.*

Formentera, *Balearic Is.*
Formyle, *Methylene.*
Fort Dauphin, *Bembatooka.*
Fort du Quesne, *U. S.*
Forteviot, *Scotland.*
Forth (*r.*), *Tasmania.*
Fort Hope, *Columbia, British.*
Fort Madison, *Iowa.*
Fort Monltrie, *Sumter, Fort.*
Fortunate Islands, *Phœnicia.*
Fortune Bay, *Newfoundland.*
Fort Wayne, *Indiana.*
Fort William, *Calcutta.*
Fossil alkali, *Sodium.*
Fouets, *House-leek.*
Foul bill, *Bill of Health.*
Foumart, *Polecat.*
'Four Land's,' the, *Bergedorf.*
Fous, *House-leek.*
Fousel-oil, *Fusel.*
Foveaux Strait, *New Zealand.*
Fovilla, *Vegetable Physiology.*
Foxing, *Beer.*
Fox-tailed monkey, *Saki.*
Foy, *Fowey.*
Foyers, *Theater.*
Foynes, *Limerick, Shannon.*
Fraises, *Fortification.*
Fambœsia, *Yaws.*
France, education in, *National Education.*
Franchise, *Parliament, Reform.*
Frankenburg, *Aix-le-Chapelle.*
Frankenwald (*mts.*), *Thuringerwald.*
Franklin (*mt.*), *White Mts.*
Fraocheilean, *Awe L.*
Fra Paolo, *Sarpi.*
Fraser's County, *Inverness-shire.*
Frauds, statute of, *Statute of Frauds.*
Frederick-August I. and II., *Saxony.*
Fredericksborg, *Sweden.*
Frcdericksburg, *Africa.*
Fredericksburg, *Virginia.*
Frederickscord, *Drenthé, Pauper Colonies.*
Frcderick the Wise, *Saxony.*
Frederikshavn, *Copenhagen.*
Frec livers, *Perfectionists.*
Free-soil Democrats, *Republican.*
Free-soil Party, *U. S.*
Freestones, *Peach.*
Frégate (*i.*), *Seychelles Is.*
Freiberg, battle of, *Seven Years' War.*
Fremont's Basin, *Great Basin.*
Fremont's Peak, *Rocky Mts.*
French chalk, *Steatite.*
French pie, *Woodpecker.*
French rye-grass, *Arrhenatherum.*
French willow, *Epilobium.*
Freshford, *Kilkenny.*
Freshman, *Cambridge University.*
Fresh-water polype, *Hydra.*
Fresh-water shrimp, *Gammarus.*
Freycinct's Peninsula, *Tasmania.*
Fribourg, *Freiburg.*
Friction-wheels, *Friction.*
Friedrichshall, *Saxe-Meiningen.*
Friedrichshamm, Peace of, *Alexander I. of Russia.*
Friedrichs-stadt, *Leipzig.*
Friedrich-Wilhelm's Canal, *Germany, Spree.*
Frigga, *Freyja.*
Fringilla spinus, *Aberdevine.*
Frio, *Nicaragua Lake.*
Frio, Cape, *Rio de Janeiro.*
Frit, *Glass.*
Frith, *Reformation.*
Fritigern, *Valens.*
Frog-fly, *Froth-fly.*
Frog-hopper, *Froth-fly.*
Frog-spittle, *Froth-fly.*
Froude, R. H., *Tractarianism.*
Fruit-sugar, *Fructose.*
Fuchsine, *Dye-stuffs.*
Fucus vesiculosus, *Algæ.*
Fuentes, Count of, *Rocroi.*
Fuhi, *Honan.*
Fu-kian, *Fuh-keen.*
Fulgentius, *Semi-pelagianism.*
Fulham, *Convict.*
Fulimart, *Polecat.*
Fulling, *Woolen & Worsted Manufactures.*
Fulness of Blood, *Congestion of Blood.*
Fulwa tree, *Bassia.*
Fumitory, common, *Fumariaceæ.*
Funcha, *Bogota.*
Fung, *Fum.*
Funghwa, *Ningpo.*
Fungic acid, *Fungi.*
Fungus Melitensis, *Cynomorium.*
Fungus salicis, *Amadou.*
Funiculus, *Seed.*
Funny bone, *Brachial Artery.*
Furnace, reverberatory, *Reverberatory Furnace.*
Furnarius, *Oven-bird.*
Furness, *Lancashire.*
Fur seal, *Otary.*
Fusible alloy, *Bismuth.*
Fusils, *Lock.*
Fusiyama, *Japan.*
Fustic, young, *Sumach.*
Futteh-Ali, *Persia.*
Futtocks, *Ship-building.*
Futwa, *Futtuha.*
Fyrd, *Train-bands.*
Fyrd, *Trinoda Necesitas.*
Fytte, *Rhapsodists.*

Gabii, *Rome.*
Gabres, *Guebres.*
Gachua, *Ophicephalus.*
Gadajos, *Guadalquivir.*
Gaddi, Taddeo, *Painting.*
Gadenolite, *Yttrium.*
Gades, *Cadiz.*
Gadhelic, *Gaelic Lang. & Lit.*
Gaga, *Kelskamma.*
Gagali, *Podocarpus.*
Gagea, *Star of Bethlehem.*
Galam butter, *Bassia.*
Galatea, grotto of, *Aci Reale.*
Galaxias, *Salmonidae.*
Galegos, *Lisbon.*
Galenists, *Anabaptists.*
Galeus canis, *Tope.*
Galgacus, *Agricola, C. J.*
Galgocz, *Freystädtl.*
Galiaceæ, *Rubiaceae.*
Galileans, *Jewish Sects.*
Galipot, *Rosin.*
Gall, James, *Sunday Schools.*
Gallanda, *Gall, St., Canton of.*
Gallenstock, *Valais.*
Galletyles, *Gallipot.*
Galley, *Type.*
Gallia Belgica, *Belgium.*
Gallia Cisalpina, Cispadana, Transalpina, Transpadana, *Rome.*
Gallicanism, *Gallican Church.*
Gallinago, *Snipe.*
Gallinazo, *Vulture.*
Gallinsecta, *Coccus.*
Gallitzin, *Gatyzin.*
Galloway breed, *Ox.*
Galloway, Earls of, *Stewart Family.*
Gallus, *Ireland.*
Gally-worms, *Julus.*
Galofaro, *Scylla & Charyb.*
Galoshes, *Goloshes.*
Galston, *Ayrshire.*
Galtees (*mts.*), *Tipperary.*
Galvanic pair, *Galvanism.*
Galvanometers, *Galvanism.*
Gal-wihara, *Ceylon.*
Gamant, *Abyssinia.*
Gambeer, *Gambir.*
Gambet, *Sandpiper.*
Gambetta, *Yellowlegs.*
Game-licenses, *Game.*
Gamgee, John, *Veterinary Medicine.*
Gaming, *Gambling.*
Gamle-by, *Copenhagen.*
Gamrie, *Banffshire.*
Gamtoos, *Camtoos.*
Ganger Rolf, *Harald I.*
Gangrene of the mouth, *Mouth.*
Gan-king-foo, *Gan-hwuy.*
Gansfort, *Wessel.*
Gapau (*r.*), *Var.*
Garagantua *Rabelais.*
Garay, B. de, *Steam-engine, Steam-navigation.*
Garcia de la Huerta, *Spanish Lang. & Lit.*
Garcinia, *Cocum Oil.*
Garden Island, *Buache.*
Gardeners' garters, *Canary Grass.*
Garden warbler, *Beccafico.*
Gare (*l.*), *Dumbartonshire.*
Garioch, *Aberdeenshire.*
Garlic, crow, *Allium*
Garnet, pyramidal, *Vesuvian.*
Garnoch, *Ayrshire.*
Garou bush, *Daphne.*
Garreg, *Flintshire.*
Garrogue (*r.*), *Sligo.*
Garry, Glen, *Inverness-shire.*
Garry (*r.*), *Tay.*
Gartan, *Columba.*
Gartempe (*r.*), *Vienne.*
Garum, *Anchovy.*
Garvock, *Kincardineshire.*
Gaseng, *Goat.*
Gastein, treaty, *Germany.*
Gasterosteus, *Stickleback.*
Gastrodynia, *Gastralgia.*
Grastro-entcritis, *Gastritis.*
Gastropods, *Gasteropoda.*
Gatehouse, *Kirkcudbrightsh.*
Gath, *Philistines.*
Gatin, Plateau de, *Vendee, La.*
Gatto, Cape, *Cyprus.*
Gau, *Pyrenees, Basses.*
Gaudens, St., *Garonne.*
Gaulanites, *Jewish Sects.*
Ganls, *Celtic Nations, Rome.*
Gaultheric acid & ganltherilenc. *Winter Green, Oil of,*
Gauntlet, *Gantlet.*
Gavarnic Falls, *Waterfall.*
Gavra, battle of, *Fenian Society.*
Gawler (*r.*), *South Australia.*
Gay-Lussac's Law, *Aërostatics.*
Gayndah, *Queensland.*
Gaza, *Phœnicia.*
Gaza, battle of, *Selim I.*
Ge, *Gœa.*
Gean, *Cherry.*
Gebatsch (*mt.*), *Tyrol.*
Gecinus, *Woodpecker.*
Ged, William, *Stereotyping.*
Gedd, *Pike.*
Gedrosia, *Beloochistan.*
Geelvink Bay, *Papua.*
Geer, Cape, *Blanco.*
Geilnau, *Nassau.*
Gelatinc, sugar of, *Glycine.*
Gelders, duchy of, *Rhenish Prussia.*
Gelimer, *Vandals.*
Gell-ale, *Ground-ivy.*
Gelya, *Cambay.*
Gemmiparous generation, *Gemmation.*
Gemmi Pass, *Alps, Valais.*
Gemmule, *Seed.*
Generationism, *Traducianism.*
Genèvre (*mt.*), *Alps.*
Genipi & Genipp, *Achillœa.*
Gensano, *Genzano.*
Gensonne, *Girondists.*
Geometers, *Caterpillar.*
Geophilus, *Centipede.*
Geordie lamp, *Safety-lamp.*
'Georgc Eliot,' *Evans.*
George of Denmark, Prince, *Anne, Queen.*
George's Town, *Biafra.*
Georgetown, *Delaware.*
Georgetown, *Pr. Edward's I.*
Gcorgetown, *Pr. of Wales I.*
Georgina, *Dahlia.*
Gephyrea, *Worms.*
Geranium, oil of, *Grass Oil.*
Geranium maculatum, *Alum Root.*
Gerard, Balthasar, *William, Prince of Orange.*
Gère (*r.*), *Vienne.*
German acacia, *Sloe.*
German carp, *Crucian.*
German catchfly, *Lychnis.*
German greens, *Kate.*
German rice, *Barley.*
Germantown, *Pennsylvania.*
Gerrara, *Guerara.*
Ghadames, *Gadames.*
Ghagra, *Ghogra, Oude.*
Ghardeia, *Gardaia.*
Ghazel, *Ghasel.*
Ghebres, *Guebres.*
Ghent, pacification of, *William, Prince of Orange.*
Gherkins, *Cucumber.*
Ghetto, *Rome.*
Ghore, *Ghur.*
Ghori (*r.*), *Anderab.*
Ghurkas, *Nepaul.*
Giacomo da Ponto, *Bassano.*
Giarretta (*r.*), *Sicily.*
Gibbe (*r.*), *Enarea.*
Gibing, *Gybing.*
Gibson, *Veterinary Med.*
Giczin, *Gitschin*
Gid, *Sturdy.*
Gien, *Loiret*
Gier-eagle, *Lammergeier.*
Gig, *Boat. Boating.*
Gig-mill, *Woollen & Worsted Manufactures.*
Giguela, *Guadiana.*
Gilbert de la Porree, *Scholastics.*
Gilgc (*r.*), *Niemen.*
Gill (*r.*), *Sligo.*
Gill-ale, *Ground-ivy.*
Gillespie, Thomas, *U. P. C.*
Gillot, Joseph, *Pen.*
Gills, *Heckles.*
Gillyflower stock, *Stock.*
Gimmal, *Ring.*
Gimone, *Gers.*
Ginneling, *Fishing.*
Giorgio Barbarelli, *Giorgione.*
Giovanni di Bologna, *Sculpture.*
Gipping (*r.*), *Suffolk.*
Gipps' Land, *Victoria*
Gipsy herring, *Pilchard.*
Giraffe (*r.*), *Nile.*
Girard, *Atgebra.*
Girard College, *Philadelphia.*
Gironettc, *Epi.*
Gitanos, *Gypsies.*
Giuseppino, *Cesari.*
Gizeh, *Ghizeh.*
Gizzard, *Birds.*
Glace, *Taffety.*
Gladsheim, *Walhalla.*
Glanders, *Equinia.*
Glasnevin, *Agricultural Education.*
Glass, earliest use of, in England, *Benedict Biscop.*
Glastonbury thorn, *Hawthorn.*
Glatt (*r.*), *Zurich.*
Glead or Gled, *Kite.*
Gleet, *Gonorrhœa.*
Glen (*r.*), *Bedford Level.*
Glendalough, *Wicklow.*
Glendalure, *Wicklow.*
Glenelg, *Inverness-shire.*
Glenelg (*r.*), *Victoria.*
Glenelg, Lord, *Grant. Ch.*
Glenever, *Vitrified Fort.*
Glengariff, *Bantry Bay.*
Glen Carry, *Inverness-shire.*
Glen Morriston, *Inverness-sh.*
Glen Ness, *Doon.*
Glenshee, *Perthshire.*
Glen Urquhart, *Inverness-shire*
Gliadin, *Gluten.*
Globe animalcules, *Monad.*
Globe-fish, *Diodon.*
Globiocephalus, *Caaing Whale.*
Globules, *Homœopathy,*
Glomach, Fall of, *Ross & Cromarty.*
Glommen *Norway.*
Glonoin, *Nitro-glycerine.*
Glory, *Halos.*
Glory, *Nimbus.*
Glossinia morsitans, *Tsetse.*
Glossitis, *Tongue.*
Gloucester nut, *Hickory.*
Clover, Miss, *Tonic Solfa.*
Glover's roll, *Roll of Arms.*
Glue, liquid, marine, &c., *Cements.*
Gluten, *Gelatigenous Tissues.*
Glycinum, *Glucinum.*
Glycocine, glycocoll, *Glycine.*
Glycosides, *Salicin.*
Glyde (*r.*), *Louth.*
Glykys (*r.*), *Albania.*
Gnidia, *Thymeleaceae.*
Gnidos, *Cnidus.*
Goat's beard, *Fungi.*
Godfrey, *Gottfried.*
Godounof, Boris, *Russia.*
Godrun, *Alfred.*
God's gift, *Dulwich College.*
Goenang Api, *Moluccas.*
Goeree, *Holland, South.*
Goes, Hugo Vander, *Painting.*
Goetz von Berlichingen, *Artificial limbs.*
Goff, *Golf.*
Goggra, *Oude (city).*
Gohfeld, battle of, *Seven Years' War.*
Goito, battle of, *Radetsky.*
Golden Age, *Ages, Pastoral Poetry.*
Golden carp, *Goldfish.*
Golden charter, *Transylvania.*
Goldene Aue, *Saxony, Prussian.*
Golden Gardens, *Danube.*
Golden Gate, *San Francisco.*
Golden Horn, *Constantinople.*
Golden Plain, *Nordhausen.*
Golden maidenhair, *Polytrichum.*
Golden-tailed flies, *Chrysis.*
Golden Vale, *Limerick.*
Golden Vein, *Tipperary.*
Gold farthing, *Rose-noble.*
Goldfinny, *Goldsinny.*
Goldilocks, *Polytrichum.*
Goldings, *Hops.*
Gold Powder, *Bronzing.*
Gold purple, *Purple of Cassius.*
Gold-seed, *Dog's-tail Grass.*
Gölek Bógház, *Cilicia.*
Golo, *Corsica.*
Golyzin, *Galyzin.*
Gombo, *Hibiscus.*
Gomphrena, *Amaranth.*
Gomul Pass, *Goolairee.*
Gonaive, *Hayti.*
Gond, *Tamil.*
Gondokoro, *Baker.*
Gonds, *India.*
Gonidia, *Lichen.*
Gonoma, *Moluccas.*
Gonubi, *Kafraria, British.*
Gonzaga, Card, *Trent, C. of.*
Good, *Stoics.*
Good Henry, *Chenopodium.*
Gooma, *Cambay.*
Goor, *Dziggethai.*
Goorjun tree, *Dipteraceæ.*
Gooscberry gonrd, *Momordica.*
Gooscfoot, *Chenopodium.*
Goose-grass, *Bed straw.*
Goræ (*r.*), *Ganges*
Gorebill, *Garfish.*
Gorey, *Wexford.*
Gorge, *Bastion.*
Gorges, *Gurges.*
Gorigunga (*r.*), *Ghogra.*
Göritz, *Görz.*
Gorse, *Furze.*
Goshob, *Abyssinia.*
'Gospel,' the, *Lesson.*
Gota (*r.*), *Sweden.*
Götaland, *Götland.*
Götarike, *Götland.*
Gottesgabe, *Erzgebirge.*
Gothelf, Jeremias, *Ritzius.*
Gouet, *Côtes-du-Nord.*
Gouges, *Carpentry.*
Goulard's extract, *Lead.*
Goulburn, *New South Wales.*
Gour, *Gaur.*
Gourami, *Goramy.*
Gourdon, *Lot.*
Gournah, *Necropolis, Thebes.*
Gout, in corn, *Corn-fly.*
Gout, rhcumatic, *Rheumatism.*
Gout powder, Duke of Portland's, *Gentian.*
Governor, *Steam-engine.*
Gowan, *Daisy.*
Gowdie, *Dragonet.*
Goyt, *Mersey.*
Gradiska, *Küstenland.*
Gräfenberger, *Rhine-wine.*
Grafton, *New South Wales.*
Graham's Dike, *Antoninus, Wall of.*
Graigue, *Carlow.*
Grakle, purple, *Quiscalus.*
Gran, *Grane.*
Grana, *Caraglio.*
Granard, *Longford.*
Grancio, *River-crab.*
Grand Lake, *New Brunswick.*
Grand Be Island, *Saint Malo.*
Grand Bernard, *Bourbon, Ile de.*
Grandbourg, *Marie Galante.*
Grand Charter, *Charte.*
Grand Chute, *Appleton.*
Grand-Colombier, *Jura.*
Grande Port, *Mauritius.*
Grand River, *Utah.*
Grand seignior, *Turkey.*
Grand vizier, *Turkey.*
Grangenenve, *Girondists.*
Granite State, *New Hampshire.*
Gran Sasso d'Italia, *Corno Monte.*
Granta, *Cam.*
Granville, Earl, *Carteret.*
Garo, *Guadalaviar.*
Grape disease, *Oidium.*
Grass tree, *Tasmania.*
Grass week, *Perambulation.*
Grates, *Warming & Ventilation.*
Graubündten, *Grisons.*
Grave, *Tempo.*
Gravel-rot, *Eupatorium.*
Gravenstein apple, *Alsen.*
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Indrapura (*r.*), *Sumatra.*
Indnration, *Softening and Induration.*
Industrial exhibitions, *Exhibitions.*
Inebriates, establishments for, *Dipsomania.*
Infantile remittent fever, *Worm Fever.*
Inflected languages, *Philology.*
Infundibula, *Respiration.*
Ingathering, feast of, *Tabernacles, Feast of.*
Ingleborough, *Yorkshire.*
Inglis (*r.*), *Tasmania.*
Ingluvies, *Digestion.*
Ingolf, *Iceland.*
Inguinal glands, *Anal Glands.*
Inhabitiveness, *Phrenol.*
Inhambane, *Sofala.*
Ink, marking, *Silver.*
Inkpen Beacon, *Wiltshire.*
Innakilly, *Youghal.*
Innerhoden, *Appenzell.*
Innishaun n, *Bundon.*
Innissherkin (*i.*), *Cork.*
Innocent II., Pope, *Roger II.*
Innuus, *Inuus.*
Inoculation, *Budding,*
Inosin, or Inosite, *Sugar.*
Inselberg (*mt.*), *Thuringerwald.*
Insomnia, *Sleep.*
Inspissated juice, *Extracts.*
Inster, *Pregel.*
Insurance, post office, *Insurance.*
Insurance-broker, *Ship-broker.*
Intendant-general, *Staff.*
Interamna, *Teramo.*
Intercostal spaces, *Ribs.*
Internuncio, *Legates, Nuncio.*
Intestinal fever, *Typhus & Typhoid Fevers.*
Intestinal juice *Digestion.*
Intiue, *Vegetable Physiol.*
Intrados, *Arch.*
Inverury, *Aberdeenshire.*
Invoice-book. *Book-keeping.*
Ionidium, *Violuceae.*
Ios, *Greece.*
Ipek, *Petsh.*
Ipe-tobacco, *Bignoniaceae.*
Ipo, *Upas.*
Ipswich, *Queensland.*
Iriartea andicola, *Wax-palm.*
Iris (*r.*), *Anatolia.*
Irmenseule, *Yggdrasil.*
Iron, Age of, *Bronze, Age of.*
Iron Island, *Tenasserim.*
Iron, wine of, *Tartaric Acid.*
Iron-bark tree, *Eucalyptus*
Iron-froth, *Haematite.*
Iron Gate, *Servia.*
Iron-refining, *Bessemer's Process.*
Iron-sand, *Loadstone.*
Ironsides, Cromwell's, *Cromwell.*
Ironstone, *Black-band Ironstone.*
Ironstone Mount, *Tasmania.*
Iron-wood, *Date Plum.*
Iron-wood, white, *Xanthoxylum.*
Irrationality of dispersion, *Refraction.*
Irritability of muscles, *Tonicity, Muscular.*
Irun, *Spain.*
Isaac Angelus, *Andronicus.*
Isaac II., *Byzantine Emp.*
Isaacs River, *Queensland.*
Isabella II., *Spain.*
Isabnormal lines, *Isothermal Lines.*
Isatis, *Woad.*
Ischys, *Æsculapius.*
Isel, *Drave.*
Iser, *Flanders, West.*
Iser, *Bunzlau.*
Iserine, *Titanium.*
Isgaur, *Colchis.*
Ishak-ben-Soleiman, *Arabian Lang. & Lit.*
Isis, *Osiris.*
Iskdanere, *Scutari.*
Isker (*r.*), *Turkey.*
Islamabad, *Cashmere.*
Islampoor, *Dacca.*
Island of Desolation, *Kerguelen's Land.*
Islandshire, *Shire.*
Islebius. *Agricola, John.*
Isle of Bourbon Tea, *Faam.*
Isle of Serpents, *Black Sea.*
Isle Royal, *Superior Lake.*
Ismail, *Persia.*
Ismaili, *Suez Canal.*
Ismid, *Nicomedia.*
Isogonic lines, *Terrestrial Magnetism.*
Isolating languages, *Philology.*
Isonandra, *Pauchonti.*
Isonza (*r.*), *Austria.*
Israfil, *Mohammedanism.*
Issik-kul (*l.*), *Semipalatinsk.*
Issoudun, *Indre*
Issuant, *Jessant.*
Istaccihuatl (*mt.*), *Mexico.*
Italian paste, *Macaroni.*
Italians, ancient, *Rome.*
Itaparica (*i.*), *All Saints' Bay.*
Itapicuru (*r.*), *Bahia.*
Itchen (*r.*), *Southampton.*
Ithon (*r.*), *Radnorshire.*
Itz (*r.*), *Saxe-Coburg-Gotha.*
Ivan Kulita, *Russia.*
Ivay, *Parana.*
Ivel, *Bedfordshire, Ouse*
Iverdun (*l.*), *Neufchatel.*
Iverula, *Hibernia.*
Ivisan, *Capiz.*
Ivry, battle of, *Henri IV. (France).*
Ixodes and Ixodidæ, *Tick.*
Izmid, *Nicomedia.*

Jablonovy (*mts.*), *Irkutsk.*
Jacare, *Alligator.*
Jack, *Pike.*
Jackatallah, *Otacamund.*
Jack-by-the-hedge, *Alliaria.*
Jackson, *Pugilism.*
Jackson, *Tennessee.*
Jacobean style of architecture, *Renaissance.*
Jaffna peninsula, *Ceylon.*
Jagatai, *Turkestan.*
Jägers, *Chasseurs.*
Jahnuvi (*r.*), *Ganges.*
Jaik (*r.*), *Ural.*
Jailuru, *Bijbahar.*
Jalon (*r.*), *Calatayud.*
Jalun, *Bundelcund.*
Jamaica, *Long Island.*
Jamaicina, *Andira.*
James Isle, *Galapagos Is.*
Jamestown, *Barbadoes.*
Jamuri, *Albania.*
Janiculus, Mons, and the Janiculum, *Rome.*
Jantra (*r.*), *Tirnova.*
Japan earth, *Catechu.*
Jarama (*r.*), *Tagus.*
Jarchi, *Rushi.*
Jardin des Plantes, *Botanic Garden.*
Jargonelle, *Pear.*
Jarool, *Lagerstroemia.*
Jaroslaf, *Russia.*
Jar-ra-warnang, *Baritah.*
Jasmine fire, *Pyrotechny.*
Jason (*i.*), *Falkland Is.*
Jatropha nuts, *Physic-nut.*
Jats, *Punjub, Sikhs.*
Jauru, *Paraguay, river.*
Javalon, *Guadiana.*
Javorskij, *Russian Lang. & Lit.*
Jaw-fall, *Trismus Nascentium.*
Jaxt, *Neckar.*
Jazyges, *Transylrania.*
Jean Paul, *Richter.*
Jebel Abad (*mts.*), *Persia.*
Jebel el-Bied, *Blanco, Cape.*
Jebel-er-rahme, *Arafat Mt.*
Jebel-esh-sherki. *Lebanno, Anti-.*
Jebel Hadnar, *Atlas Mts.*
Jebel Katharin, *Sinai.*
Jebel Mûsa, *Sinai.*
Jeddah, *Jiddah.*
Jefferson (*mt.*), *White Mts.*
Jegani, *Albania.*
Jehovists, *Pentateuch.*
Jehroom, *Fars.*
Jejunum, *Alimentary Canal.*
Jellinghee (*r.*), *Bengal, Ganges.*
Jelly-fish, *Acalephue.*
Jemmingen, battle of, *William, Prince of Orange.*
Jemtland, *Sweden.*
Jenibazar. *Novibazar.*
Jenil, *Granada, Spain.*
Jenner, Dr., *Typhus and Typhoid Fevers.*
Jercs, *Xeres.*
Jer-falcon, *Gyr-falcon.*
Jericho's Ford, battle of, *U. S.*
Jerusalem oak, *Chenopodium.*
Jesses, *Falconry.*
Jesuit's drops, *Benzoin.*
Jetee, *Asclepiadaceae.*
Jethou, *Jersey.*
Jew's apple, *Egg-plant.*
Jezebel, *Ahab.*
Jiloca, *Ebro.*
Jinn, *Genii.*
Joannes Christians, *Zabism.*
Joannes Eremita, *Cassianus.*
Joannina, *Albania.*
Jocaste, *Œdipus.*
Joggs, *Jougs.*
Johannes, emperors, *Byzantine Empire.*
John of Brienne, *Byzantine Empire.*
John of Bruges, *Anabaptists.*
Johnshaven, *Kincardineshire.*
Johnsoniana, *Ana.*
John the Almoner, *Chrysostom.*
John Tzimiskes, *Byzantine Empire.*
John XXIII., Pope, *Schism, Western.*
Jointed pipework, *Eriocaulaceæ.*
Joints, resection or excision of, *Resection of Joints.*
Joints, stiffness in, *Ankylosis.*
Jokgrin, *Zubern.*
Jolliffes, *Africa.*
Jonathan ben Uzziel, *Targum.*
Jones, Owen, *Welsh Lang. & Lit.*
Jongleur, *Troubadour.*
Jonzac, *Charente-Inférieure.*
Jorat, Mont, *Vaud.*
Jordanes, *Jornandes.*
Jordshaui, *Arubian Lang. & Lit.*
Josa, *Tarifa.*
Jotuns, *Giants and Dwarfs.*
Joubert, *Glass.*
Jouffroy, Marquis de, *Steam-navigation.*
Journal, *Book-keeping.*
Jovinus, *Valentinianus.*
Jowaree, *Durra.*
Juana, *Cuba.*
Juan Mannel, *Spanish Lang. & Lit.*
Juba, *Muscat.*
Jubal, or Jublah, Strait of, *Red Sea*
Jubeil, *Byblos.*
Jublanik, *Bosnia.*
Juca, *Manioc.*
Judcock, *Snipe.*
Jug (*r.*), *Votogda.*
Juggs, *Jougs.*
Jugulars, *Circulation.*
Julian, Count, *Roderic.*
Juliana, *Prunes.*
Julian Period, *Period.*
Juliers, *Julich.*
Jumarts, *Hybrid.*
Jumper, *Blasting.*
Jumping mouse, *Deermouse.*
Juncaginæ. *Alismaceae.*
Juncus, *Rush.*
June-berry, *Amelanchier.*
Jungfernsprung (*mt.*), *Saxony.*
Jungmann, *Bohemia.*
Juniata (*r.*). *Susquehanna.*
Junior optime, *Wrangler.*
Junjera, *Concan.*
Jupiter, *Planets.*
Jurançon, *Pyrénées, Basses.*
Jurass c, *Oolite.*
Jurat, *Affidavit.*
Jure devoluto, *Patronage.*
Jurnut, *Earth-nut.*
Jurua (*r.*), *Amazon.*
Justicia. *Acanthus.*
Justin II , *Byz. Empire.*
Justinian II., *Byz. Empire.*
Jusuf-ben-Jakub, *Alfonso I.*
Jutay (*r.*), *Amazon.*
Jutes, *Anglo-Saxons.*
Juts, *Sinde.*
Jyhun (*r.*), *Zeithun.*

Kaab-ben-Zohair, *Arabian Lang. & Lit.*
Kabinda, *Loango.*
Kabiri, *Phœnicia.*
Kabus, *Persian Lang. & Lit.*
Kabyles, *Berbers.*
Kachugsk, *Lena.*
Kadi-kane, *Millet.*
Kadikoi, *Constantinople.*
Kadjak Isles, *Russia.*
Kadoe, *Java.*
Kæmpferia pandurata, *Turmeric.*
Kafu, *Nile.*
Kahlamba (*mt.*), *Zululand.*
Kahoolani, *Sandwich Is.*
Kaid, *Sheep-louse.*
Kaifung-fu, *Honan.*
Kaila, *Indus.*
Kailasa, Temple of, *Ellora.*
Kaimakans, *Turkey.*
Kaisarijeh, *Anatolia.*
Kaiserstuhl, *Black Forest.*
Kakaterra tree, *Dacrydium.*
Kakerlac, *Cockroach.*
Kakerlaken, *Albinos.*
Kaki, *Date Plum.*
Kalabagh (*mts.*), *Salt Range.*
Kalagwe (*l.*), *Zambesi.*
Kalambi (*mt.*), *Kaffraria.*
Kalambu, *Colombo.*
Kalamita, Bay of. *Alma.*
Kalany-ganga, *Colombo.*
Kaldera, *Screw Pine.*
Kali, *Umá.*
Kalihara Desert, *Namaqualand.*
Kali-mas (*r.*), *Surabaya*
Kalimazoo, *Michigan.*
Kali Nuddi (*r.*), *Kunnoj.*
Kalipani, *Ghogra.*
Kalouga (*r.*), *Borodino.*
Kamburg, *Saxe-Meiningen.*
Kamehameha I., II., &c., *Sandwich Islands.*
Kamela, *Vermifuges.*
Kamtchadales, *Kamtchatka.*
Kanarak, *Cuttack.*
Kandalak, Gulf of, *White Sea.*
Kandyans, *Ceylon.*
Kangaroo rat, *Potoroo.*
Kangaroo vine, *Vitaceue.*
Kang-tung, *China.*
Kanowry, *Bornu.*
Kanpoo, *Hang-Chow-Foo.*
Kan-su, *Chinu.*
Kapunda, *South Australia.*
Karadagh, *Montenegro.*
Karague, *Albert N'yanza.*
Kara Kerman, *Babatag.*
Kara-kool, *Bokharu*
Karakorum (*mts.*), *Tibet.*
Kara-kum, *Kizil-kum.*
Karasch, *Bunat.*
Kara See, *Russia.*
Karatchi, *Sinde.*
Karlsburg, *Carlsburg.*
Karmoot, *Siburidae.*
Karmoe, *Carmoé.*
Karoefa, *Papua.*
Karotcha, *Korotcha.*
Karun (*r.*), *Shuster.*
Kasbec (*mt.*), *Terek.*
Kasbin, *Persia.*
Käsenburg, *Schwarzburg.*
Kasipoor, *Kumaon.*
Kassu, *Cutechu.*
Kastron, *Antiparos:*
Katahdin (*mt.*), *White Mts.*
Katchi, *Tibet.*
Katherinenberge, *Radom.*
Katif, *Wahabis.*
Katschalinskala, *Duborka.*
Katskill (*mts.*), *New York, state.*
Kattegat, *Cattegat.*
Kattywar, *Guzerat.*
Katune, *Ob.*
Katunsk (*mts.*), *Altai Mts.*
Kaui, *Sandwich Islands.*
Kava, *Ava.*
Kaye, Bishop, *Sabbath.*
Kayinga (*l.*), *Victoria Lake.*
Kayserling, Count, *Russia.*
Kazbeck (*mt.*). *Tiflis.*
Kazembe, *Cazembe.*
Kazvin, *Casbin.*
Kea, *Cang.*
Keang-se, *China.*
Keang-su, *China.*
Kearsage, the (ship), *Alabama*
Kedah, *Quedah.*
Kedirie (*r.*), *Surabaya.*
Kedron, *Kidron.*
Keedah, *Quedah.*
Keeper (*mt.*), *Tipperary.*
Kee wee-naw, *Superior, Lake.*
Keffing, *Moluccas.*
Kefr Cana, *Cana of Galilee.*
Keg-fig, *Date Plum.*
Keilberg, *Erzgebirge.*
Keith, *Banffshire.*
Keitloa, *Rhinoceros.*
Kelænonesia, *Polynesia.*
Keller, *Engraving.*
Kellet Straits, *Melville I.*
Kelp ware, *Wrack.*
Kelt, *Salmon.*
Kemi, *Egypt.*
Kemi, *Lapland.*
Kempenfeldt, Admiral, *Royal George.*
Ken, *Cane.*
Ken (*l.*), *Dee.*
Kenia, *Moon, Mountains of.*
Kenmare Bay, *Kerry.*
Kennet (*r.*), *Thames.*
Kenneth, *Scotland.*
Kentucky coffee tree, *Gymnocladus.*
Kenwyn (*r.*). *Truro*
Keppel, *Falkland Islands.*
Keppel Bay, *Queensland.*
Keptchak, *Kiptchak.*
Keratose, *Sponge.*
Kerka, *Dalmatia.*
Kerkhah, *Persia.*
Kernwald, *Unterwalden.*
Kerrera, *Hebrides.*
Kerry Head, *Shannon.*
Kershope Water, *Border.*
Kertch, Strait of, *Yenikale Strait.*
Keswick (*l.*), *Derwentwater.*
Ket, *Ob.*
Ketch, Jack, *Executioner, Tyburn.*
Ketley, *Shropshire.*
Key, *Moluccus.*
Keys, *Caicos.*
Keys, relative, *Relative Keys.*
Keystone, *Arch.*
Kezanlik. *Kasanlik.*
Khabs, *Cubes.*
Khafren. *Egypt.*
Kham, *Tibet.*
Khamsin, *Egypt.*
Khan, *Caravansarai.*
Khapalu, *Khafaloun.*
Kharfah, *Wahabis.*
Kassou-Kaye, *Khaya.*
Khat, *Catha.*
Khaurezm, *Khiva.*
Khnum, *Egypt.*

Khond, *Tamil.*
Khonds, *India, Orissa.*
Khopah, *Trebizond.*
Khoper (*r.*), *Don, Penza.*
Khor, *Tibet.*
Kyora, *Samos.*
Khoten, *Turkestan.*
Khudavenkiar, *Anatolia.*
Khur, *Dziggethai.*
Kia-ling (*r.*), *Yang-tse-kiang.*
Kiang, *Dziggethai.*
Kiehenev, *Kishenau.*
Kidwelly, *Caermarthenshire.*
Kiery, *Amaranth.*
Kiesh, *Cow Parsnip.*
Kilauea (*i.*), *America, Sandwich Islands.*
Kilbirnie, *Argyleshire.*
Kilbrennan Sound, *Arran.*
Kildrum, *Waterford.*
Kileh-shergat, *Assyria.*
Kilimane, *Zambesi.*
Killaloe, *Clare.*
Killington Peak, *Appalachians.*
Killybegs, *Donegal.*
Kilmichael Point, *Wexford.*
Kimair (*r.*), *Troy.*
Kimbri, *Cimbri.*
Kimmeridge coal, *Shale.*
King, explorer, *Australian Explorations.*
Kingarth, *Vitrified Fort.*
King-bird, *Tyrant Shrike.*
King Charles's South Land, *Tierra del Fuego.*
King-duck, *Eider.*
King-ki-tao, *Corea.*
King of the herrings, *Shad.*
King's hood, *Ruminantia.*
King's Island, *Bengal, Bay of.*
King's Island, *Limerick.*
Kingtang, *Ningpo.*
King vulture, *Condor.*
King William's Town, *Kaffraria, British.*
Kiui Balu, *Borneo.*
Kino, Jamaica, *Seaside Grape.*
Kinphu, *Corea.*
Kiutore, *Aberdeenshire.*
Kinzig (*r.*), *Black Forest.*
Kipper, *Salmon.*
Kippure (*mt.*), *Dublin.*
Kircnsk, *Irkutsk.*
Kiriaghuna, *Asclepiadaceae.*
Kirkdale Cavern, *Caves.*
Kirkton, *Crediton.*
Kirtynassa, *Ganges.*
Kishengunga, *Mazufurabad.*
Kishon, *Carmel.*
Kish-Tshai, *Nucha.*
Kisil (*r.*), *Urat.*
Kisil-Irmak (*r.*), *Anatolia.*
Kisky Thomas nut, *Hickory.*
Kissavo, *Ossa.*
Kitchen middens, *Recent Periods.*
Kitjap, *Soy.*
Kitta, *Magpie.*
Kittalinnies, *Appalachians.*
Kizil-Uzen, *Azerbijan.*
Klar (*r.*), *Wener Lake.*
Klaus-narr, *Court-fool.*
Klek (*mt.*), *Dinaric Alps.*
Klephts, *Armatoles.*
Klettgau, *Schaffhausen.*
Klip (*r.*), *Natal.*
Klip-dasse, *Daman.*
Kliuchi, *Zlatoust.*
Kliutschewsk, *Volcanoes.*
Klodnitz, *Oder.*
Kloster-Erbacher, *Rhine-wine*
Klutha. *Otago.*
Knees, broken, *Broken Knees.*
Kneph, *Ammon.*
Kniashnin, *Russian Lang. & Lit.*
Knight-heads, *Shipbuilding.*
Knock (*mt.*), *Banffshire.*
Knockmahon, *Waterford.*
Knockmeledown (*mt.*), *Tipperary.*
Knot of Cusco and Pasco, *Peru.*
Know-nothing party, *U. S.*
Knox's Isle, *Gilbert Islands.*
Knysna Inlet, *Cape of Good Hope.*
Kobdo (*r.*), *Altai Mts.*
Kocher (*r.*), *Neckar.*
Kochia, *Belvedere.*
Kocpang, *Timor.*
Koeti, *Borneo.*
Kohik, *Bokhara.*
Ko-ko-nor, *Tibet.*
Kokum oil, *Cocum oil.*
Kolberg, *Colberg.*
Koleah, *Algeria.*
Kolerum, battle, *Tippoo Sahib.*
Koles, *India.*
Kolguev, *Kalguef.*
Kolubara (*r.*), *Servia.*
Koluri, *Salamis.*
Komorn, *Comorn.*
Komotapur, *Loll Bazaar.*
Komul, *Turkestan.*
Komuldsina, *Ghumurdjina.*
Konaie (*r.*), *Brahmaputra.*
Konevetz, *Ladoga.*
Kongsberg, *Silver.*
Kongun, *Congoon.*
Koniggrätz, battle, *Germany.*
Konigsborn, salt-works of, *Unna.*
Konigsmark, Countess A., *Saxe, Count of.*
Konigstein (*mt.*), *Saxony.*
Koolokamba, *Gorilla.*
Koombar, *Gmelina.*
Kooth, *Putchuk.*
Koping, *Maelar. L.*
Koprili, Moh., *Ot. Emp.*
Koree (*r.*), *Ajmeer.*
Korkilo, Cape, *Cos.*
Kormachiti, Cape, *Cyprus.*
Koro, *Fiji Islands.*
Korona, *Carlstadt.*
Koros (*r.*), *Theiss.*
Kosala, *Oude.*
Kosciusko (*mt.*), *N. S. Wales.*
Kosel, *Oder.*
Kosi, Little (*r.*), *Purneah.*
Kosila (*r.*), *Almora.*
Kosmos, *Chaos.*
Kosso, *Cusso.*
Koteluoi, *New Siberia.*
Kothen, *Cöthen.*
Kotorosl, *Jaroslav.*
Kotoura, *Khoi.*
Kottagherry, *Ootacamund.*
Kottbus, *Cottbus.*
Kotzebue's Sound, *America, Russian.*
Kowek, *Ain-tab.*
Kowno honey, *Lime* (*Linden*).
Kowrie, *Kauri.*
Krafla, *Iceland.*
Krakov, *Cracow.*
Krakowska (*r.*), *Jaworow.*
Kral, *Padishah.*
Krame, *Booth.*
Kranen, Peter, *Vondel.*
Kranichfeld, *Saxe-Meiningen.*
Krasnoi-yar, *Caspian Sea.*
Kriegsberg, battle, *Nisch.*
Krotalon, *Castanets.*
Krückau, *Elmshorn.*
Kuang-nam, *Quang-nam.*
Kuban (*r.*), *Caucasus.*
Kudamba, *Cadamba.*
Kuilenburg, *Culenborg.*
Kukolnik, Nestor, *Russian Lang. & Lit.*
Kulpa (*r.*), *Carniola.*
Kuluglis, *Barbary.*
Kunawur, *Bussahir.*
Kund, *Tamil.*
Kunduz, *Anderab.*
Kungara, *Nubia.*
Kurland, *Courland.*
Kurnalli, *Ghogra.*
Kurrumfuli, *Chittagong.*
Kurshi, *Bokhara.*
Kurumnassa, *Ganges.*
Kush, *Ethiopia.*
Kusha, *Abyssinia.*
Kusip, *Ovampos.*
Kuti Lama, *Borneo.*
Kutshouk-Kainardji, *Ottoman Empire.*
Kuvan-Daria, *Jaxartes.*
Kuyp, *Cuyp, Jacob Ger.*
Kvalo (*i.*), *Tromsöe.*
Kwang-se, *China.*
Kwan-lun, *Kuen-lun.*
Kwei-chow, *China.*
Kyabuca, *Kiaboucca.*
Kyanite, *Cyanite.*
Kyffhausen, *Schwarzburg-Rudolstadt.*
Ky Gariep (*r.*), *Vaal* (*r.*).
Kyle, *Ayrshire.*
Kyleakin, *Skye.*
Kyle Rhea, *Skye.*
Kyll, *Moselle.*
Kyrle, John, *Ross, Man of.*
Kythnos, *Archipelago.*

Laach, *Rhenish Architecture.*
La Belle Alliance, *Waterloo.*
La Bosse du Dromedaire, *Mont Blanc.*
Labrador tea, *Ledum.*
Laburia, E., *Compressed-air Bath.*
Labyrinth, *Ear.*
Labyrinthibranchidæ, *Anabasidae.*
Lacedæmon, *Sparta.*
La Chatre, *Indre.*
Lachlan (*r.*), *N. S. Wales.*
Laconia, *Morea, Sparta.*
Lactine, lactose, *Sugar.*
Lactometer, *Galactometer.*
Ladhia, *Ghogra.*
Ladies' tracce, *Canary Grass.*
La Digne (*i.*), *Seychelles Is.*
Ladislaus I., *Hungary.*
Lady's fingers, *Kidney-vetch.*
Lady's smock, *Cress.*
Laens, *Sweden.*
Laertes, *Ulysses.*
Lævo-racemic acid, *Tartaric Acid.*
Lafayette (*mt.*), *New Hampshire, White Mts.*
La Fourche (*r.*), *Washita.*
Lagan (*r.*), *Antrim, Down.*
Lagenaria, *Bottle-gourd.*
Lagidium, *Chinchilla.*
Lago di Salpi, *Manfredonia.*
Lagostomus, *Chinchilla.*
Lagotis, *Chinchilla.*
La Haye Sainte, *Waterloo.*
Lahn, *Nassau.*
La Hogue, battle, *Tourville.*
La Isoletta, *Cartagena.*
Laisse (*r.*), *Savoy.*
Lakaan (*mt.*), *Timor.*
Lakahia, *Papua.*
Lalo, *Adansonia.*
Lamar, *Bolivia.*
La Marmolata (*mt.*), *Alps.*
Lambasa, *Barbary.*
Lambay Isle, *Dublin.*
Lamhel, *Label* (*her.*).
Lambert's nut, *Hazel.*
Lambourn, *Berkshire.*
Lambrequin, *Mantling.*
Lamb's lettuce, *Corn Salad.*
Laminitis, *Founder.*
Lammer Law, *Lammermoors.*
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Myconus, *Greece.*
Mycose, *Sugar.*
Mydaus, *Teledu.*
Myodonia, *Nisibis.*
Myhee (*r.*), *Cambay.*
Myletes, *Salmonidae.*
Myology, *Anatomy.*
Myopia, *Eye.*
Myothera, *Ant-catcher.*
Myra, *Lycia.*
Myrlandros, *Phœnicia.*
Myricaria, *Tamarisk.*
Myricin, *Wax.*
Myrmelion, *Ant-lion.*
Myrmica, *Ant.*
Myrmidons, *Ægina.*
Myron, *Sculpture.*
Myropetra, *Wasp.*
Myrrh, *Cicely.*
Myzomela, *Blood-bird.*

Naab, *Bavaria.*
Naango, *Biafra.*
Nabegha, *Arabian Lang. & Lit.*
Nabon (*r.*), *Fars.*
Nadder (*r.*), *Wiltshire.*
Nagas, *Saivas.*
Nagasena, *Nagarjuna.*
Nagla Ragee, *Eleusine.*
Nagna (*r.*), *Nowanagar.*
Nagpore the less, *Chota Nagpore.*
Nagy-Kikinda, *Kikinda.*
Nagy-Szombath, *Tyrnau.*
Naharro, *Spanish Lang. & Lit.*
Nahavend, battle of, *Sassanidae.*
Nahe (*r.*), *Rhenish Prussia.*
Nahiyehs, *Turkey.*
Nahr-el-Asi, *Orontes.*
Nahr-el-Haleb (*r.*), *Aleppo.*
Nain, *Labrador.*
Nainital (*l.*), *Himalaya.*
Najerilla, *Ebro.*
Nakir, *Mohammedanism.*
Naksheh, *Karshi.*
Nakskov, *Laaland.*
Namagari (*r.*), *Vaal River.*
Namatotte, *Papua.*
Namhy-pamby, *Philips, Amb.*
Namenghan, *Turkestan.*
Namoi (*r.*), *Darling.*
Nanda Devi, *Himalaya.*
Naning, *Malacca.*
Nan-ling (*mts.*), *Chinese Empire.*
Napo (*r*), *Amazon.*
Napoleon II., *Reichstadt Duke of.*
Napoleona, *Belvisia.*
Nar (*r.*), *Tiber.*
Nar (*r.*), *Wash.*
Narainganj, *Dacca.*
Narborough Isle, *Galapagos Islands.*
Narenta (*r.*), *Bosnia, Dalmatia.*
Narev, *Bielsk.*
Narim, *Ob.*
Narin (*r.*), *Thian-Shan.*
Narova, *Peipus.*
Narr-Klaus, *Courl-fool.*
Narra, *Sinde.*
Narraganset Bay, *Rhode I.*
Narragansetts, *Rhode I.*
Narrows, *Nevis Island.*
Naseberry, *Sapodilla Plum.*
Nashik, *Nassick.*
Nasmyth James, *Steam-Hammer, Sun.*
Nat, *Egypt.*
National Sunday League, *Sabbath.*
National workshops, *Ateliers Nationaux.*
Nations, *University.*
Natisone (*r.*), *Cividalé.*
Natives, *Oyster.*
Natrium, *Sodium.*
Natrix, *Snake.*
Natural Bridge, *Virginia.*
Natural selection, *Species.*
Nau, Cape, *Cotroné.*
Nauclea, *Cadamba.*
Naupactus, *Ætolia. Lepanto.*
Naussa, *Paros.*
Naval regulations, *Regulations, Mil. & Nav.*
Navel-string, *Umbilical Cord.*
Naver (*r.*), *Sutherland.*
Navvies, *Canal* (*note*), *Railways.*
Navy, British, *War Services.*
Navy retirement, *Retirement.*
Navy schoolmaster, *Schoolmaster, Army & Navy.*
Nazareth (*r.*), *Ogobai.*
Naze, the, *Scandinavia.*
Nazza, *Saxe-Coburg-Gotha.*
Neapolis, *Naples.*
Near-sight, *Sight, Defects of.*
Neasho (*r.*), *Kansas.*
Nechtansmere, battle of, *Scotland.*
Neckar Highlands, *Baden.*
Necrophorus, *Burying Beetle.*
Necrosis, *Teeth.*
Nectan, *Picts.*
Nectandra, *Greenheart.*
Nectanebus, *Egypt.*
Nedjed, *Arabia.*
Needle-furze, *Genista.*
Needle-guns, *Breech-loading Arms.*
Needles, the, *Wight, Isle of.*
Needle-woods, *Coniferae.*
Neenah, *Fox River.*
Neepigon (*r.*), *Superior Lake.*
Negative, *Photography.*
Negrais, *Bengal, Bay of.*
Negro (*r.*), *Red River.*
Negrohead, *Tobacco.*
Negro monkey, *Semnopithecus.*
Negus, *Abyssinia.*
Neilgherries, *Ootacamund.*
Neill, General, *Allahabad.*
Neiva, *Neviansk.*
Nekao, *Egypt.*
Nell's Point, *Barry Island.*
Nelson (*r.*), *Hudson's Bay.*
Nematoneura, *Zoology.*
Nen, or Nene (*r.*), *Bedford Level, Cambridgeshire. Wash.*
Nenagh (*r.*), *Tipperary.*
Neo-Castro, *Navarino.*
Neokhori, *Pella.*
Neoplanta, *Neusatz.*
Nepaul paper, *Daphné.*
Nepaul plateau, *India.*
Nepean Bay, *South Australia.*
Nepeta, *Catmint.*
Nephin (*mt.*), *Mayo.*
Nephites, *Mormons.*
Nephralgia, *Kidneys.*
Nephthys, *Egypt.*
Nepidæ, *Water-bug.*
Neptune, *Planets.*
Neptune's cup, *Alcyonium.*
Ner (*r.*), *Lodz.*
Nera (*r.*), *Tiber.*
Nerac, *Lot-et-Garonne.*
Nerchinsk (*mts.*), *Irkutsk.*
Nergal, *Assyria.*
Neris-les-Bains, *Montluçon.*
Nero (*l.*), *Rostof.*
Neroulos, *Greece.*
Nervion (*r.*), *Bilbao.*
Nestorius, Chronicle of, *Russian Language & Literature.*
Nestos (*r.*), *Macedonia.*
'Ne sutor supra crepidam,' *Apelles.*
Netherohy, *Rio de Janeiro.*
Netta (*r.*), *Augustowo.*
Nettuno, *Antium.*
Netze, *Posen.*
Neuenhurg, *Neufchatel.*
Neuera, *Ceylon.*
Neufahrwasser, *Danzig.*
Neural arch, *Skeleton.*
Neurapophyses, *Skeleton.*
Neurology, *Anatomy.*
Neustadt, *Banya.*
Neustadt, *Saxe-Weimar-Eisenach.*
Neusulza, *Saxe-Meiningen.*
Nevado de Tolima, *New Granada.*
Neville, *Warwick, Earl of.*
Nevin, *Caernavonshire.*
New Amsterdam, *Berbice, Essequibo.*
New Archangel, *Novoarkhanghelsk.*
Newars, *Nepaul.*
Newborough, *Anglesey.*
New Braunfels, *Texas.*
New Brunswick, *Canada.*
Newcastle, *Delaware.*
Newcastle, *Limerick.*
Newcastle, *N. South Wales.*
Newcomen, *Steam-engine.*
Newfoundland, *Canada.*
New Galloway, *Kirkcudbrightshire.*
New Georgia, *Antar. Ocean.*
New Grange (cairn), *Cairn.*
New Holland goose, *Cereopsis.*
New Holland vulture, *Talegalla.*
New Jersey Tea, *Red Root.*
New Kingston, *Kingston-upon-Thames.*
New Lanark, *Owen, Robert.*
Newmilns, *Ayrshire.*
New Orkneys, *Antar. Ocean.*
New Orleans moss, *Bromeliaceae.*
New Philipines. *Texas.*
New Providence, *Bahamas.*
New River, *Great Kanawha.*
New River, *Middlesex.*
Newry (*mts.*), *Armagh.*
New Sarum, *Salisbury.*
New Spain, *Alvarado.*
New Toledo, *Cumana.*
Newton, G. S. *Painting.*
Newtown, *Wight, Isle of.*
Newtownbarry, *Wexford.*
Newtown-Mount-Kennedy, *Wicklow.*
New Westminster, *Columbia, British.*
New-Year River, *Bogan.*
Ngan-Hoee, *Gan-Hwuy.*
N'gomano, *Rovuma.*
Ngornu, *Angornow*
Ngotuane, *Oori.*
Ngouyai (*r.*), *Ogobai.*
Niagara and Onondaga epochs, *America.*
Nib-nih, *Neb-neb.*
Nicander, *Alexandrine Age.*
Niccolo of Fuligno, *Alunno.*
Niee, *Alpes Maritimes.*
Nicephorus Botaniates, *Alexius Comnenus.*
Nieephorus Phocas, *Byzantine Empire.*
Nicholajesk, *Amoor.*
Nickelne, *Arsenical Minerals.*
Nicker-trec, *Guilandana.*
Nicolas Kanabus, *Byzantine Empire.*
Nicot, Jean, *Tobacco.*
Nicoya, Gulf of, *Carthago.*
Nidaros, *Trondhjem.*
Nidd (*r.*), *Yorkshire.*
Nid-Elv (*r.*), *Trondhjem.*
Nidhugger, *Nifheim.*
Nidwald, *Unterwalden.*
Niende, *Rovuma.*
Niers (*r.*), *Maas.*
Nieusiedlersee, *Alps.*
Nieuwe Diep, *Amsterdam.*
Nigger caterpillar, *Black Jack.*
Night-blindness, *Sight, Defects of.*
Night-churr, *Goatsucker.*
Night-scented rocket, *Dame's Violet.*
Nigritia, *Africa.*
Nihau, *Sandwich Islands.*
Nijneudinsk, *Irkutsk.*
Nijni-Kamtchatsk, *Kamtchatka.*
Nikkul Seyne, *Nicholson, J.*
Nikolsburg, armistice, *Germany.*
Nikosia, *Lefkosia.*
Nilgiri, *Neilgherry Mts.*
Nimach, *Neemuch.*
Nimhus, *Clouds.*
Nimègueu, *Nijmegen.*
Nimrud, *Layard.*
Ning-thee, *Irrawadi.*
Ninth-day disease, *Trismus Nascentium.*
Ninus, *Nineveh.*
Niobrora, *Nebraska.*
Nipissing (*l.*), *Canada.*
Nirmidea, *Parasitic Animals.*
Nissa, *Nisch, Sigismund.*
Nisus, *Sparrow-hawk.*
Nith, *Dumfriesshire.*
Nitocris, *Egypt.*
Nitre-whey, *Refrigerants.*
Nivelle, *Pyrenees, Basses.*
Nizam-al-Mulk, *Seljuks, Alp-Arslan.*
Nizami, *Persian Lang. & Lit.*
'No. 290,' *Alabama.*
No-Ammon, *Ammon.*
Nohili, *Thermo-electricity.*
Noble, *Pogge.*
Noble, *Rose-noble.*
Noctua, *Cabbage Moth.*
Nogal (*r.*), *Somali Land.*
Nogat (*r.*), *Vistula.*
Nogays, *Turks.*
Noguera (*r.*), *Aragon.*
Noirmoutier, *France.*
Noma, *Cancrum Oris.*
None-so-pretty, *Saxifrage.*
Nonnenstein (*mt.*), *Saxony.*
Nonpareil, *Type.*
Nonsueh (*i.*), *Bermudas.*
Nopal, *Cochineal.*
Norhorg, *Alsen.*
Nore (*r.*), *Tipperary.*
Norfolk Island pine, *Araucaria.*
Norhamshire, *Shire.*
Norse, *Scandinavian Lang. & Lit.*
Norska, *Norway.*
North Anna, battle of, *U. S.*
North Branch (*r.*), *Tennessee.*
North-east (*i.*), *Spitzbergen.*
Northern Lights, *Aurora Borealis.*
North German Confederation, *Germany.*
Northshead, *Chillern Hundreds.*
North-west Passage, *Maclure.*
Norton Sound, *America, Russian.*
Noss, *Bressay.*
Notation, chemical. *Chemistry.*
Notonectidæ, *Water-bug.*
Notre Dame Inlet, *Newfoundland.*
Nottorno, *Serenade.*
Nouba, Wady, *Nubia.*
Noumenon, *Philosophy, Substance.*
Nousa-Laut, *Moluccas.*
Novara, battle of, *Radetsky.*
Nova Scotia, *Canada.*
Novi, battle of, *Suvorof.*
Novitiate, *Monachism.*
Novo, *Ladogo.*
Novogrodek, *Lithuania.*
Noya Bay, *Spain.*
Noyes, J. H , *Perfectionists.*
Nshiego-Mbouvé, *Gorilla.*
Nu, *Egypt.*
Nueva Cacere, *Philippine Is.*
Nugget, *Gold.*
Nuggur, *Bednore.*
Nukha, *Nucha.*
Numb-fish, *Torpedo.*
Numen, *Om.*
Numenius, *Whimbrel.*
Numitor, *Romulus.*
Nun, *Niger.*
Nunez, *Senegambia.*
Nuphar, *Water-lily.*
Nurzek, *Bielsk.*
Nuthe (*r.*), *Zerbst.*
Nyborg, *Fühnen.*
Nykjobing, *Falster.*
Nylandischen Skären, *Sweaborg.*
Nyroca, *Scaup Duck.*

Oakingham, *Wokingham.*
Oak-lungs, *Lungwort.*
Oat-cakes, *Bread.*
Oatlike grass, *Arrhenatherum.*
Obcordate, *Leaves.*
Obdorsk, *Ob.*
O Becze, *Racz.*
Ober-Hesse, *Germany.*
Obertyn, battle of, *Sigismund.*
Obi (*i.*), *Moluccas.*
Obi, *Ob.*
Obion (*r.*), *Tennessee.*
Object-lessons, *Urbis Pictus, Pestalozzi.*
Ohovate, *Leaves.*
Obree, *Papua.*
Obstetries, *Midwifery.*
Obwald, *Unterwalden.*
Ocean currents, *Gulf Stream.*
Ochiltree, Lords, *Stewart Family.*
Ochri (*l.*), *Albania.*
Ochroite, *Cerite.*
Ock, *Berkshire.*
Ockment, West (*r.*), *Dartmoor.*
Octant, *Sextant.*
Octave, rule of the, *Rule of the Octave.*
Octavo, *Book.*
Octodecimo, *Book.*
Oddern, *Christiansand.*
Odet (*r.*), *Finistère.*
Odo, Bishop of Bayeux, *William I. & II. of England.*
Odylism, *Animal Mag.*
Odysseus, *Ulysses.*
Odyssey, *Homer.*
Oe, *O.*
Œa, *Tripoli.*
Œnanthe, *Water Dropwort.*
Oeräfa Jokul, *Iceland.*
Œsir, *Scandinavian Myth.*
Oestre Bygd *Greenland.*
Oeta-Nata, *Papua.*
Ofen, *Buda.*
Officers' allowances, *Allowances, Officers'.*
Ogechee lime, *Tupelo.*
Ogilo (*r.*), *Iseo* (*l.*), *Po.*
Ogress, *Roundle.*
Oguzian Turks, *Ottoman Empire.*
Ohm's law, *Galvanism.*
Oieh (*l.*), *Caledonian Canal.*
Oidemia, *Scoter. Surf Duck.*
Oikel (*r.*), *Ross & Cromarty.*
Oil City, *Oil-wells.*
Oil of apples, *Valerianic acid.*
Oil of spike, *Lavender.*
Oil of verbena, *Lemon Grass.*
Oil Springs (town), *Oil-wells.*
Oinomania, *Dipsomania.*
Ointments, *Unguents.*
Oistin, *Barbadoes.*
Okak, *Labrador.*
Okanda (*r.*), *Ogobai.*
Okavango (*r.*), *Zambesi.*
Okement, West (*r.*), *Dartmoor.*
Okonagan (*r.*), *Washington (territory).*
Olan (*mt.*), *Alpes, Hautes.*
Olau and Olawa, *Ohlau.*
Oldfieldia Africana, *Teak.*
Old Light Burghers, &c., *U. P. Church.*
'Old Man of Coniston,' *Lancashire.*
'Old Man of the Mountain, *Hussen-ben-Sabah.*
Old man pipes, *Tobacco-pipes.*
Old man's beard, *Bromeliaceae.*
Old Woman's Isle, *Bombay.*
Olearos or Oliaros, *Antiparos.*
Olekma and Olekminsk, *Lena.*
Olfactory bulb, *Brain.*
Oligoclase, *Felspar.*
Oliva, *Spun. Lang. & Lit.*
Olive nuts, *Elaeocarpaceae.*
Olona (*r.*), *Milan.*
Olympia, *Washington* (*ter*).
Olympian Mountains, *Vancouver's Island.*
Olympus (town), *Lycia.*
Olynthos, *Macedonia.*
Om (*r.*), *Tobolsk.*
Oma, *Moluccas.*
Omaiades, *Ommiades.*
Omar II., *Ommiades.*
Omhre, *Quadrille.*
Omhres Chinoises, *Puppet.*
Ombrone (*r.*), *Grosseto.*
Omenek, *Greenland.*
Ometepec, *Nicaragua* (*l.*).
Ommeyades, *Ommiades.*
Omototzi. *Kamtchatka.*
Omun, *Calabar.*
Onatas, *Sculpture.*
Onchus, *Fishes.*
Ondatra, *Musquash.*
Oneiromancy, *Divination.*
Oneyzah, *Wahabis.*
Onion (*r.*), *Vermont.*
Onkaparinga (*r.*), *South Australia.*
Ononis, *Rest-harrow.*
Onopordon, *Thistle.*
Onos agrios, *Unicorn.*
Ontario, *Canada.*
Oolowtee, *Cambay.*
Oori (*r.*), *Transvaal Republic.*
Oosterschelling, *Terschelling.*
Opera buffa, *Buffo.*
Ophiology, *Zoology.*
Ophiosaurus, *Glass Snake.*
Ophir (*mt.*), *Malacca.*
Opossum shrimp, *Mysis.*
Oppa (*r.*), *Oder, Troppau.*
Opposition (in astronomy), *Conjunction.*
Optical ghosts, *Ghosts, Optical.*
Optic thalamus, *Brain, Cerebrum.*
Oral Law, *Talmud.*
Orange, *Roundle.*
Orange root, *Hydrastis.*
Orarium, *Stole.*
Orb (*r.*), *Herault.*
Orbe (*r.*), *Neufchatel.*
Orbitolites, *Rhizopoda.*
Orcades, *Orkneys.*
Orcagna, A., *Painting.*
Orchard grass, *Cock's Foot Grass.*
Orchids, *Orchideæ.*
Orchy, *Awe* (*l.*).
Orco Falls, *Waterfall.*
Orcus, *Roman Religion, Ancient.*
Order-book, *Book-keeping.*
Order of the day, *Parliament.*
Orellana, *Amazon.*
Orenburg gum, *Larch.*
Orestes, *Agamemnon.*
Orestes, *Odoacer, Rome.*
Orfa, *Edessa.*
Organ, *Phrenology.*
Organography or organology, *Botany.*
Organzine, *Silk & Silkworm.*
Oriental jade, *Nephrite.*
Oriental wool, *Carmine.*
Oriflamme, *Standard.*
Original Burgher Presbytery, *U. P. Church.*
Orizava (*mt.*), *Mexico.*
Orkhan, *Ottoman Empire.*
Orkney (derivation of name), *Hebrides.*
Orkney, Earls of, *Hamilton Fam., Sinclair Fam.*
Orla (*r.*), *Saxe-Weimar-Eisenach,*
Orlik, *Orel.*
Ormista, *Orosius.*
Ormond, *Tipperary.*
Ormuz, *Rock-salt.*
Ornain, *Bar-le-Duc.*
Ornithichnites, *Birds, Fossil.*
Ornithogalum, *Star of Bethlehem.*
Oronsay, *Colonsay.*

Orontiaceæ, *Calla.*
Orpine, *Sedum.*
Orsajo (*mt.*), *Parma.*
Orza, battle of, *Sigismund.*
Ortegal, Cape, *Spain.*
Orthoclase, *Felspar.*
Orthognathous cranium, *Skull.*
Orthopædic surgery, *Surgery.*
Ortler Spitz, *Tyrol.*
Ortygia, *Alpheus, Syracuse.*
Orwell (*r.*), *Suffolk.*
Oryctognosy, *Mineralogy.*
Osborne, Captain Sherard, *Taepings.*
Os innominatum, *Pelvis.*
Osiût, *Siout.*
Osma (*r.*), *Turkey.*
Osmanli, *Othman.*
Osmanlis, *Ottoman Empire. Turkey.*
Osmerus, *Smelt.*
Os sacrum, *Sacrum.*
Ossification, *Arteries, Dis. of.*
Osterôe, *Farôe Isles.*
Ostheim, *Saxe-Weimar-Eisenach.*
Ost Vaagen, *Lofoden.*
Otaha, *Society Islands.*
Othman I., II., III., *Ottoman Empire.*
Othyl, *Acetyl.*
Otis, *Bustard.*
Otjiherero, *Ovampos.*
Otoconia, *Ear.*
Otsego (*l.*), *Susquehanna.*
Otter, *Ghost-moth.*
Otter, Peaks of, *Appalachians.*
Otter (*r.*), *Norway.*
Ottocar, *Rudolph.*
Ottochar, *Odoacer.*
Ouchy, *Lausanne.*
Ouder Amstel, *Nieuwer Amstel.*
Oudon (*r.*), *Mayenne.*
Ouessant, *Ushant.*
Ouette, *Mayenne.*
Oughter (*l.*), *Cavan.*
Oulu-Keme (*r.*), *Yenisei.*
Ouse (*r.*), *Sussex.*
Onsel, *Ouzel.*
Onsel (*r.*), *Buckinghamshire.*
Onycou, *Manioc.*
Ovarian tumor, *Ovaries.*
Ovariotomy, *Ovaries.*
Overflackkee, *Holland, South.*
Overshot wheel, *Water-power.*
Ovis, *Sheep.*
Ovoca, *Aroca.*
Ovolau, *Fiji Islands.*
Ovum anguinum, *Viper.*
Owenmore (*r.*), *Sligo*
Owen Stanley (*mt.*), *Papua.*
Owl-parrot, *Kakapo.*
Owyhee (*r.*), *Oregon.*
Oxen-le-Field, *Darlington.*
Oxe-eye bean, *Cowage.*
Oxford Tracts, *Tractarianism.*
Oxidizing flame, *Blow-pipe.*
Ox Mountains, *Sligo.*
Oxychloride of carbon, *Phosgene Gas.*
Oxysalts, *Salts.*
Oyapock, *Guiana, French.*
Oyster Bay, *Tasmania.*
Oyster plant, *Salsafy.*
Ozan, *Chizerots.*
Ozokerite, *Wax.*

Pabbay, *Skye.*
Pacasse, *Pegasse.*
Pachacamac, *Peru.*
Pacheco, Donna Maria de, *Padilla, Juan de.*
Pachyrizos, *Root.*
Packenham, Gen., *U. S.*
Paco, *Alpuca.*
Pacu, *Salmonidæ.*
Padaviry (*r.*), *Rio Negro.*
Padus, *Bird-Sherry.*
Pagancs, H. de, *Templars.*
Pagei, *Sumatra.*
Paget, Hon. Wm. *Anglesea, Marquis of.*
Pago-Pago, *Tutuila.*
Paillon (*r.*), *Alpes Maritimes.*
Paimbœuf, *Loire-Inférieure.*
Painted tortoise, *Emys.*
Painted pig, *Wart-hog.*
Paint-rock (*r.*), *Tennessee.*
Packnam, *Siam.*
Palais, *Belleisle-en-Mer.*
Palamedea, *Screamer.*
Palaucia (*r.*), *Segorbe.*
Palar (*r.*), *Chingleput.*
Palikat, *Pulicat.*
Palitsch (*l.*), *Theresiopel.*
Palki, *Palunquin.*
Pallet (in heraldry), *Pale.*
Palmas, Cape, *Guinea, Gulf of.*
Palm cabbage, *Cocoa-nut.*
Palm-honey, *Coquito.*
Palmistry, *Cheiromancy.*
Palm-wine, *Palms.*
Palmyrene language, *Shemitic Languages.*
Palo de Vaca, *Cow-tree.*
Palos, *Moguer.*
Palos, Cape, *Spain.*
Palshat, *Coimbatore.*
Paludina, *Wealden Formation.*
Pamiers, *Ariège.*
Pampas hare, *Agouti.*
Pampero, *Wind.*
Pamphilus, *Painting.*
Pampur, *Cashmere.*
Pamunkey (*r.*), *York.*
Panacea, *Æsculapius.*
Panætius, *Stoics.*
Panama hats, *Pandanaceæ.*
Panaria, *Lipari.*
Panaro, *Po.*
Panay, *Philippine Islands.*
Pancake Tuesday, *Shrove-tide.*
Pancreatic sarcoma, *Adenocele*
Pancreatine, *Digestion.*
Pandharpur, *Punderpur.*
Pandokratora, *Corfu.*
Paniani, *Ponani.*
Panic, *Pan.*
Panke, *Aralia.*
Panniers, *Packhorse.*
Panormus, *Palermo.*
Panphobia, *Fear.*
Pantagruel, *Rabelais.*
Pantaloon, *Harlequin.*
Pantar, *Solor Islands.*
Panthera, *Wildfowl.*
Papa, *Bishop.*
Papandayang, *Volcanoes.*
Paphos, *Phœnicia.*
Papier d'Albespeyres, *Vesicants.*
Papiete, *Tahiti.*
Pappenburg, *Ems.*
Papunha, *Gulielma.*
Papus, *Borneo.*
Para, *Belem.*
Paragoa, *Philippine Islands.*
Parallel motion, *Steam-engine.*
Parallel roads, *Glenroy.*
Parameters, *Variation of.*
Paramo de los Papas, *Andes.*
Parana (town), *Entre Rios.*
Parang Pass, *Himalaya.*
Parasites, root, *Root-parasites.*
Paratartaric acid, *Tartaric Acid.*
Pardepis, *Sapindaceæ.*
Pardo, *Parana (r.).*
Parekhia, *Paros.*
Parenchymatous worms, *Sterelmintha.*
Parens, *Landes.*
Parga, *Albania.*
Parhelia, *Halos.*
Paria, Gulf of, *Trinidad.*
Pariahs, *Caste.*
Parinarium, *Chrysobalanaceæ.*
Parkhurst, *Convict.*
Parliament of Scotland, *Scotland.*
Parma, Duke of, *Cambacérès.*
Parma (*r.*), *Po.*
Parmenio, *Alexander the Great.*
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Ptelea, *Ephesus.*
Pteris. *Brake, Tara Fern.*
Pteroglossus, *Aracari.*
Ptiloris, *Rifle-bird.*
Ptisan, *Tisan.*
Ptyaline, *Digestion.*
Ptyalism, *Salivation.*
Puberty, legal, *Age.*
Pubes, *Pelvis.*
Publicans, *Cathari.*
Public Health, *Sanitary Science.*
Publilian Laws. *Rome.*
Publishing, *Book-trade.*
Puccoon, *Sanguinaria.*
Pucha-pat, *Patchouli.*
Puck, *Fairies.*
Pudding-pipe tree, *Cassia.*
Puddling, *Iron.*
Puebla, *Juarez.*
Puffinus, *Shearwater.*
Puget-Theniers, *Alpes, Maritimes.*
Pughe, Owen, *Welsh Lang. & Lit.*
Puglia, *Apulia.*
Puglia, Francesca da, *Savonarola.*
Pug-mill, *Brick.*
Pulcinella, *Punch.*
Pulmonaria, *Arachnida.*
Pulmonary arteries and veins, *Respiration.*
Pulsatilla, *Pasque Flower.*
Pulteney-town, *Wick.*
Pulu-Buru, *Amboyna.*
Puna, *Poona.*
Punching-machine, *Panch.*
Punctated tissue, *Wood & Woody Fibre*
Punjnud, *Chenab, Punjab.*
Puno, *Ecuador.*
Punos, *Venezuela.*
Punta Arenas, *Costa Rica, San Jose.*
Punto, *Quadrille.*
Punty, *Glass.*
Pupilarity, *Age.*
Pupipara, *Homaloptera.*
Pur autre vie, *Estate.*
Purbach, *Almanac.*
Puri, *Jaggernaut.*
Purna (*r.*), *Oomrawutti.*
Purnabada (*r.*), *Dinagepore.*
Purples, the, *Purpura.*
Purpure, *Color (her).*
Purree, *Indian Yellow.*
Purses, *Ray.*
Pursuk (*r.*), *Kutaieh.*
Purus (*r.*), *Amazon, Peru.*
Puruvesi (*l.*), *Finland.*
Pushtaneh and Pushtu, *Afghanistan.*
Pusterthal, *Tyrol.*
Puteoli, *Campania.*
Putten, *Holland, South.*
Putting nets, *Prawn.*
Pu-tu, *Chusan Islands.*
Putumayo (*r.*), *Amazon.*
Puy-de-Sancy, *Dor.*
Puy-Vieux, Mont de, *Vienne, Haute.*
Pwllheli, *Caernarvonshire.*
Pycnonotus, *Bulbul.*
Pydna, *Macedonia.*
Pydna, battle of, *Scipio Æmilianus.*
Pygmalion, *Tyre.*
Pyhäjärvi (*l.*), *Finland.*
Pylos, *Messenia.*
Pyramus (*r.*), *Zeithun.*
Pyrethrum carneum, *Persian Powder.*
Pyrgita, *Sparrow.*
Pyroxyline, *Collodion.*
Pyrrhic foot, *Pyrrhic Dance.*
Pyrrhula, *Bull-finch.*
Pyrus Japonica, *Quince.*
Pysang, *Moluccas.*
Pythias. *Damon.*
Pythogenetic fever, *Typhus & Typhoid Fevers.*

Quade, *Grane.*
Quadi, *Silesia.*
Quadrantes, *Rose-noble.*
Quadrat, *Type.*
Quadrequivalent elements, *Triads.*
Quaker bird, *Albatross.*
Quality, in logic, *Quantification of the Predicate.*
Quantity, in logic, *Quantification of the Predicate.*
Quantity, in verse, *Rhythm.*
Quantock Hills, *Somersets.*
Quarnero Bay, *Adriatic Sea.*
Quarry, *Falconry.*
Quarter evil, *Black Quarter.*
Quarter-pieced, *Square-pieced*
Quarto, *Book.*
Quartz resinite, *Girasol.*
Quartz, smoke, *Rock-Crystal.*
Quatcruatc, *Leaves.*
Quathlamba, *Kaffraria.*
Quathlamba (*mts.*), *Natal, Orange River Free State.*
Quebec, *Canada*
Queen Elizabeth's Foreland, *Frobisher, Sir M.*
Queensberry (*mt.*), *Dumfriesshire.*
Queen's cadets, *Sandhurst.*
Queen's coroners, *Queen's Bench.*
Queen's conch, *Cameo*
Queen's ware, *Wedgwood.*
Queich (*r.*), *Bavaria, Landau.*
Quelpaerts, *Corea.*
Quercine, *Oak.*
Quercite, *Sugar.*
Quercus ballota, *Racahout.*
Quercus tinctoria, *Quercitron.*
Querquedula, *Teal.*
Question, the, *Torture.*
Quetsen-Hahn, *Volumetric Analysis.*
Queyles (*r.*), *Tarazona.*
Quick Grass, *Bent Grass.*
Quicks or quicksets, *Hawthorn.*
Quida, *Scandinavian Lang. & Lit.*
Quieto, *Kusterland.*
Quiloa, *Muscat.*
Quina, *Cinchona.*
Quinate, *Leaves.*
Quinic acid, *Kinic Acid.*
Quinicine, *Quinia.*
Quinidine, *Quinia.*
Quininism, *Quinia.*
Quinoline, *Dye-stuffs.*
Quinquina, *Cinchona.*
Quinte, Bay, *Ontario.*
Quippo, *Writing.*
Quipu, or Quippu, *Peru.*
Quirinal, *Quirinus.*
Quiriquino (*i.*), *Concepcion.*
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Quiver, *Archers.*
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Ra, *Ammon.*
Raab (*r.*). *Alps.*
Rabato, *Gozzo.*
Rabbath-Ammon, *Ammonites.*
Rabbets, *Shipbuilding.*
Rabe, Martha, *Catherine I.*
Race, Cape, *Newfoundland.*
Rachelberg, *Bavaria.*
Rachitis, *Rickets.*
Rack, *Arrack*
Radagaisus, *Stilicho.*
Radaune, *Danzig.*
Raddle, *Reddle.*
Radegast, *Slaves*
Radiaria, *Zoophyte.*
Radicle, *Seed.*
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Radius, *Hand.*
Rae Isthmus, *Melville I.*
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Ragalmuto, *Racalmuto.*
Ragatz, *Pfeffers.*
Rage, *Emotion.*
Ragged Robin, *Lychnis.*
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Ragotski, *Transylvania.*
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Raim, *Caulking.*
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Rajasthan, *Rajpoots.*
Rajmahal Hills, *India.*
Raki, *Arrack.*
Ralick Islands, *Radack.*
Ramee, *Bœhmeria.*
Rame Head, *Cornwall.*
Ram feasts, *Beltein.*
Ramgunga (*r.*), *Budaon.*
Ramier, Mount, *Washington (territory).*
Ramisseram, *Manaar, G. of.*
Ramnugger, battle of, *Sikh Wars.*
Ramps, *Rampion.*

Rampur, *Rohilcund.*
Rampura, *Indore.*
Ramree, *Aracan (prov.).*
Ramses, *Ramesses.*
Ramsons, *Allium.*
Ram-turai, *Hibiscus.*
Ramy, *Natuna Is.*
Rance (*r.*), *Côtes-du-Nord.*
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Ransome, Frederick, *Stone, Artificial.*
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Raphoe, *Adamnan.*
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Rapti (*r.*), *Ghogra, Oude.*
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Ras, *Abyssinia.*
Ras Mohammed, *Red Sea.*
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Rata, *Inocarpus.*
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Ratan, *Rattan.*
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Rathdrum, *Wicklow.*
Rathmelton, *Donegal.*
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Ratnagheriah, *Concan.*
Rattan, *Ruatan.*
Rattening, *Trades' Unions.*
Rattles, *Respiratory Sounds.*
Rattlesnake fern, *Botrychium.*
Rattoons, *Sugar-cane.*
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Raucoux, battle of, *Saxe, Count of.*
Rauenthaler, *Rhine-wine.*
Ravee or Ravi (*r.*), *Chenab. Punjab.*
Raveuala, *Traveler's Tree.*
Ravensbourne, *Deptford.*
Rawtenstall, *Newchurch.*
Ray, Cape, *Newfoundland.*
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Rays of fins, *Fishes.*
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Red-breasted goose, *Barnacle Goose.*
Red charcoal, *Charbon Rouge.*
Red dog, *Dhole.*
Red flames, *Sun.*
Redif, *Turkey.*
Redl, *Signals.*
Red lead, *Red Colors.*
Red-legged crow, *Chough.*
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Redondillas, *Spanish Lang. & Lit.*
Red River Settlement, *Canada.*
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Reed (*r.*), *Tyne.*
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Reed-mace, *Bulrush.*
Reed meadow grass, *Manna Grass.*
Reedy sweet water grass, *Munna Grass.*
Reek, the, *Westport.*
Reel, *Spinning.*
Reel, angler's, *Angling.*
Reeve, *Ruff.*
Referee, *Arbitration.*
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Reformed Franciscians, *Recollet.*
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Reggio, Duke of, *Oudinot.*
Regina, *Juno.*
Regj Lagni, *Acerra.*
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Regulus, St., *Andrews, St.*
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Reims, *Rheims.*
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Relief Presbytery, *Scotland, Church of.*
Religious Brotherhoods, *Brotherhoods, Religious.*
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Rennet, *Ruminantia.*
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Reo, *Salmon.*
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Repeating guns, *Revolver.*
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Reshid Pasha, *Abd-ul-Medjid-Khan.*
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Rete mirabile, *Circulation.*
Reticulum, *Ruminantia.*
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Rhazes, *Medicine, Hist. of.*
Rhea Silvia, *Romulus.*
Rheidol, *Cardiganshire.*
Rhein, *Rhubarb.*
Rheineck, *Rhine.*
Rheinpreusseu, *Rhenish Prussia.*
Rheinprovinz, *Rhenish Prussia.*
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Rhenus, *Rhine.*
Rheostat, *Galvanism.*
Rheum, *Rhubarb.*
Rhinencephalon, *Skull.*
Rhins of Galloway, *Wigtown.*
Rhion, Cape, *Ætolia.*
Rhipæi Montes, *Ural Mts.*
Rhipiptera, *Strepsiptera.*
Rhithymnos, *Candia.*
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Rhymney, *Cardiff.*
Rhynchaspis, *Shoveler.*
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Ribbing, Count, *Ankarström.*
Ribble, *Lancashire.*
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Ribchester, *Preston.*
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Ribes, *Gooseberry.*
Ribs, *Ship-building.*
Rice bird, *Bob-o-link.*
Rice weevil, *Corn Weevil.*
Richardia, *Calla.*
Richardson, Dr., *Melhylene.*
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Richelieu, *Canada.*
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Ricimer, *Rome.*
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Rideau, *Ottawa (r.).*
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Rinaldo, *Armida.*
Rind, *Jumna.*
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Ringtail, *Hurrier.*
Rink, *Curling.*
Rinman's green, *Cobalt.*
Rinn, Lough, *Leitrim.*
Rio Coco, *Nicaragua.*
Rio d'Aveiro, *Aveiro.*
Rio del Monte, *Tagus.*
Rio del Rey, *Biafra.*
Rio de Senna, *Sofala.*
Rio Dulce, *Golfo Dulce.*
Rio Grande, *Texas.*
Rio Grande de Lerma, *Chapala.*
Rion, *Phasis, Poty.*
Rios di Senna, *Zambesi.*
Rio Tinto, *Moguer.*
Rippling, *Flax-dressing.*
Rissel, *Lille.*
Ritardando, *Lentando.*
Riva, *Tyrol.*
Rivas, *Nicaragua.*
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Rivers, Mr., *Orchard-house.*
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'Rivulet,' controversy, *Binney, Th.*
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Robert, Louis, *Paper.*
Robertina, *Sorbonne.*
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Rock-fish, *Basse.*
Rockhampton, *Queensland.*
Rockites, *Whiteboy.*
Rock-leather, *Asbestus.*
Rock manakin, *Rock, Cock of the.*
Rock-rose, *Cistus.*
Rock-shell, *Murex.*
Rock-snake, *Bongar, Python.*
Rock-wood, *Asbestus.*
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Romerswaal, *Beveland.*
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Romni, *Moldavia.*
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Ronas Hill, *Shetland.*
Ronay, *Skye.*
Roncal, *Navarre.*
Ronne, *Bornholm.*
Rood, *Rod.*
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Rosamond, *Alboin.*
Rosamond, *Henry II. of England.*
Rosas Bay, *Catalonia.*
Rose, Rev. Hugh, *Tractarianism.*
Rose apple, *Eugenia.*
Rose bay, *Oleander.*
Roseberry Topping Hill, *Cleveland.*
Rose-chafer, *Turnip.*
Roseine, *Dye-stuffs.*
Rose laurel, *Oleander.*
Rosemary, *Dampier Archip.*
Rosemary, marsh, *Statice.*
Rosencranz, General, *U. S.*
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Rosenkreuz, Father, *Rosicrucians.*
Rose of the Virgin, *Rose of Jericho.*
Rose-point, *Lace.*
Rose-spots, *Typhus and Typhoid Fevers.*
Rosette, *Leaves.*
Rosewood, *Convolvulus.*
Rosmarinus, *Rosemary.*
Rosoglia, *Orange.*
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Rosslare Point, *Wexford.*
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Rother (*r.*), *Don, Yorkshire.*
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Rotorua (*l.*), *New Zealand.*
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Roymatla, *Calcutta.*
Royston, *Cambridgeshire.*
Rozenburg, *Netherlands.*
Rozingain, *Moluccas.*
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Sugar-loaf Hill, *Monmouth.*
'Sugar-loaves,' *Galerites.*
Sugar-louse, *Lepisma.*
Suhl (*r.*), *Saxe-Weimar-Eisenach.*
Suhurunpur, *Saharanpur.*
Suil Veinn (*mt.*), *Assynt, Mountains.*
Suipacha (*r.*), *Pilcomayo.*
Sukara, *Naraka.*
Sukarchakiyâ, *Sikhs.*
Sulciman, *Solyman.*
Suli (*mts.*), *Albania, Suliots.*
Suliman, *Ommiades.*
Sulitelma, *Norway.*
Sullane (*r.*), *Macroom.*
Sulphur, *Allotropy.*
Sulphur (*mt.*), *Lucia, St.*
Sulphur anhydride, *Sulphur.*
Sulphur cure, *Sulphurous Acid.*
Sulphurets, *Sulphides.*
Sulphuretted hydrogen, *Hydrosulphuric Acid.*
Sulphuring, *Bleaching.*
Sulphurizing, *Wine.*
Sulphurous acid, *Sulphur.*
Sulphurous waters, *Mineral Waters.*
Sulphydric acid, *Hydro-sulphuric Acid.*
Sulpicius Rufus, Publius, *Sulla.*
Sulze, *Lüneburg*
Sumarokov, *Russian Lang. & Lit.*
Summer, *Seasons.*
Summerside, *Pr. Edward's I.*
Snmmer teal, *Garganey.*
Sumter (steamer), *Alabama.*
Sunart, *Argyleshire.*
Sunday (*r.*), *Algoa Bay.*
Sune, *Moselle.*
Sunflower (*r.*), *Mississippi.*
Sungari, *Mantchuria.*
Sunium Promontorium, *Colonna, Cape.*
Snn Kosi, *Ganges.*
Sunstone, *Felspar, Girasel.*
Superb warbler, *Maurus.*
Supination, *Hand.*
Supplement. *Trigonometry.*
Suppression of urine, *Retention of Urine.*
Supranaturalism, *Rationalism.*
Sura (*r.*), *Volga.*
Surbiton, *Kingston-upon-Thames.*
Sûri, *Ghuri.*
Surinam toad, *Pipa.*
Surju, *Ghogra.*
Surmeneh, *Trebizond.*
Surtees Society, *Roxburghe Club.*
Susc, *Morocco.*
Susiana, *Baqdad.*
Suspected bill, *Bill of Health.*
Suspension whicel, *Water-power.*
Sussex marble, *Petworth.*
Su-Tchou, *Soo-Chow.*
Sutermann, *Engraving.*
Sutors, *Cromarty Firth.*
Suwance (*r.*), *Floridu.*
Svcaborg, *Sweaborg.*
Sverige, *Sweden.*
Sviatoslaf, *Russia.*
Svir (*r.*), *Ladoga.*
Svislocz, *Minsk.*
Swabia, *Suabia.*
Swabisch-Hall, *Hall.*
Swainson, *Entomology, Ornithology.*
Swakop, *Ovampos.*
Swamp-oak, *Casuarina.*
Swan River Settlement, *Western Australia.*
Sweating, *Beer.*
Sweet Calabash, *Granadilla.*
Sweet cane, *Calamus Aromaticus.*
Sweet gale, *Candleberry.*
Sweet Juca, *Manioc.*
Sweet locust, *Honey Locust Tree.*
Sweet milk vetch, *Astragalus.*
Sweet sultan, *Centaurea.*
Sweet virgin's bower, *Clematis.*
Sweet water grass, *Catabrosa.*
Sweet woods, decoction of, *Sarsaparilla.*
Swenta (*r.*), *Vikomir.*
Sweyn or Swein, *Canute.*
Swiatowit, *Slaves.*
Swift, *Silk & Silkworm.*
Swimming-bladder, *Air-bladder.*
Swine (*r.*), *Pomerania.*
Swinestoue, *Stinkstone.*
Swinge, *Hanover.*
Swing-flying bridge, *Bridge. Military.*
Swiss tea, *Achillaea.*
Switzerland, Austrian, *Salzkammergut.*
Switzerland, educatiou in, *National Education.*
Syajee Rao, *Guicowar.*
Syboes, *Onion.*
Sychar, *Nabulus.*
Sydney, *Cape Breton.*
Sydney, Algernon, *Sidney.*
Sylvia, *Chiff-chaff.*
Sylvie acid, *Rosin.*
Symbolism, *Writing.*
Symmetry, *Rhythm.*
Symonds, Rodolph, *Elizabethan Architecture.*
Symphemia, *Willet.*
Symphoria or Symphoricarpus, *Snowberry.*
Symplegades, *Argonauts.*
Synarthiosis, *Joints.*
Syndesmology, *Anatomy.*
Synodites, *Cœnobites.*
Synthesis, *Alcohols.*
Synthetic method, *Analysis.*
Syriam, *Bengal, Bay of.*
Syrian rue, *Peganum.*
Syrinx, *Riddle.*
Syros, *Greece.*
Szakolcza, *Skalitz.*
Szamos (*r.*), *Theiss.*
Szeklers or Szekhelyi, *Transylvania.*
Szeksna (*r*), *Novgorod.*
Szoboszlo, *Haiducks.*

Taag, *Sunn.*
Taas, *Yemen.*
Tab, *Fars.*
Tabah, *Medina.*
Tabari, *Arabian Lang. & Lit.*
Tabaris, *Bamboo.*
Tabeniow, *Banjermannis.*
Tablature, *Lute.*
Table Mt., *Sierra Nevada.*
Table d'hote, *Hotel.*
Tabriz, Lake of, *Urumeyah (l.).*
Tabujong, (*r.*), *Sumatra.*
Tabur stycke, *Falconry.*
Tacape, *Cabes.*
Taeht-i-Suliman, *Suliman Mountains.*
Tacitus, *Amnianus, Marcellinus.*
Tackle, *Block, Pulley.*
Tacoary, *Paraguay River.*
Tacon, *Claude, St.*
Tadla, *Tefsa.*
Tadorna, *Shelldrake.*
Tænarus, *Greece.*
Taff (*r.*), *British Channel, Caernarthensh Glamorgansh.*
Tafilelet, *Morocco.*
Tagal, *Java.*
Tagherain, *Atlas Mts.*
Taghmon, *Wexford.*
Tagliamento (*r.*), *Alps, Austria.*
Tahae, *Coral Is.*
Taher, *Calif.*
Taherites, *Persia.*
Tahiti apple, *Hog Plum.*
Taic language, *Turanian Languages.*
Taida, *Calcutta.*
Tai-hu, *China.*
Taisch, *Second Sight.*
Taj-al-Tuarikh, *Saad-ed-din*
Tajiks, *Turkestan.*
Tajuña (*r.*), *Brihuega.*
Takas, *Nubia.*
Takazze, *Nile.*
Ta-kiang (*r.*), *Yang-tze-kiang.*
Takinos (*l.*), *Crannoges.*
Takkatu (*mt.*), *Beloochistan.*
Takkazie (*r.*), *Abyssinia.*
Takvins, *Mohammedanism.*
Talcahuano, *Chili Concepcion.*
Tale of a Tub, *Swift.*
Talha, *Mimoseæ.*
Taliacotian operation, *Rhinoplastic Operation.*
Taliesin, *Welsh Lang. & Lit.*
Talisker, *Skye.*
Tallahatchie (*r.*), *Yazoo.*
Tallies in Exchequer, *Records, Public.*
Tallow, *Waterford.*
Tamandna, *Ant-eater.*
Tamandua (*l.*), *Shirwa.*
Tamar, *Devonshire.*
Tamaricaceæ, *Tamarisk.*
Tamarind plum, *Tamarind.*
Tambilan (*is.*), *Riouw.*
Tambo (*r.*), *Ucayali.*
Tambookie, *Tembu.*
Tambora (*mt.*), *Sumbawa.*
Tame (*r.*), *Birmingham.*
Tamega (*r.*), *Amarante.*
Tamias, *Squirrel.*
Tamils, *Ceylon.*
Tamina, *Gall. St.*
Tanacetum, *Tansy.*
Tanais, *Don.*
Tanantasia, *Savoy.*
Tanaquil, *Tarquinius.*
Tanaro, *Cherasco, Po.*
Tanera, *Summer Islands.*
Tangent sailing, *Great Circle Sailing.*
Tangleberry, *Whortleberry.*
Tangnu Ula (*mts.*), *Altai Mountains.*
Tanis, *Egypt.*
Tanist stone, *Standing Stones.*
Tanjong Putri, *New Johore.*
Tanna, *New Hebrides.*
Tanrec, *Tenrec.*
Tantallon Castle, *Haddingtonshire.*
Taotl, *Mexico.*
Taou, *Laou-tsze.*
Tapanuli, *Sumatra.*
Tapoa, *Phalanger.*
Tapoa tafa, *Phascogale.*
Tappan Zee, *Hudson, Tarrytown.*
Taprobane, *Ceylon.*
Tapu, *Tabu.*
Taquari, *Coxim.*
Tara, *Meath.*
Tarabosan, *Anatolia.*
Taragurh (*mt.*), *Ajmeer.*
Taraika, *Sakalin.*
Tarandus, *Reindeer.*
Taranis, *Thor.*
Tarapia, *Therapia.*
Tarbert, *Argyleshire.*
Tardonère (*r.*), *Charente.*
Tarentella, *Tarantism.*
Tarentines, *Rome.*
Tarentum, *Taranto.*
Tarichæa, *Galilee.*
Tariga, *Bolivia.*
Tarik, *Roderic.*
Tarn (*r.*), *Trent.*
Taro (*r.*), *Po.*
Tarpan, *Horse.*
Tarquinii, *Carneto.*
Tarraco, *Tarragona.*
Tarsal spur, *Birds.*
Tarso, *Tarsus.*
Tarsus, *Birds.*
Tarsus, *Phœnicia.*
Tartaglia, *Algebra.*
Tartar bread, *Crambé.*
Tartar emetic *Tartaric Acid.*
Tartarian lamb, *Barometz.*
Tartaro (*r.*), *Villafranca.*
Tartessus, *Andalusia, Tarshish.*
Tartrated iron, *Tartaric Acid.*
Tar Vale, *Clogheen.*
Tasmanian devil, *Tasmania.*
Tasman's Peninsula, *Tasmania.*
Tasteless pnrging salt, *Sodium.*
Tatars, *Tartars.*
Tate, Zouch, *Self-denying Ordinance.*
Tatishshev, *Rus. Lang. & Lit.*
Tatler, *Addison.*
Tatra (*mts.*), *Austria, Carpathian Mountains.*

Tauber (*r.*), *Bavaria, Würtemberg.*
Taupo (*l.*), *N. Zealand.*
Tauranga Bay, *N. Zealand.*
Taurica, *Kertch.*
Tauris *Tabriz.*
Taut, *Thoth.*
Tave, *Caermarthenshire.*
Tavignano, *Corsica.*
Taviuni, *Fiji Islands.*
Tavola, *Corsica.*
Tavy, *Dartmoor.*
Taw (*r.*), *Dartmoor, Devonsh.*
Tawe, *Brecknockshire, Glamorganshire.*
Tawing, *Leather.*
Taxaceæ and taxus, *Yew.*
Taxila, *Attock, Indus.*
Taxology, *Botany*
Taxonomy, *Botany.*
Taylors of Norwich, *Austin, Mrs.*
Tchadda (*r.*), *Benuê.*
Tchadir Dagh (*mts.*), *Alma, Crimea.*
Tchany (*l.*), *Siberia.*
Tchar-dagh, *Balkan.*
Tchernaya (*r.*), *Sebastopol.*
Tchernigof, *Russia.*
Tchernomorski, *Cossacks.*
Tchoros, *Kalmucks.*
Tchuktchis, *Siberia.*
Tchulim, *Ob*
Tchuruksû, *Trebizond.*
Tchuvashes, *Russia.*
Tea, New Jersey, *Red Root.*
Tea-cucumber, *Holothuria.*
Teaser, *Woollen & Worsted Manufactures.*
Tea-tree, *Leptospermum.*
Tehu, *Air.*
Tecoma, *Trumpet-flower.*
Tecumseh, *U. S.*
Tedding-machine, *Hay.*
Tedla, *Tefsa.*
Tee, *Carling.*
Teetotal, *Temperance.*
Tef, *Egypt.*
Teghahadar, *Sikhs.*
Tegea, *Arcadia, Tripolitza.*
Teguexin, *Monitor.*
Tehama, *Arabia, Yemen.*
Tehuantepec (*r.*), *America.*
Teify, *Caermarthensh. Cardigansh. Pembrokesh.*
Teign (*r.*), *Dartmoor.*
Teith, *Callander.*
Tekedempt, *Algeria.*
Tekoah, *Bethlehem.*
Tela vesicatoria, *Vesicants.*
Tel Basta, *Bubastis.*
Telegraph, Atlantic, *Atlantic Telegraph.*
Tel-el-Amarna, *Egypt.*
Tell-es-Safret, *Gath.*
Tell-hûn, *Capernaum.*
Telma, *Irkutsk.*
Telugu, *Tamil.*
Teme, *Herefordsh., Severn, Shropsh., Worcestersh.*
Temes (*r.*), *Banat, Danube.*
Temini, *Arabian Lang. & Lit.*
Temminck, *Ornithology.*
Temnodon, *Bluefish.*
Temor, *Meath.*
Temsah (*l.*), *Suez.*
Tenants, removing of, *Removing of Tenants.*
Tendo Achillis. *Achilles Tendon.*
Tendril, *Cirrhus.*
Tengiz, *Balkash.*
Tengri-Tagh (*mts.*), *Thian-Shan.*
Tenimber (*is.*), *Timor-laut.*
Ten Kate, *Flemish. Lang. & Lit.*
Tenné, *Abatement, Color* (*her.*).
Tennees (*i.*), *Menzaleh* (*l.*)
Tenochtillan, *Mexico.*
Tenos, *Tinos.*
Tensas (*r.*), *Washita.*
Tenthredo, *Sawfly.*
Teos, *Anacreon.*
Tepe Suene (*mts.*), *Mexico.*
Teplitz, *Töplitz.*
Tequendama Fall, *Bogota.*
Ter (*r.*), *Catalonia.*
Terai, *Oude.*
Tercel, *Peregrine Falcon.*
Terchloride of formyle, *Chloroform.*
Terch, *Caspian Sea.*
Tercquivalent elements. *Triads.*
Terghu, Mount, *Alps.*
Tergoes, *Goes.*
Terioli, *Tyrol.*
Termilæ, *Lycia.*
Termo (*r.*), *Bosa.*
Tern (*r.*), *Severn, Shropsh.*
Ternate, *Leaves.*
Terney, Admiral De, *U. S.*
Terraces, river, *River Terraces.*
Terra Firma, *Darien.*
Terra sigillata, *Lemnian Earth.*
Terricolæ, *Annelida.*
Terror (*mt.*), *Antarctic Ocean.*
Terror, Reign of, *Reign of Terror.*
Terry Alts, *Whiteboy.*
Tersus, *Tarsus.*
Tertiaries, *Birds.*
Teruel, *Aragon.*
Teru-tero, *Lapwing.*
Test (*r.*), *Hampshire.*
Testa, *Seed.*
Testigos, *Antilles.*
Testimony, *Belief.*
Testoon, *Numismatics.*
Testudo, imbricata, *Tortoise-shell.*
Tetè, *Sofala, Zambesi.*
Tetrabranchiata, *Cephalopoda.*
Tetrads, *Triads.*
Tetrapolitan Confession, *Sacramentarian.*
Tetrarhynchidæ, *Tapeworm.*
Tetraspore, *Spore.*
Tetrathionic acid, *Sulphur.*
Tetuan, Duke of, *O'Donnell.*
Tetuaroa, *Society Islands.*
Teucheira, *Cyrenaica.*
Tevorone (*r.*), *Tiber.*
Teviot (*r.*), *Tweed.*
Textor, *Weaver-bird.*
Teyde, Pico de, *Teneriffe.*
Tez (*r.*), *Altai Mts.*
Thamamians, *Molazilites.*
Thame, *Mersey.*
Thames, *Connecticut.*
Thapsus, battle of, *Cæsar.*
Thara Lake, *Corrientes.*
Tharawady, *Pegu.*
Thatta, *Tatta.*
Thaumatrope, *Stereoscope.*
Thebaid, *Egypt.*
Theism, *Deism.*
Theodemir, *Theodoric.*
Theodicea, *Optimism.*
Theodora, *Byzantine Emp.*
Theodorus, St., *Gregory Thaumaturgos.*
Theodorus Lascarus, *Byzantine Empire.*
Theodosia, *Kaffa.*
Theodosians, *Monophysites.*
Theodosians, *Raskolnik.*
Theodotus, *Humanitarians.*
Theophania, *Otho II. of Germany.*
Theophilus, *Byzantine Emp.*
Thera, *Archipelago, Greece.*
Therain, *Oise.*
Theresa of Castile, *Alfonso I.*
Thermæ Helveticæ, *Baden.*
Thermo-magnetism, *Thermo-Electricity.*
Thetes, *Solon.*
Thetis's hair-stone, *Rock-crystal.*
Thevenot, traveler, *Africa.*
Thiaki, *Ithaca.*
Thian-shau nan-lû, *Turkestan.*
Thian-shan pe-lû, *Turkestan.*
Thibet, *Tibet.*
Thier-epos, *Germany.*
Thionville, *Moselle.*
Thirty Cities, confederacy of the, *Rome.*
Thishe, *Pyramas & Thisbe.*
Thiva, *Thebes.*
Thlaspi, *Shepherd's Purse.*
Thodas & Thodawurs, *Todars.*
Thomas I., *Savoy, House of.*
Thomason Collection, *British Museum.*
Thomastown, *Kilkenny.*
Thomond, *Clare, Limerick.*
Thompson (*r.*), *Fraser River.*
Thomson (*r.*), *Victoria.*
Thomson, Professor W., *Sun, Telegraph.*
Thoulounides, dynasty of, *Egypt.*
Thonon, *Savoy.*
Thorismund, *Attila.*
Thorn acacia, *Locust Tree, Robinia.*
Thorney, *Cambridgeshire.*
Thornhill, Sir James, *Painting.*
'Thorough,' *Strafford.*
Thorpe, John, *Elizabethan Architecture.*
Thorshälla, *Maelar, Lake.*
Thorshavn, *Faröe Isles.*
Thothmes, *Egypt.*
Thoumart, *Polecat.*
Thouvenin, Col., *Rifled Arms.*
Thrasamund, *Vandals.*
Thrax, Dionysius, *Grammar.*
Three Chapters, *Theodore.*
Three Kings' Reef, *Cromarty Firth.*
'Three Sisters,' *Barrow.*
Thresher, *Fox Shark.*
Threshers, *Ribbonism.*
Thrombus, *Venesection.*
Throstle, *Thrush.*
Throwing, *Silk & Silkworm.*
Throw-stick, *Wild-fowl.*
Thsin-ling Mts., *China.*
Thunder-stones, *Belemnites, Elf Arrow heads.*
Thur (*r.*), *Gall, St., Canton of, Rhine.*
Thur, *Sinde.*
Thurible, *Censer, Tharifer.*
Thurmberg, *Durlach.*
Thurn, Count, *Thirty Years' War.*
Thyatira, *Ak-Hissar.*
Thymallus, *Grayling.*
Thynnus, *Tunny.*
Tia-Huanacu, *Peru.*
Tiber-stone, *Limestone.*
Tibia, *Foot.*
Tihur, *Rome, Tivoli.*
Ticinum, *Pavia.*
Ticinus, battle of the, *Scipio, P. C.*
Tick, sheep-, *Sheep-louse.*
Tidone, *Molaccas.*
Tie, *Slur.*
Tierras Calientes, *Mexico.*
Tierras Frias, *Mexico.*
Tierras Templadas, *Mexico.*
Tier-shot, *Grape-shot.*
Tiete (*r.*), *Parana River, Itu.*
Tiger-cat fur, *Serval.*
Tigerhnach, *Ireland.*
Tiger-wolf, *Hyaena.*
Tigre, *Abyssinia.*
Tigridia, *Tiger-flower.*
Tignin (*r.*), *Cabatuan.*
Tikritch (*r.*), *Zvenigorodka.*
Tilbury, *Coach.*
Tilestones, *Old Red Sandstone.*
Tilgate, *Wealden Formation.*
Till (*r.*), *Northumberland, Tweed.*
Tilon, *Crannoges.*
Tilt (*r.*), *Blair-Athol.*
Til-wood, *Oreodaphne.*
Timanthes, *Painting.*
Timbri, *Niger.*
Timby, Theo. R., *Turret-ship.*
Time, *Space & Time.*
Timok (*r.*), *Servia.*
Timon, *Phyrrhon.*
Timor, *Bosnia.*
Tinca, *Tench.*
Tincal, *Borax.*
Tinch, *Pelusium.*
Tin-foil, *Foil, Tin.*
Ting, *Heen.*
Ting-hai, *Chusan.*
Tingis, *Bug.*
Tingitana, *Atlas Mountains.*
Tinker, *Skate.*
Tinstone, *Tin.*
Tintock (*mt.*), *Lanarkshire.*
Tio-cen-koak, *Corea.*
Tioga (*r.*), *Susquehanna.*
Tirailleurs, *Chasseurs de Vincennes.*
Tirailleurs d'Afrique, *Algeria.*
Tiran, Strait of, *Red Sea.*
Tir Enna, *Adamnan.*
Tirowli, *Azimabad.*
Tirring, *Quarry.*
Tirso de Molina, *Tellez.*
Tirun, *Borneo.*
Tissaphernes, *Alcibiades.*
Tissue, areolar, reticular, &c., *Cellular Tissue.*
Titeri, *Algeria.*
Titisee, *Baden.*
Titulars, *Erection, Lords of.*
Titusville, *Oil-wells.*
Tiza, *Hayesine.*
Tiziano, *Titian.*
Tlos, *Lycia.*
Tmolus, *Lydia, Pactolas.*
Toa, *Casuarina.*
Tobacco-root, *Lewisia.*
Tohercurry, *Sligo*
Tobias, *Apocrypha.*
Tohol (*r.*), *Tobolsk.*
Tockenburg *Toggenburg.*
Toddy, *Cocoa-nut, Date Palm.*
Todi, *Tiber.*
Tödiberg, *Glarus.*
Togrul Beg, *Seljuks.*
Tohkani, *Albania.*
Tokely, *Tekeli.*
Tokology, *Midwifery.*
Toktemesh Khan, *Timur.*
Tolima, Pic de, *Andes.*
Toli Menastir, *Monastir.*
Tolomei, John, *Olivetans.*
Tolosa, battle of, *Almohades, Spain.*
Toltecs, *Mexico.*
Tom (*r.*), *Ob, Tomsk.*
Tomantoul, *Banffshire.*
Tombenhorn, *Spitzgen*
Tombigbee (*r.*), *Alabama.*
Tomi, *Otchakow.*
Tompion, *Organ.*
Tone (*r.*), *Taunton.*
Tongariro, *New Zealand.*
Tonge (*r.*), *Farnworth.*
Tongheni, *Turkestan.*
Tonghoo, *Pegu.*
Tonka (*r.*), *N'Ghami, Lake.*
Tons (*r.*), *Ganges.*
Toongroo, *Dhoorcatee.*
Toowoomber, *Queensland.*
Topaz, gold, *Rock-crystal.*
Topeka, *Kansas.*
Topical style, *Calico Printing.*
Topinamburi, *Jerusalem Artichoke.*
Top-timbers, *Shipbuilding.*
Torch thistles, *Cacteæ.*
Torden, *Thor.*
Tordina (*r.*), *Teramo.*
Torgoch, *Charr.*
Torgots, *Kalmucks.*
Tor Hill, *Glastonbury.*
Toro (*mt.*), *Minorca.*
Torockzo, *Transylvania.*
Torquemada, *Inquisition.*
Torregiano, *Sculpture.*
Torrens (*l.*), *Australian Explorations.*
Torrens (*r.*), *Adelaide, Australia.*
Torridalself, *Christiansand.*
Torridge, *Bristol Channel.*
Torro, *Toro.*
Torsion, *Strength of Materials.*
Tortille, *Wreathed.*
Tortuga, *Hayti.*
Toruvars, *Neilgherry Mts.*
Tory, *Whig & Tory.*
Tory Isle, *Donegal.*
Tosa Falls, *Domo d'Ossola.*
Toss (*r.*), *Rhine, Zürich.*
Total abstinence societies, *Temperance.*
Totanus, *Greenshank, Sandpiper.*
Totarra, *Podocarpus.*
Touched patent or bill, *Bill of Health.*
Touch-me-not, *Balsam.*
Touchwood, *Amadou.*
Touques, *Calvados.*
Toura (*r.*), *Tobolsk.*
Touraco, *Houzin, Plantain-eater.*
Tournil, *Mezquite.*
Touse, *Jumna.*
Toweym, *Wahabis.*
Towton, battle of, *Warwick, Earl of, Yorkshire.*
Towy, *Bristol Channel, Caermarthen.*
Toxotes jaculator, *Archer-fish.*
Toys, chemical, *Chemical Toys.*
Toys, steel, *Steel Toys.*
Trachearia, *Arachnida.*
Trachinus, *Weever.*
Traction, coefficient of, *Friction.*
Tract Society, Religious, *Religious Tract Society.*
Traeth Mawr, *Merioneth.*
Tragopogon, *Salsafy.*
Tragus, *Ear.*
Trail-flying bridge, *Bridge, Military.*
Trajectum ad Mosam, *Maastricht.*
Trajectum ad Rhenum, *Utrecht.*
Tralee Bay, *Kerry.*
Tralles, *Aidin.*
Tram, *Silk & Silkworm.*
Tramore, *Waterford.*
Tramps, *Vagrants.*
Tramways, *Railways.*
Transcendental analysis, *Calculus, Infinitesimal.*
Transpiration, *Gases.*
Trapassi, *Metastasio.*
Trapeza Prothesis, *Credence.*
Trapezus, *Trebizond.*
Traquair, Earls of, *Stewart Family.*
Trastevere, *Rome.*
Traunsee, *Gmunden.*
Traun (*l.* and *r.*), *Salzkammergut*
Traveler's joy, *Clematis.*
Traverse table, *Sailings.*
Treacle mustard, *Erysimum.*
Trehhia, battle of the, *Suvorof.*
Trehisond, date of, *Date Plum.*
Trebnitz Heights, *Prussia.*
Tree lilies. *Vellozia.*
Trefoil, *Clover.*
Trefrhiw, *Conway.*
Tregaron, *Cardiganshire.*
Trehalose. *Sugar.*
Trelo Vouni, *Hymettus.*
Tremadoc, *Caernarvonshire.*
Tremando, *Tremolo.*
Tremont, *Boston.*
Trente-et-quarante, *Rouge-et-Noir.*
Trente-un, *Rouge-et-Noir.*
Trenton period, *America.*
Tresco, *Scilly Islands.*
Tresham, *Gunpowder Plot.*
Trestle-bridge, *Bridge, Military.*
Tret, *Tare & Tret.*
Trevcryn, *Dee.*
Trevethick, Richard, *Railways.*
Treviri or Treveri, *Trèves.*
Triads, *Welsh Lang. & Lit.*
Triballi, *Servia.*
Tributary, *River.*
Tributers, *Mining.*
Trichas Marylandica, *Yellow-throat.*
Trichiuris, *Hair-tail.*
Trichosis, *Ringworm.*
Tricophyton, *Parasitic Diseases, Tinea.*
Trient, *Trent.*
Trieux, *Côtes-du-Nord.*
Trifle, *Pewter.*
Trigone, *Bladder.*
Trimab or Trimah (*r.*). *Jhelum.*
Trimelone, *Garda, Lago di.*
Tringa, *Knot.*
Trinitrophenic, *Phenyl.*
Trinity, *Newfoundland.*
Trinity Term, *Terms.*
Trinobantes, *Essex.*
Triodia pungens, *Australian Explorations.*
Triosteum perfoliatum, *Tinkar's Root.*
Triphœna, *Surface Grub.*
Tripinnate, *Leaves.*
Triplet, *Rhime.*
Tripos, *Wrangler.*
Triptolomea, *Rosewood.*
Trismus, *Tetanus.*
Tristomidæ, *Trematoda.*
Triternate, *Leaves.*
Trithionic acid, *Sulphur.*
Trogen, *Appenzell.*
Troglodytes, *Wren.*
Trogosita, *Cadelle.*
Troitzko-Savsk, *Irkutsk.*
Trojans, *Troy.*
Trolhätten, *Sweden.*
Trombay, *Bombay I*
Trombidium, *Acarus.*
Trommer's test, *Sugar.*
Trona, *Natron, Sodium.*
Trophonius, *Oracle.*
Tropidonotus, *Snake.*
Trostan (*mt.*), *Antrim.*
Trotso, *Carlscrona.*
Trotzendorf, *Friedland, V.*
Troup Head, *Buchan.*
Trout, *Salmon of North-west America.*
Trout, salmon, *Salmon.*
Troutbeck (*l.*), *Windermere.*
Trout of Australia and New Zealand, *Salmonidæ.*
Troy (weight), *Octroi.*
Truando, *Atrato.*
Truhsch (*r.*), *Saxony.*
True Believers, *Sincere Brethren.*
Trump, game of, *Whist.*
Trumpeter, *Agami.*
Trumpet-wood, *Cecropia.*
Trunk-fish, *Ostracion.*
Trush *Thrush.*
Tryphiodorus, *Lipogram.*
Tsad (*l.*), *Tchad, Lake.*
Tsan-hu, *China.*
Tschernobolzi, *Raskolnik.*
Tshapodshirs, *Tungûs.*
Tshar-dagh (*mts.*), *Albania.*
Tshonsovaia, *Perm.*
Tsiangshan, *Ningpo.*
Tsike, *Ningpo.*
Tsi-tsi-har, *Mantchuria.*
Tsna (*r*), *Oka, Tambov, Tver.*
Tsomo (*r.*), *Kei River, Tembu.*
Tsugar Strait, *Yesso.*
Tuatha de Danann, *Firbolgs.*
Tuba. *Society Islands.*
Tubbergen, *Overyssel.*
Tuber, *Truffle.*
Tuberathi, *Berat.*
Tubes, *Pipes.*
Tuhet, *Tibet.*
'Tubingen School,' *Bible*
'Tuhingen School,' New, *Bible.*
Tuhular bridge. *Britannia Tubular Bridge, Strength of Materials.*
Tuck, *Casting-net.*
Tucker, *Woollen & Worsted Manufactures.*
Tucum and tucuma, *Astrocaryum.*
Tudas, *Neilgherry Mts., Tamil, Todars.*
Tudela, battle of, *Spain.*
Tu-duk, *Cochin-China.*
Tufaceous limestone, *Calcareous Tufa.*
Tuffstein, *Andernach.*
Tufted duck, *Pochard.*
Tugela, *Natal.*
Tuisco, *Mannus.*
Tui-tui, *Honey-eater.*
Tulang-Bawang (*r.*), *Sumatra*
Tullihardine, Marquis of, *Stuart, Prince C. E.*
Tullow, *Carlow.*
Tuloma, *Kola.*
Tulu or Tuluva, *Tamil.*
Tulukdars, *Oude.*
Tumhez, *Guayaquil.*
Tumble-dung beetle, *Dung Beetle.*
Tumbling-net, *Trammel-net.*
Tumbrel, *Ducking-stool.*
Tumbudra, *Dharwar.*

Tumen-kiang, *Corea.*
Tummel, Loch, *Perthshire.*
Tummel, (*r.*), *Tay.*
Tumor, fibrous, *Womb, Diseases, &c., of the.*
Tunbridge cakes, *Biscuits.*
Tunga, *Boyaca.*
Tungabhadro, *Kistna, Mysore.*
Tungani, *Turkestan.*
Tung-ting-hu, *China, Yangtze-kiang.*
Tunguragua, *Andes.*
Tungurrut, *Chestnut.*
Tungusic language, *Turanian Languages.*
Tunguska (*r.*), *Yenisei.*
Tunic, *Vestments.*
Tunica palmata, *Triumph.*
Tunicated, *Bulb.*
Tunstal Court, *Stoke-upon-Trent.*
Tuolumne, *Crescent City.*
Tuoro, *Trasimenus Lacus.*
Tupa fruillei, *Lobelia.*
Tuquerrez, *New Granada.*
Tura, *Perm.*
Turan, *Taranian Langaages, Turkestan.*
Turbellaria, *Worms.*
Turbinella, *Chank-shell.*
Turf, *Peat.*
Tûrfan, *Turkestan.*
Turia, *Guadalaviar.*
Turk, the, *Bark Beetle.*
Turkic language, *Taranian Languages.*
Turkish mauna, *Sagar.*
Turk's cap, *Gourd.*
Turk's Island, *America, Bahamas.*
Turma, *Legion.*
Turnbull, Dr. G., *Reid, T.*
Turner's cerate, *Zinc.*
Turning of wine, *Wine.*
Turnip butterfly, *Cabbage Butterfly.*
Turnip-drill, *Sowing.*
Turnip sawfly, *Sawfly.*
Turon, *Qaang-Nam.*
Turoukchau (*r.*), *Yenisei.*
Turps, *Paints.*
Turriff, *Buchan.*
Turrilites, *Ammonites.*
Tursi, *Basilicata.*
Turtur, *Turtle-dove.*
Tusca (*r.*), *Numidia.*
Tuscaloosa, *Alabama.*
Tusk, *Torsk.*
Tusseh, *Silk & Silkworm.*
Tustan, *Hypericaceæ.*
Tutela, *Tudela.*
Tutmen, *Mining.*
Tvertza (*r.*), *Caspian Sea, Tver.*
Tweeg, *Menopome.*
Twelve Pens, the, *Galway.*
Twe-twe, *Akyab.*
Twig-rush, *Cladium.*
Twist, *Tobacco.*
Twite, *Linnet.*
Two hundred and ninety, No. (No. 290), *Alabama.*
Ty (*r.*), *Sakhalin.*
Ty-cock-tow, *Bocca Tigris.*
Tymy (*r.*), *Sakhalin.*
Tyndale, *Reformation.*
Tyne, *Haddingtonshire*
Typha, *Molluccas.*
Typhlopsidæ, *Serpents.*
Typhon, *Osiris.*
Typographer beetle, *Bark Beetle.*
Tyrannus, *Petchary, Tyrant, Shrike.*
Tyrconnel, *Donegal.*
Tyre, *Phœnicia.*
Tyrian purple, *Purple Colors.*
Tyszmanika, *Drohobicz.*
Tzana (*l.*), *Africa.*
Tzna (*r.*), *Oka, Tambov, Vishni-Volotchek.*

Ubaye, *Durance.*
Udasis, *Sikhs.*
Udine (*r.*), *Gemona.*
Udo, *Audæus.*
Ufa (*r.*), *Zlatoust.*
Ugni, *Eugenia.*
Uig, *Skye.*
Uj-Videk, *Neusatz.*
Ulceration of anus, *Anus.*
Ulcer of the stomach, *Stomach*
Ulea (*r*), *Uleaborg.*
Uliassers, *Moluccas.*
Ulna, *Hand.*
Ulna (*r.*), *Hondaras.*
Ulster (*r.*), *Saxe-Weimar-Eisenach.*
Ulva, *Hebrides.*
Umbashee (*r.*), *Kaffraria, Proper.*
Umbellule, *Umbelliferæ.*
Umbilicus, *Seed.*
Umbo, *Bivalve Shells.*
Umbrella tree, *Magnolia.*
Umbro-Sabellians, *Rome, Sabini.*
Umcomanzi (*r.*), *Natal.*
Umea (*r.*), *Lapland, Sweden.*
Umgani, *Natal.*
Ummerapoora, *Amarapara.*
Umooti, *Natal.*
Um Shaumer, *Sinai.*
Umtata, *Kaffraria.*
Umtugela (*r.*), *Zululand.*
Umvoluzi (*r.*), *Zululand.*
Umzimculu (*r.*), *Natal.*
Umzimvoobo (*r.*), *Kaffraria.*
Umzimyati (*r.*), *Zululand.*
Unalaska, *Aleutian Is.*
Unau, *Sloth.*
Uncaria, *Grapple-plant.*
Undercliff, *Wight, Isle of.*
Underground railway, *U. S.*
Undershot wheel, *Water-power.*
Underwing moth, *Surface Grub.*
Undistributed middle, *Fallacy.*
Unguentum cetacci, *Spermaceti.*
Uniamesi (*l.*), *Africa.*
Unicorn's horn, *Melanthaceæ.*
Uniequivalent elements, *Triads.*
Unilocular sbells, *Univalves*
Unimak (*l.*), *Aleutian Is.*
Union (*r.*), *Ellsworth.*
Union Party, *Republican.*
United Brethren, *Moravians.*
United Kingdom Alliance, *Temperance.*
United Provinces, *Netherlands.*
United States, education in, *National Education.*
Universal rose engine, *Machine-engraving.*
Unjon, *Futtypur.*
Unleavened bread, feast of, *Passover.*
Unna (*r.*), *Bosnia.*
Unstrut (*r.*), *Saxe-Coburg-Gotha.*
'Unter den Linden,' *Berlin.*
Unterinnthal, *Tyrol.*
Unter See, *Rhine.*
Unz (*r.*), *Zirknitz (l.).*
Upa (*r.*), *Toula.*
Upa Canal, *Volga.*
Upper Peru, *Bolivia.*
Upsilorites, *Candia.*
Uramel, *Uric Acid.*
Urania, *Traveler's Tree.*
Uranus, *Planets.*
Urate of ammonia, *Lithic Acid Diathesis.*
Urbanists, *Claire, St.*
Urchvy, *Argyleshire.*
Ure (*r.*), *Yorkshire.*
Uredo rubigo vera, *Rust.*
Urethra, spasm of the, *Retention of Urine.*
Urgendji, *Turkestan.*
Urgunge, *Khiva.*
Urhur, *Pigeon Pea.*
Uria, *Guillemot.*
Urine, bloody, *Red Water.*
Urine, incontinence of, *Retention of Urine.*
Urine, retention of, *Retention of Urine.*
Urine, suppression of, *Retention of Urine.*
Urk, *Netherlands, Zuider Zee.*
Urlingford, *Kilkenny.*
Urmea (*l.*), *Urumeyah (l.).*
Urquiza, Don J. J., *Rosas.*
Ursine opossum, *Dasyure.*
Ursine seal, *Otary.*
Urumijah (*l.*), *Urumeyah (l.).*
Ury, *Don.*
Usaguadero (*r.*), *Nicaragaa L.*
Usbekistan, *Bokhara.*
Usdum, *Dead Sea.*
Ushant, battle off, *Howe, Earl.*
Usk (*r.*), *Brecknockshire, Monmouth.*
Uskûdar, *Scutari.*
Usquebaugh, *Whisky.*
Ussel, *Corrèze.*
Usses (*r.*), *Savoy.*
Ustica, *Lipari.*
Ustrialov, *Russ. Lang. & Lit.*
Usumasinta, *Palenqué.*
Usuri (*r.*), *Manichuria, Siberia.*
Utgarda-Loki, *Loki.*
Utica, *Barbary.*
Utila or Utilla, *Bay Islands, Ruatan.*
Utretcht, Union of, *William, Prince of Orange.*
Utricularia, *Bladderwort.*
Uvaria triloba, *Papaw.*
Uvula, *Palate.*

Vaagen, *Bergen.*
Vaagmaer, *Dealfish.*
Vaagoe, *Faröe Isles.*
Vacoa, *Screw Pine.*
Vacovia, *Albert Nyanza.*
Vacti, *Lates.*
Vacuum pan, *Sugar.*
Vadutz, *Liechtenstein.*
Vahalis (*r.*), *Waal.*
Vaigatch, *Vaygach.*
Vaigatz, *Vaygach.*
Vaisya, *Caste.*
Vala, *Witchcraft.*
Valaam, *Ladoga.*
Val d'Aran, *Pyrenees.*
Val del Bove, *Etna.*
Valdenses, *Waldenses.*
Valdez, *Spanish Lang. & Lit.*
Valdivia, *Chili.*
Valentia, *Britannia.*
Valentin, *Anatomy.*
Valerien, Mont, *Seine.*
Valesquez, Diego, *Cortés, Hernan.*
Valis (*r.*), *Waal.*
Valladolid, *Morelia.*
Valladolid la Nueva, *Comayagua.*
Vallejo, *California.*
Valognes, *Manche.*
Valparaiso corn, *Maize.*
Valteline, *Alps.*
Valvassor, *Vavasour.*
Vamospircs, *Haiducks.*
Vancouver, *Washington (ter.).*
Vancouver I., Herring, *Herring, Vancouver I.*
Van den Bosch, Cape, *Papua.*
Vanderhelst, *Painting.*
Vandyke (in dress), *Fashion.*
Vanessa, *Swift.*
Vanishing fractions, *Fractions, Vanishing.*
Vanishing point, *Perspective.*
Vannucci, Pietro, *Perugino.*
Vanozza, Rosa, *Alexander VI., Pope.*
Van Swieten, *Medicine, Hist. of.*
Vanua Levu, *Fiji Islands.*
Vaqueros, *Astarias.*
Var (*r.*), *Alpes Maritimes.*
Varan, *Monitor.*
Vardar (*r.*), *Turkey.*
Vardhamana, *Mahavira.*
Varenne, *Mayenne.*
Vargas, Don Juan de, *Alba.*
Variable cod, *Dorse.*
Varicolaria, *Archil.*
Varied monkey, *Cercopithecas.*
Variegated laurel, *Aucuba.*
Variou-Be, *Nossi-Be.*
Varvels, *Vervels.*
Vasa lactea, *Digestion.*
Vascular plants, *Spiral Vessels.*
Vascular turgescence, *Congestion of Blood.*
Vassili I., II., III., *Russia.*
Vassili Shouisky, *Russia.*
Vassy, *Marne, Haute.*
Vatavi, *Batavi.*
Vatazes, John, *Byzantine Empire.*
Vateria, *Sal.*
Vathy, *Samos.*
Vati Ambrym, *New Hebrides.*
Vaunks (*r.*), *Cape River.*
Vecht, *Overyssel, Rhine.*
Vecbte (*r.*), *Hanover.*
Veddahs, *Ceylon.*
Ved-el-Kebir (*r.*), *Tunis.*
Ved-el-Mehanah (*r.*), *Tunis.*
Vedius Pollio, *Slavery.*
Veenhuizen, *Pauper Colonies.*
Veere, *Campvere.*
Vega, *Almodovar del Campo.*
Vegetable brimstoue, *Lycopodiaceæ.*
Vegetable butter, *Avocado Pear.*
Vegetable jelly, *Gelatine.*
Vegetable leather, *Leathercloth.*
Vegetables for food, *Food.*
Vegetable silk, *Pula, Silk-cotton.*
Vegeto-alkalies, *Alkalimeter.*
Veglia, *Austria.*
'Veiled Prophet,' *Mohammedan Sects.*
Vein, contraction of, *Hydrodynamics.*
Veit Stoss, *Carving.*
Velebich (*mts.*), *Dalmatia.*
Velcia and Veleiates, *Velleia.*
Velekaia, *Peipus.*
Veleta (*mt.*), *Sierra Nevada.*
Velhas, Rio das, *Sao Francisco.*
Velikaia, *Pskov.*
Velino (*mt.*), *Apennines.*
Vellenore, *Pondicherry.*
Velvet leaf, *Cissampelos.*
Vena contracta, *Hydrodynamics.*
Venæ cavæ, &c., *Circulation.*
Vendidad, *Zend, and Zend-Avesta.*
Venedi, *Sarmatians.*
Venefica, *Witchcraft.*
Venephes, *Egypt.*
Venerable, *Reverend.*
Veneti, *Venice.*
Venetia, *Germany, Italy.*
Venetian-point, *Lace.*
Venice talc, *Steatite.*
Venice turpentine, *Pine.*
Venice white, *Baryta.*
Vennachar (*l.*), *Katrine (l.).*
Ventadour, Bernard de, *Troubadour.*
Ventilator, Archimedean screw, *Blowing-machines.*
Ventnor, temperature of, *Great Britain.*
Ventoux, Mont, *Vaucluse.*
Ventricles, *Brain, Circulation.*
Ventriculus succenturiatus, *Birds.*
Ventuare, *Orinico.*
Venus, *Planets.*
'Venus of Quinipily,' *Baud.*
Venus's comb, *Chervil.*
Venus's comb, *Murex.*
Venus's hair-stoue, *Rock-crystal.*
Venus's pencils, *Rock-crystal.*
Venus's slipper, *Carinaria.*
Vepris undnlata, *Xanthoxylum.*
Ver (*r.*), *Albans, St.*
Veratric acid, *Sabadilla.*
Verbas, *Bosnia.*
Verbena triphylla, *Aloysia.*
Vercingetorix, *Alesia, Caesar.*
Verdandi, *Nornae.*
Verde, Cape, *Africa.*
Verde di Corsica duro, *Diallage.*
Verdon, *Durance.*
Vere, *Campvere.*
Verkholensk, *Irkatsk.*
Vermandois, *Valois.*
Vermes, *Worms.*
Vermetus, *Serpula.*
Vermicular motion, *Peristaltic Motion.*
Vermilion Pass, *Saskatchewan.*
Vermillion (*r.*), *Ohio.*
Verneuil, E. de, *Russia.*
Vernon, Admiral, *Puerto Bello.*
Verocchio, *Sculptare.*
Veronica Giuliani, *Stigmatization.*
Verplancks Point, *Stony Point.*
Verres, *Sicily.*
Verrières, *Seine.*
Verrucæ, *Warts.*
Verte, *New Brunswick.*
Verticil, *Vegetable Physiology.*
Verticillate, *Leaves.*
Verulam, *Albans, St.*
Vespa and Vespidæ, *Wasp.*
Vespertilio, *Noctale.*
Vestibule, *Ear.*
Vestini, *Civita di Penné.*
Veto law, *Free Church of Scotland.*
Vexillum, *Papilionaceæ.*
Vexin, Counts of, *Standard.*
Vezere, *Dordogne.*
Vezzola (*r.*), *Teramo.*
Via Æmilia, *Reggio.*
Via Appia, *Appian Way.*
Via Dolorosa, *Jerusalem.*
Viaud, *Satire.*
Vicary, Thos., *Anatomy.*
Vichada, *Orinoco.*
Victor Harbor, *S. Aastralia.*
Victoria, *New Zealand.*
Victoria, *Seychelles Islands.*
Victoria (*r.*), *S. Australia.*
Victoria cross, *War Services.*
Victoria Falls, *Zambesi.*
Victoria Land, *Antarctic Ocean.*
Victualing bill, *Bill of Victualing.*
Vidal, Peire, *Troubadour.*
Vidoe, *Eider.*
Vidua, *Whydaw Bird.*
Viena Mountains, *Ætolia.*
Vienna (treaty), *Germany.*
Vienna white, *Chalk.*
Vienne (*r.*), *Charente, Loire.*
Vieque, *Virgin Islands.*
Vierländer, *Bergedorf.*
Vigita Magna, *Zambesi.*
Vigo Bay, *Spain.*
Vigors, *Ornithology.*
Vile and Ve, *Odin.*
Vilia (*r.*), *Nienen, Vilno.*
Villach, *Alps.*
Villa del Fuerte, *Fuerte.*
Village-system, *India.*
Villalobos, *Spanish Lang. & Lit.*
Villani, Giovanni, *Italy.*
Villars, *Succession Wars.*
Villa Rufini, *Columbarium.*
Villa Viciosa, battle of, *Vendome.*
Villenage service, *Tenure of Land.*
Villeroy, Marshal, *Ramillies.*
Villiers, *Buckingham, Duke of.*
Vilui, *Lena,*
Vimieira, battle of, *Wellington.*
Viminal Hill, *Rome.*
Vincent of Beauvais, *Encyclopædia.*
Vin cotti, *Wine.*
Vin de paille, *Wine.*
Vindobona, *Vienna.*
Vine gall, *Coccas.*
Vinegar, wood, *Pyroligneous Acid.*
Vingoria, *Concan.*
Vin sec, *Wine.*
Vintschgau, *Tyrol.*
Violet moss, *Violet Stones.*
Violine, *Dye-stuffs.*
Violone, *Contra Bass.*
Viper's grass, *Scorzonera.*
Vique, *Vich.*
Vira, *Mahavira.*
Viretons, *Espringal.*
Virgilius, *Ireland.*
Virgin-Gorda, *Virgin Is.*
Virginia City, *Nevada.*
Virginian deer, *Cariacou.*
Virginian silk, *Asclepias.*
Virginian snakeroot, *Aristolochia.*
Virginian stock, *Stock.*
Virginius Rufus, T., *Rome.*
Virgin's milk, *Benzoin.*
Viroma, *Esthonia.*
Virtue, *Stoics.*
Virtues, *Cardinal Virtues.*
Visa, *Passport.*
Viscaya, *Biscay.*
Vischer, *Engraving.*
Vishni-Volotchek Canal, *Volga.*
Vishnugunga (*r.*), *Bhadrinath.*
Visnia, *Hypericaceæ, Waxtree.*
Visou, *Mink.*
Visparad, *Zend & Zend-Avesta.*
Visurgis, *Weser.*
Vital capacity, *Respiration.*
Vitalian, *Anastasius I. (emperor).*
Vitava, *Moldau.*
Vitellus, *Development of the Embryo.*
Viti Islands, *Fiji Islands.*
Viti Levu, *Fiji Islands.*
Vitim (*r.*), *Lena.*
Vitis, *Vine.*
Vitreous humor, *Eye.*
Vivace, *Tempo.*
Vivandier, *Sutler.*
Vivis, *Vevay.*
Vizezy, *Montbrison.*
Viziadroog, *Concan.*
Vizor, *Visor.*
Vladika, *Montenegro.*
Vladimir, Prince George of, *Russia.*
Vlieland, *Holland, North, Netherlands.*
Voandzou, *Gobbe.*
Vogelberg (*mt*), *Rhine.*
Vogelweide, Walther von der, *Walther von der Vogelweide.*
Vohlgemuth, *Engraving.*
Voice, *Registers of Voice.*
Voigtlaud, *Germany, Saxony.*
Voirlich, Ben, *Dumbartonshire*
Vojussa (*r.*), *Albania.*
Volatile alkali, *Ammonia.*
Volcano (*l.*), *Boracic Acid.*
Volkenrode, *Saxe-Coburg-Gotha.*
Volkhof (*r.*), *Ilmen.*
Volkhov, *Wolchow.*
Volme (*r.*), *Ladenscheid.*
Volsinii, *Rome.*
Volta (*r.*), *Ashanti, Dahomey.*
Voltameter, *Galvanism.*
Volterra, *Alabaster.*
Volterra, Daniele da, *Painting.*
Volturnum, *Capua.*
Völundr and Völundar-quida, *Scandinavian Lang. & Lit.*
Voluntary controversy, *U. P. Church, Voluntaryism.*
Voluntary education, *National Education.*
Vomiting of blood, *Stomach.*
Voorne, *Holland, South.*
Voragine, James de, *Golden Legend.*
Vorarlberg, *Rhine, Tyrol.*
Vorhate Island, *Timor-laut.*
Vormen, *Glommen.*
Vorosmarti, *Petöfi.*
Vorsova (*r.*), *Theiss.*
Vostermann, *Engraving.*
Voters, registration of, *Parliament.*
Vouet, Simon, *Painting.*
Vouga (*r.*), *Aveiro.*
Vouziers, *Ardennes.*
Voyutza (*r.*), *Turkey.*
Vrana (*l.*), *Dalmatia.*
Vricsland, *Friesland.*
Vrina (*r.*), *Bosnia.*
Vulcano, *Lipari.*
Vulpine opossum, *Phalanger.*
Vulturnus, *Campania.*
Vuna, *Fiji Islands.*
Vurla, *Clazomenæ.*
Vyborg, *Christian II.*
Vyrnwy (*r.*), *Montgomerysh.*
Vyse, Gen. Howard, *Pyramid.*
Vytchegda, *Dwina, N.*
Vytegra, *Onega.*

Waag, *Comorn, Danube.*
Wacaka des Indes, *Wikana.*
Wachita (*r.*), *Hot Springs.*

Wachtlieder, *Minnesingers.*
Wackenroder, *Romantic School.*
Wadt, *Vaud.*
Wady Kawas, *Bilma.*
Wady Magara. *Egypt.*
Waes, Pays de, *St. Nicholas.*
Waga, *Dwina.*
Wagel, *Gull.*
Wager-boat, *Boating.*
Wager of battel, *Battel.*
Wagon, the, *Ursa Major.*
Wah, *Panda.*
Wahsatch (*mts.*), *Utah.*
Waiau (*r.*), *New Zealand.*
Waigatz, *Vaygach.*
Wai-ini (*r.*), *Guiana, Brit.*
Waikato (*r.*), *New Zealand.*
Wain Ganga (*r.*), *Nagpur.*
Waitaki, *Otago.*
Wakatip, *Otago.*
Wakefield, battle of, *Yorkshire.*
Wakefield theory of colonization, *South Australia.*
Wake Robin, *Arum.*
Walderbsenkopf, *Prussia.*
Waldheimia, *Terebratula.*
Waldo, Peter, *Waldenses.*
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